United States
Department of
Agriculture

Natural
Resources
Conservation
Service

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

Soil Survey of Glades County, Florida

How to Use This Soil Survey

General Soil Map

The general soil map, which is a color map, 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.

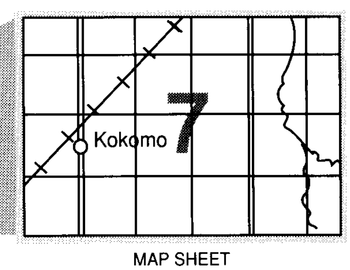
Detailed Soil Maps

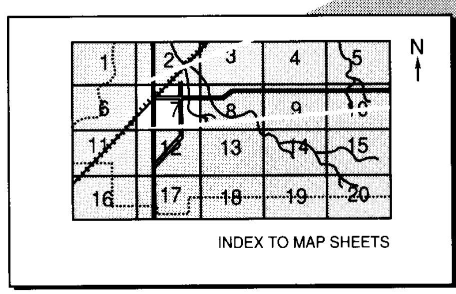
The detailed soil maps can be useful in planning the use and management of small areas.

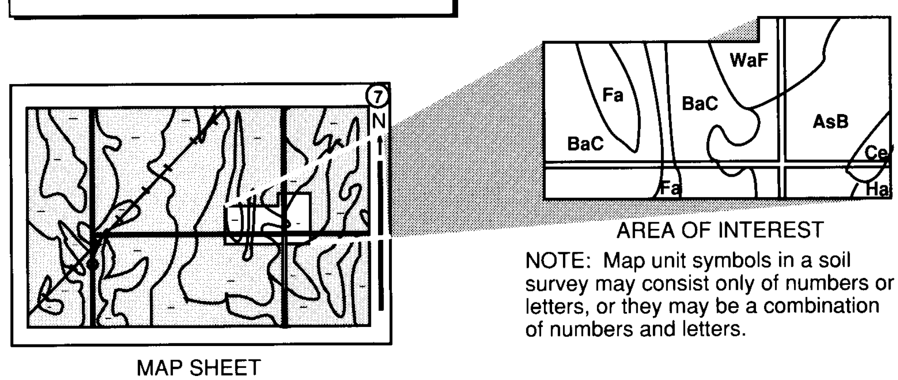
To find information about your area of interest, locate that area on the **Index to Map Sheets**. Note the number of the map sheet and turn to that sheet.

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

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **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 Natural Resources Conservation Service (formerly 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 1989. Soil names and descriptions were approved in 1991. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1989. This survey was made cooperatively by the Natural Resources Conservation Service and 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 Glades County Soil and Water Conservation District.

Cover: Improved pasture in an area of Immokalee sand.

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service home page on the World Wide Web. The address is http://www.nrcs.usda.gov (click on "Technical Resources").

Contents

Issued 2000

Foreword

This soil survey contains information that affects land use planning in this survey area. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

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

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations that affect various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

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 Natural Resources Conservation Service or the Cooperative Extension Service.

T. Niles Glasgow
State Conservationist
Natural Resources Conservation Service

Soil Survey of Glades County, Florida

By Lewis Carter, Doug Lewis, and Juan Vega, Natural Resources Conservation Service

Participating in the fieldwork were David Belz, Debbie Prevost, Ken Scalzone, Joe Falkenburg, Robert Murphy, Janet Engle, Tom D'Avello, Mary Ellen McFadden, and Rich Jaros, Natural Resources Conservation Service

United States Department of Agriculture, Natural Resources 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

GLADES COUNTY is in the south-central part of peninsular Florida (fig. 1). It is bordered on the north by Highlands County, on the west by Charlotte County, and on the south by Hendry County. The eastern border is the line of flow of the Kissimmee River and Lake Okeechobee. A large Seminole Indian Reservation is in the county.

Glades County has a total area of 488,000 acres, or about 763 square miles. It is a rural county and has little of the development pressure that occurs in neighboring counties. The population of the county is approximately 8,000. The county seat is Moore Haven, which is located in the southeastern part of the county near Lake Okeechobee. Moore Haven has a population of approximately 1,500.

The beef industry, citrus, and sugarcane are the main contributors to the local economy. Three small communities are in the county—Palmdale in the west and Buckhead Ridge and Lakeport in the east along Lake Okeechobee. In recent years, Buckhead Ridge and Lakeport have rapidly developed as resort areas for fishing.

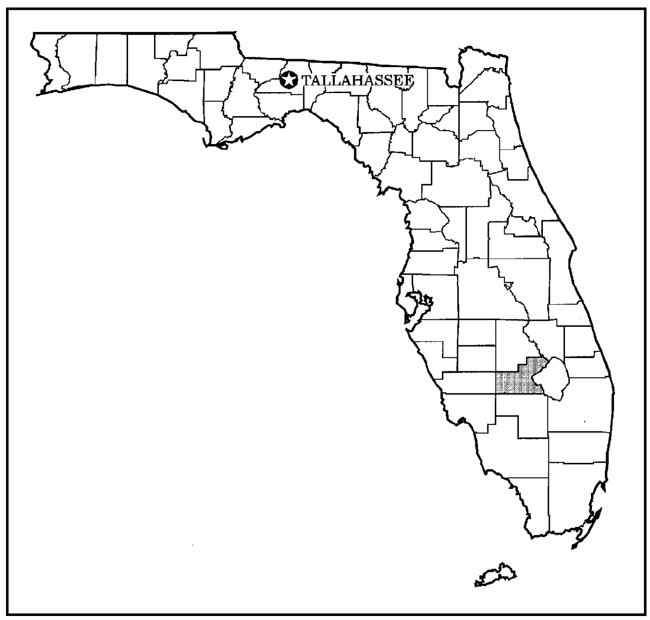


Figure 1.—Location of Glades County in Florida.

General Nature of the County

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

Climate

The climate of Glades County is characterized by long, warm, humid summers and by mild, dry winters.

The average temperature is 81 degrees F in summer and 62 degrees F in winter. The average annual rainfall is about 54 inches.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Archbold Biological Station in the period 1932 to 1989.

In summer, temperature varies only slightly from day to day. The temperature is tempered by cumulus clouds and rain showers during the late afternoon. The average daily maximum temperature is about 92 degrees, and the average daily minimum temperature is about 68 degrees. The highest recorded temperature, which occurred during May 1953, is 103 degrees.

In winter, temperature can vary considerably because of dry, cold air from the north. It is not uncommon for the temperature to fall from a daytime high in the 70's to a nighttime low in the 30's because of a passing cold front. The coldest temperature usually occurs the second night after a front passes.

In winter, the mean daily maximum temperature is 75 degrees and the mean daily minimum temperature is 48 degrees. The lowest recorded temperature, which occurred during January 1982, is 13 degrees. Freezing temperatures can be expected several times from mid-November to the end of March, mostly in late December and in January. They usually occur just before sunrise. Very rarely does the temperature not get above 32 degrees during the day. Frost can severely damage vegetables, new growth on citrus trees, and improved pasture grasses, especially in the lower areas of the county.

Rainfall is seasonally distributed. Nearly 60 percent of the average annual precipitation falls from June through September. Most of the rainfall in summer comes as thundershowers of short duration during the afternoon and early evening. Lightning activity can be intense in these storms, and sometimes 2 or 3 inches of rain falls in 1 to 2 hours.

Rains that last all day are rare in summer. When such rains occur, they are usually associated with a tropical storm. Rainfall in winter and spring is generally less intense than the summer thundershowers but may last 24 hours or more.

Nearly all of the precipitation in Glades County falls as rain. Hail falls occasionally late in the spring and early in the summer, but the hailstones generally are small and cause little damage. Snow is very rare.

Tropical storms can occur at any time from June through November but are most common in August and September. These storms can produce high winds and very heavy rainfall. They can cause considerable damage and can cause flooding in low-lying areas.

Periods of dry weather can occur during any season but are most common in winter and spring. Dry periods are more damaging in April and May than in other months because of the higher temperatures and the effects these conditions have on crops and pasture grasses. Forest fires and muck fires are more prevalent during these times. Prescribed burning requires special care during dry periods.

Prevailing winds generally are southerly in spring and summer and northerly in fall and winter. Wind speed generally ranges from 8 to 15 miles per hour during the day and usually drops below 8 miles per hour at night.

History

Valerie Coffey contributed information for this section.

Florida became a territory of the United States in 1821, and Escambia and St. Johns Counties were formed. In the period 1824 to 1887, Alachua, Hillsborough, Manatee, and Desoto Counties were formed. In 1921, several counties were formed from Desoto County, among them was Glades County. Moore Haven became the county seat and remains so today.

In the early days of the county, much of the economy was tied to the fishing industry on Lake Okeechobee. Daily shipments of fresh fish were made to the coast by way of the Caloosahatchee River. Moore Haven, which was founded in 1924 by James A. Moore, was the center of this activity. Mr. Moore purchased 100,000 acres in the Moore Haven area and resold large areas through his company, the South Florida Land Company.

Moore Haven prospered until a devastating hurricane occurred in 1926. Large areas of Glades County were isolated by floodwater for days. Many small towns that were beginning to become established, such as Citrus Center, Hall City, and Tasmania, never recovered and were abandoned. Many businesses shut down, banks failed, and land payments ceased.

Hydrology

Kenneth M. Campbell, geologist, Florida Geological Survey, helped to prepared this section.

Two regional aquifer systems are important in Glades County: the surficial and intermediate aquifer systems *(11)*. The Floridan aquifer system, although utilized in the past, contains nonpotable water. The concentration of chloride or sulfate or both is more than 250 milligrams per liter in the Glades County area *(3)*.

The surficial aquifer system consists of undifferentiated surficial sands and shell beds, limestone, and marl from the Caloosahatchee/Fort Thompson and Tamiami Formations. These formations contain water under unconfined, or water table, conditions. The base of the surficial aquifer system consists of relatively impermeable beds of regional extent in the Peace River Formation. The thickness of the surficial aquifer system ranges from about 20 to 100 feet.

The intermediate aquifer system consists primarily of permeable beds in the Peace River Formation and in the Arcadia Formation where it is not in hydraulic communication with the Floridan aquifer system.

The permeable beds are typically interbedded with impermeable beds, and the water is under confined conditions. In Glades County, the intermediate aquifer system ranges from about 90 to more than 225 feet in thickness.

Water Quality

Water quality is highly variable in the surficial and intermediate aquifer systems but generally is better than that of the underlying Floridan aquifer system. Analyses of water samples indicate that generally the water is hard (13 to 755 milligrams per liter) and that about one-half of the wells in the county have a concentration of total dissolved solids of more than 500 milligrams per liter *(5)*. Sulfate, iron, chloride, and color are all highly variable. The concentrations of sulfate, iron, and chloride commonly exceed standards. The concentration of ammonia exceeds 0.5 milligrams per liter in some of the water in the county *(8)*.

Mineral Resources

Quartz-sand and limestone are produced in Glades County *(12)*. Quartz-sand is mined in the vicinity of Ortona from beds that are tentatively assigned to the Peace River Formation. These sands are characteristically coarse and are mined for use in concrete and asphalt, as fine aggregate, and as filter bed materials. Limestone is mined from an area adjacent to the northwest shore of Lake Okeechobee and from an area west of Moore Haven. It is used as base material for roads.

Farming

The soils and climate in Glades County are well suited to a variety of agricultural crops and enterprises. Beef, citrus, and sugarcane are the most apparent enterprises. There is limited production of forestry products.

Raising cattle is the major agricultural enterprise in the county. Most of this industry consists of cow-calf operations on pastureland and rangeland. About 58,000 head of cattle are in the county. Calves are sold and shipped to the Midwest for finishing. About 142,725 acres of improved pasture and 280,000 acres of native range are in the county. Many breeds of cattle, including Hereford, Angus, Brahman, and various crosses, are produced in the county. Improved pasture and hay grasses in the county include bahiagrass, pangolagrass, hermarthia, and white clover.

Recently, citrus planting has increased significantly in the county. Advances in water management and irrigation have made the production of citrus practical in areas of the poorly drained soils on flatwoods. About 9,000 acres of citrus is in the county.

Most of the citrus is grown for the production of juice. Early varieties of oranges and grapefruit are sometimes packed as fresh fruit.

Sugarcane is grown in large areas of organic soils south of Lake Okeechobee. These areas have been extensively drained. In recent years, some varieties of sugarcane have been developed for mineral soils. About 37,000 acres was used for sugarcane in 1989.

Small scale vegetable or fruit operations are scattered throughout the county. Most of these operations are in cleared areas of native range, and watermelon is the most commonly grown crop. Other crops include tomatoes, cucumbers, peppers, and squash.

How This Survey Was Made

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

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept or model of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area 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-vegetation-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 color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

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

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

This survey area was mapped in detail. The map units are narrowly defined. Map unit boundaries were plotted and verified at closely spaced intervals. The detail of mapping was selected to meet the anticipated long-term use of the survey, and the map units were designed to meet the needs for that use.

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those of the soils in adjacent survey areas. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey 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, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The components of one map unit can occur in another but in a different pattern.

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

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soils of the Flatwoods

The two general soil map units in this group consist dominantly of nearly level, poorly drained and moderately well drained, sandy soils that have a dark, sandy subsoil.

1. Pomello-Immokalee

Nearly level, moderately well drained and poorly drained, sandy soils that have an organic-stained subsoil

This map unit is in association with major drainageways, such as Fisheating Creek. It is in slightly elevated areas near the drainageways.

The natural vegetation is scattered slash pine, scrub oak, saw palmetto, and pineland threeawn.

This map unit makes up 12,115 acres, or about 2$^1/_2$ percent of the county. It is 70 percent Pomello soils, 10 percent Immokalee soils, and 20 percent other soils.

Pomello soils are moderately well drained. Typically, the surface layer is dark gray fine sand 3 inches thick. The subsurface layer is gray and light gray fine sand to a depth of 55 inches. The subsoil is black fine sand to a depth of 65 inches. The substratum is dark brown fine sand to a depth of 80 inches or more.

Immokalee soils are poorly drained. Typically, the surface layer is very dark gray sand about 8 inches thick. The subsurface layer is gray and white sand to a depth of 38 inches. The subsoil extends to a depth of 80 inches or more. The upper 10 inches of the subsoil is black sand. Below this to a depth of 55 inches is yellowish brown sand. The lower part of the subsoil is brown sand.

Of minor extent in this map unit are Basinger and Myakka soils. Basinger soils are in slightly lower positions on the landscape than the major soils and do not have a well developed subsoil. Myakka soils are in landscape positions similar to those of the major soils and have a subsoil within a depth of 30 inches.

Most areas of this map still support natural vegetation and are used for native range.

This map unit is moderately suited to citrus and pasture. Water control and droughtiness are the major management concerns.

2. Immokalee-Myakka

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

This map unit consists of poorly drained soils in areas of flatwoods interspersed with wet depressions. It is the general soil map unit of greatest extent in the county. It is mostly in the western part of the county.

The natural vegetation is slash pine, saw palmetto, gallberry, pineland threeawn, chalky bluestem, and creeping bluestem.

This map unit makes up 218,188 acres, or about 45 percent of the county. It is 60 percent Immokalee soils, 30 percent Myakka soils, and 10 percent other soils.

Typically, the surface layer of the Immokalee soils is very dark gray sand about 8 inches thick. The subsurface layer is gray and white sand to a depth of

38 inches. The subsoil extends to a depth of 80 inches or more. The upper 10 inches of the subsoil is black sand. Below this to a depth of 55 inches is yellowish brown sand. The lower part of the subsoil is brown sand.

Typically, the surface layer of the Myakka soils is very dark gray fine sand about 3 inches thick. The subsurface layer is grayish brown and light brownish gray fine sand to a depth of about 27 inches. The subsoil is black and dark brown fine sand to a depth of 45 inches. The substratum is brown fine sand to a depth of 80 inches or more.

Of minor extent in this map unit are Basinger, EauGallie, Malabar, and Oldsmar soils. Basinger soils are in slightly lower positions on the landscape than the major soils and do not have a well developed subsoil. EauGallie, Malabar, and Oldsmar soils are in landscape positions similar to those of the major soils and have a loamy subsoil below a depth of 40 inches.

Most areas of this map unit are used for improved pasture or still support natural vegetation and are used for livestock grazing.

This map unit is moderately suited to citrus and improved pasture. Wetness is the major management concern.

Soils in Sloughs and on Hammocks

The three general soil map units in this group consist dominantly of nearly level, poorly drained soils. Some of the soils are sandy throughout, some are loamy at a depth of 20 to 40 inches, some are loamy at a depth of more than 40 inches, and some are underlain by limestone at a depth of less than 40 inches.

3. Basinger-Valkaria

Nearly level, poorly drained soils that are sandy throughout

This map unit consists of poorly drained soils in sloughs. The largest area of this unit is in the Seminole Indian Reservation. This unit occurs in all areas of the county.

The natural vegetation is mostly blue maidencane, low panicums, wax-myrtle, and various other grasses.

This map unit makes up 83,990 acres, or about 17 percent of the county. It is 60 percent Basinger soils, 35 percent Valkaria soils, and 5 percent other soils.

Typically, the surface layer of the Basinger soils is gray fine sand about 6 inches thick. The subsurface layer is light gray fine sand to a depth of about 32 inches. The subsoil is dark brown fine sand to a depth of 40 inches. The substratum is brown and grayish brown fine sand to a depth of 80 inches or more.

Typically, the surface layer of the Valkaria soils is very dark gray fine sand about 4 inches thick. The subsurface layer is light gray fine sand to a depth of 13 inches. The subsoil is brownish yellow and very pale brown fine sand to a depth of 38 inches. The substratum extends to a depth of 80 inches or more. It is light brownish gray fine sand.

Of minor extent in this map unit are Astor, Felda, Floridana, Malabar, and Pineda soils. Astor and Floridana soils are in depressions and have black surface and subsurface layers that are more than 20 inches thick. Felda, Malabar, and Pineda soils have a loamy subsoil below a depth of 20 inches and are in landscapes positions similar to those of the major soils.

Large areas of this map unit have been cleared of natural vegetation and are used for improved pasture or for citrus or vegetable production.

This map unit is poorly suited to citrus and cultivated crops. The major management concern is wetness. The unit is moderately suited to improved pasture and to the production of pine trees. Seeding mortality due to the wetness is the major management concern affecting the production of pines.

4. Felda-Pineda-Malabar

Nearly level, poorly drained soils that have a loamy subsoil

This map unit consists of poorly drained soils on low, broad flats and in sloughs. Most areas of the unit are in the eastern part of the county. Smaller areas are scattered throughout the county.

The natural vegetation is slash pine, cabbage palm, saw palmetto, wax-myrtle, maidencane, panicums, bluestems, sand cordgrass, and other water-tolerant species.

This map unit makes up 92,404 acres, or about 19 percent of the county. It is about 40 percent Felda soils, 33 percent Pineda soils, 20 percent Malabar soils, and 7 percent other soils.

Typically, the surface layer of the Felda soils is black fine sand about 4 inches thick. The subsurface layer is light gray fine sand to a depth of 35 inches. The subsoil is grayish brown fine sandy loam to a depth of 43 inches. The substratum extends to a depth of 80 inches. It is light brownish gray extremely gravelly fine sand. It is up to 70 percent, by volume, shells and shell fragments.

Typically, the surface layer of the Pineda soils is gray fine sand about 4 inches thick. The subsurface layer is light gray fine sand to a depth of 11 inches.

Next is pale brown fine sand to a depth of about 22 inches. Next is light gray fine sand to a depth of 32 inches. The subsoil extends to a depth of 47 inches. It is grayish brown loamy fine sand and gray fine sandy loam. Intrusions of light gray fine sand are in the upper part of the subsoil. Below the subsoil to a depth of 80 inches or more is light gray fine sand mixed with about 10 percent shell fragments.

Typically, the surface layer of the Malabar soils is black fine sand about 8 inches thick. The subsurface layer is light gray fine sand to a depth of 35 inches. The upper part of the subsoil extends to a depth of 42 inches. It is brownish yellow fine sand. Below this is grayish brown fine sandy loam to a depth of 60 inches. The substratum to a depth of 80 inches or more is grayish brown fine sand. The lower 10 inches of the substratum has shell fragments and pockets of loamy material.

Of minor extent in this map unit are Astor, Basinger, Floridana, and Valkaria soils. Astor and Floridana soils are in depressions. Astor soils have black surface and subsurface horizons that are more than 20 inches thick. Asto soils do not have a loamy subsoil. Floridana soils have a black surface horizon that is less than 20 inches thick. Basinger and Valkaria soils are in landscape positions similar to those of the major soils and do not have a loamy subsoil.

Most areas of this map unit support natural vegetation or improved pasture and are used for livestock grazing.

This map unit is poorly suited to citrus and cultivated crops. Wetness is the major management concern. The unit is moderately suited to improved pasture and the production of pine trees. Seedling mortality and an equipment limitation due to the wetness are the major management concerns affecting the production of pine.

5. Pople-Boca-Hallandale

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

This map unit consists of poorly drained soils in areas of hammocks and cabbage palm flatwoods. Most areas of this map unit are in the eastern part of the county.

The natural vegetation is cabbage palm, live oak, slash pine, saw palmetto, and various grasses.

This map unit makes up 44,701 acres, or about 9 percent of the county. It is 40 percent Pople soils, 37 percent Boca soils, 15 percent Hallandale soils, and 8 percent other soils.

Typically, the surface layer of the Pople soils is dark gray fine sand about 8 inches thick. The subsurface layer is light gray fine sand to a depth of 15 inches. The upper part of the subsoil, to a depth of 25 inches, is light brownish yellow fine sand. The next part, to a depth of 30 inches, is white fine sand intermixed with calcareous material. The lower part, to a depth of 38 inches, is light gray fine sandy loam. The upper part of the substratum, to a depth of 48 inches, is light gray fine sand and loamy sand. The next part, to a depth of 56 inches, is gray loamy sand and fine sand. The lower part, to a depth of 80 inches, is light gray fine sand and loamy fine sand mixed with about 10 percent shell fragments.

Typically, the surface layer of the Boca soils is dark gray fine sand about 4 inches thick. The subsurface layer is light gray fine sand to a depth of 21 inches. The upper part of the subsoil is brown fine sand to a depth of 25 inches. The lower part is light brownish gray fine sandy loam to a depth of 34 inches. Below this is fractured limestone bedrock. Solution holes are common in the limestone. They vary from 4 inches to several feet in width.

Typically, the surface layer of the Hallandale soils is very dark gray fine sand about 4 inches thick. The subsurface layer is dark gray fine sand to a depth of 9 inches. The subsoil is brown fine sand to a depth of 19 inches. Below this is limestone.

Of minor extent in this map unit are Basinger, Ft. Drum, and Smyrna soils. Basinger soils are in lower positions on the landscape than the major soils and do not have calcareous material or limestone within a depth of 80 inches. Ft. Drum and Smyrna soils are in landscape positions similar to those of the major soils. Ft. Drum soils do not have limestone. Smyrna soils have an organic-stained subsoil.

Most areas of this map unit support natural vegetation and are used for livestock grazing. Some areas have been cleared and are used for improved pasture.

This map unit is poorly suited to citrus and cultivated crops. Wetness is the major management concern. The unit is well suited to improved pasture and the production of pine trees. Seedling mortality due to the wetness is the major management concern affecting the production of pine trees.

Soils in Swamps and Marshes

The two general soil map units in this group consist dominantly of nearly level, poorly drained and very poorly drained soils. Some of the soils are organic and are underlain by limestone, some have a mucky or sandy surface layer and are sandy throughout, and some have a loamy subsoil.

6. Lauderhill-Plantation-Pahokee

Nearly level, very poorly drained, organic soils underlain by limestone

This map unit is in the southeast corner of the county, south of Lake Okeechobee. Areas of this unit have been cleared and drained for the production of sugarcane.

This map unit makes up 20,284 acres, or about 4 percent of the county. It is 38 percent Lauderhill soils, 26 percent Plantation soils, 16 percent Pahokee soils, and 20 percent other soils.

Typically, the surface and subsurface layers of the Lauderhill soils are black muck about 25 inches thick. Below this is hard limestone.

Typically, the surface layer of the Plantation soils is black muck about 10 inches thick. Below this is black sand to a depth 17 inches. Next is gray sand to a depth of 30 inches. Below this is hard limestone.

Typically, the surface and subsurface layers of the Pahokee soils are black muck about 48 inches thick. Below this is hard limestone.

Of minor extent in this map unit are Okeelanta and Terra Ceia soils. These soils are in landscape positions similar to those of the major soils. They do not have limestone within a depth of 80 inches.

Most areas of this map unit have been drained and are used for the production of sugarcane.

This map unit is well suited to improved pasture and sugarcane. It is not suited to citrus or the production of pine trees. Wetness is the major management concern.

7. Floridana-Astor-Felda

Nearly level, very poorly drained and poorly drained, mucky and sandy soils; some that have a loamy subsoil; subject to frequent flooding

This map unit consists of soils adjacent to major drainageways. The areas of this unit are interspersed with shallow creek channels. They are frequently flooded.

The natural vegetation is cypress, water oak, bays, red maple, cabbage palm, maidencane, ferns, and other water-tolerant species.

This map unit makes up 16,638 acres, or about 3 1/2 percent of the county. It is 40 percent Floridana soils, 30 percent Astor soils, 22 percent Felda soils, and 8 percent other soils.

Floridana soils are very poorly drained. Typically, the surface layer is black fine sand to a depth of 19 inches. The subsurface layer is light brownish gray fine sand to a depth of 25 inches. The subsoil is gray fine sandy loam to a depth of 45 inches. The substratum is gray fine sand to a depth of 80 inches.

Astor soils are very poorly drained. Typically, the surface layer is black fine sand about 34 inches thick. Below this to a depth of 80 inches or more is dark gray fine sand.

Felda soils are poorly drained. Typically, the surface layer is black fine sand about 4 inches thick. The subsurface layer is light gray fine sand to a depth of 35 inches. The subsoil is grayish brown fine sandy loam to a depth of 43 inches. The substratum to a depth of 80 inches is light brownish gray extremely gravelly fine sand. It is up to 70 percent, by volume, shells and shell fragments.

Of minor extent in this map unit are Basinger, Chobee, Okeelanta, and Valkaria soils. Basinger and Valkaria soils are in slightly higher landscape positions than the major soils and do not have a thick, black surface layer or a loamy subsoil. Chobee and Okeelanta soils are in landscape positions similar to those of the major soils. Chobee soils have a loamy horizon within a depth of 20 inches. Okeelanta soils are organic.

Most areas of this map unit support natural vegetation and are used for wildlife habitat.

This map unit is not suited to cultivated crops, citrus, pasture, or the production of pine trees. The major management concern is flooding.

Detailed Soil Map Units

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

A map unit delineation on a map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils or miscellaneous areas. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some "included" areas that belong to other taxonomic classes.

Most included soils have properties 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, or similar, inclusions. They may or may not be mentioned in the map unit description. Other included soils and miscellaneous areas, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, inclusions. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The included areas of contrasting soils or miscellaneous areas are mentioned in the map unit descriptions. A few included areas may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

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

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit 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, 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, slope, stoniness, salinity, 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, Basinger fine sand, depressional, is a phase of the Basinger series.

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

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

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

Table 2 gives the acreage and proportionate extent of each map unit. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

Soil Descriptions

2—Hallandale fine sand

This poorly drained soil is on low, broad flats and on cabbage palm hammocks. Individual areas are irregular in shape. They range from 5 to 50 acres in size. Slopes are smooth, are slightly convex or concave, and range from 0 to 2 percent.

Typically, the surface layer is very dark gray fine sand about 4 inches thick. The subsurface layer is dark gray fine sand to a depth of about 9 inches. The subsoil is brown fine sand to a depth of about 19 inches. The underlying material to a depth of 80 inches or more is limestone.

Included in mapping are small areas of Boca, Ft. Drum, Malabar, Pineda, and Pople soils. Boca soils are moderately deep over limestone. Ft. Drum, Malabar, Pineda, and Pople soils are very deep. In 80 percent of the areas of this map unit, the included soils make up 10 to 20 percent of the mapped area. In the remaining 20 percent, the included soils make up more than 20 percent or less than 10 percent.

The seasonal high water table is at a depth of 6 to 18 inches from June through September. Permeability is rapid. Available water capacity is very low.

The natural vegetation consists of South Florida slash pine, cabbage palm, and live oak. The understory vegetation consists of saw palmetto, wax-myrtle, chalky bluestem, and panicums.

This map unit is not suited to cultivated crops. Wetness is a severe limitation.

This map unit is poorly suited to the production of citrus. Wetness is a limitation. Water-control measures are needed to efficiently remove excess surface water. If citrus trees are to be established, maintaining the water table below the root zone is necessary. Citrus rows should be bedded, and irrigation should be provided for periods of low rainfall. Regular applications of soil amendments and fertilizer are needed for maximum production.

This map unit is suited to pasture and hayland. Wetness is a limitation. Bahiagrass and pangolagrass grow well if managed properly. Water-control measures should be established. Regular applications of soil amendments and fertilizer are needed. Plant vigor can be maintained by controlling grazing.

This map unit is suited to woodland. An equipment limitation, seedling mortality, and plant competition are moderate limitations. Harvesting during drier periods of the year, increasing seedling planting rates, and properly preparing the site help to minimize these limitations. Slash pine and South Florida slash pine are preferred for planting.

This map unit has low potential for range productivity. The dense overstory of pine, oak, and cabbage palm allows only a limited potential for production of chalky bluestem and panicums, which are the most desirable range grasses. These areas, however, provide shelter for cattle from the intense heat in summer. This soil is in the Wetland Hardwood Hammocks range site.

This map unit is not suited to urban uses. Wetness and depth to bedrock are severe limitations.

This map unit is not suited to recreational purposes. Wetness, sandy textures, and depth to bedrock are severe limitations.

The capability subclass is IVw. The woodland ordination symbol is 3W.

4—Valkaria fine sand

This poorly drained soil is in areas of the low flatwoods, in sloughs, and in poorly defined drainageways. Individual areas are irregular in shape. They range from 10 to more than 100 acres in size. Slopes are smooth, are slightly concave or convex, and range from 0 to 2 percent.

Typically, the surface layer is very dark gray fine sand about 4 inches thick. The subsurface layer is light gray fine sand to a depth of about 13 inches. The subsoil is fine sand and extends to a depth of 38 inches. It is brownish yellow in the upper part and very pale brown in the lower part. The substratum to a depth of 80 inches is light brownish gray fine sand.

Included in mapping are small areas of Basinger, Immokalee, Malabar, Myakka, and Pineda soils. Basinger soils do not have higher-chroma material. Immokalee and Myakka soils have a well defined, dark horizon. Malabar and Pineda soils have a horizon that has an increase in clay content. In 90 percent of the areas of this map unit, the included soils make up 2 to 24 percent of the mapped area. In the remaining 10 percent, the included soils make up more than 24 percent or less than 2 percent.

The seasonal high water table is within a depth of 12 inches from June through September. Permeability is rapid. Available water capacity is low.

Most areas of this map unit are woodland. The overstory vegetation consists of slash pine and South Florida slash pine. The understory vegetation consists of maidencane, chalky bluestem, sand cordgrass, pineland threeawn, and saw palmetto.

This map unit is poorly suited to cultivated crops. Wetness and seasonal droughtiness are limitations. They can be minimized by a properly designed water-control system that provides for the removal of excess surface water and for the addition of irrigation water during dry periods. Fertilizer and lime should be added according to the specific needs of the crop.

This map unit is poorly suited to the production of citrus. Wetness is a limitation. If a carefully designed water-control system is installed, citrus trees can be grown. Planting the citrus trees on bedded rows and maintaining a cover crop minimize the wetness and help to control erosion. Irrigation should be available during extended dry periods.

This map unit is suited to pasture and hayland. Wetness is a limitation. A water-control system that removes excess surface water after heavy rainfall is needed to ensure good yields. Properly managed pangolagrass, bahiagrass, and white clover are the best adapted pasture plants. Plant vigor can be maintained by controlling grazing.

This map unit is suited to woodland. It has a severe equipment limitation. Seedling mortality and plant competition are moderate limitations. Harvesting should be planned for the drier periods of the year. Increasing the planting rate helps to compensate for the seedling mortality. Proper site preparation helps to minimize the plant competition. Slash pine and South Florida slash pine are the preferred trees for planting.

This map unit has moderately high potential for range productivity and for producing significant amounts of blue maidencane, chalky bluestem, and bluejoint panicum. To maintain the range, a management plan should include such considerations as grazing time and the number of cattle per acre. This soil is in the Slough range site.

This map unit is poorly suited to urban uses. Wetness and poor filtering capacity are limitations. Mounding with suitable fill material to raise the filter field a sufficient distance above the seasonal high water table improves septic system performance and increases the filtering capacity.

This map unit is poorly suited to recreational purposes. Wetness and sandy textures are limitations. A properly designed drainage system and suitable topsoil or resurfacing help to minimize these limitations.

The capability subclass is IVw. The woodland ordination symbol is 8W.

5—Smyrna fine sand

This poorly drained soil is in broad areas of flatwoods. Individual areas are irregular shape. They range from 15 to more than 100 acres in size. Slopes are smooth, are slightly concave or convex, and range from 0 to 2 percent.

Typically, the surface layer is very dark gray fine sand about 4 inches thick. The subsurface layer is gray fine sand to a depth of about 15 inches. The subsoil is fine sand and extends to a depth of 20 inches. It is black in the upper part and black and brown in the lower part. The substratum is fine sand and extends to a depth of 80 inches. It is brown in the upper part and dark grayish brown in the lower part.

Included in mapping are small areas of Basinger, Immokalee, Myakka, Oldsmar, Pomello, and Valkaria soils. Basinger and Valkaria soils do not have a dark horizon. Immokalee soils have a dark horizon at a depth of 30 to 50 inches. Myakka soils have a dark horizon at a depth of 20 to 30 inches. Oldsmar soils have a horizon that has an increase in clay content. The moderately well drained Pomello soils do not have dark horizons. In 80 percent of the areas of this map unit, the included soils make up 0 to 23 percent of the mapped area.

The seasonal high water table is at a depth of 6 to 18 inches from June through September. Permeability is rapid in the surface and subsurface layers and moderately rapid or moderate in the subsoil. Available water capacity is moderate.

Most areas of this map unit are used for improved pasture or native range. The natural vegetation consists of slash pine, saw palmetto, gallberry, fetterbush, pineland threeawn, chalky bluestem, creeping bluestem, Indiangrass, low panicum, and various other native grasses.

This map unit is poorly suited to cultivated crops. Wetness and seasonal droughtiness are limitations. A properly designed water-control system that provides for the removal of excess water and for the addition of water during dry periods helps to minimize the wetness and the seasonal droughtiness. Fertilizer and lime should be added according to the specific needs of the crop.

This map unit is poorly suited to the production of citrus. If a carefully designed water-control system is installed, citrus trees can be grown. Citrus trees should be planted on bedded rows to maintain root systems well above the seasonal high water table. Plant cover should be maintained between the rows to help control erosion of the beds. Irrigation should be available during extended dry periods.

This map unit is suited to pasture and hay crops. Wetness is a limitation. A water-control system that removes excess water after heavy rainfall is needed to ensure good yields. Properly managed pangolagrass, improved bahiagrass, and white clover are the best adapted pasture plants. Plant vigor can be maintained by controlling grazing.

This map unit is suited to woodland. An equipment limitation, seedling mortality, and plant competition are moderate limitations. Harvesting should be planned for the drier periods of the year. Increasing the planting rate helps to compensate for the seedling mortality. Proper site preparation helps to minimize the plant competition. Trees should be planted in bedded rows to ensure highest productivity. Slash pine and South Florida slash pine are the preferred trees for planting.

This map unit has moderate potential for the production of desirable range plants and for producing significant amounts of creeping bluestem, chalky bluestem, Indiangrass, and other desirable range plants. As range condition deteriorates, pineland threeawn and saw palmetto dominate the site. Management of the native range should include the use of cross fencing, cattle rotations to help maintain plant vigor, and careful consideration of stocking rates. This soil is in the South Florida Flatwoods range site.

This map unit is poorly suited to urban uses. Wetness and poor filtering capacity are limitations. Mounding with suitable fill material to raise the filter field a sufficient distance above the seasonal high water table improves septic system performance. Sites for dwellings without basements should also be mounded before construction to prevent moisture problems.

This map unit is poorly suited to recreational purposes. Wetness and sandy textures are limitations. A properly designed drainage system and suitable topsoil or resurfacing help to minimize these limitations.

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

6—Malabar fine sand

This poorly drained soil is in narrow to broad sloughs and in poorly defined drainageways in areas of the flatwoods. Individual areas are irregular in shape. They range from 10 to more than 100 acres in size. Slopes are smooth, are slightly concave or convex, and range from 0 to 2 percent.

Typically, the surface layer is black fine sand about 8 inches thick. The subsurface layer is light gray fine sand to a depth of about 35 inches. The subsoil extends to a depth of 60 inches. In the upper part, it is brownish yellow fine sand that has yellowish brown mottles. In the lower part, it is grayish brown fine sandy loam. The substratum is grayish brown fine sand to a depth of 80 inches.

Included in mapping are small areas of Basinger, Felda, Pineda, and Valkaria soils. Basinger and Valkaria soils do not have a horizon that has an increase in clay content. Felda and Pineda soils have a horizon that has an increase in clay content at a depth 20 to 40 inches. Also included are soils that have a layer of organic staining directly above the loamy part of the subsoil. In 90 percent of the areas of this map unit, the included soils make up 2 to 23 percent of the mapped area. In the remaining 10 percent, the included soils make up more than 23 percent or less than 2 percent.

The seasonal high a water table is within a depth of 6 inches from June through October. Permeability is rapid in the surface layer, the subsurface, and the upper layers of the subsoil. Permeability is slow or very slow in the lower part of the subsoil. Available water capacity is moderate.

Most areas of this map unit are used for improved pasture or native range. The natural vegetation consists of scattered slash pine, saw palmetto, cabbage palm, maidencane, panicums, and sedges.

This map unit is poorly suited to cultivated crops. Wetness is a limitation. A properly designed water-control system that provides for the removal of excess water helps to minimize the wetness. Fertilizer and lime should be added according to the specific needs of the crop.

This map unit is poorly suited to the production of citrus. Wetness is a limitation. If a well designed water-control system is installed, citrus trees can be grown. The system should maintain the water table at the proper depth and provide for irrigation. Trees should be planted on bedded rows, and a cover crop should be maintained between the rows to help control erosion of the beds.

This map unit is suited to pasture and hay crops. Wetness is a limitation. Water-control measures are needed to remove excess surface water after heavy rainfall. Pangolagrass, improved bahiagrass, and white clover are the best adapted pasture plants. Grazing should be controlled to prevent overgrazing of the site and weakening of the plants.

This map unit is suited to woodland. An equipment limitation and plant competition are moderate limitations. Seedling mortality is a severe limitation. Harvesting should be planned for the drier periods of the year. Increasing the planting rate helps to compensate for the seedling mortality. Proper site preparation helps to minimize the plant competition. Trees should be planted in bedded rows to ensure highest productivity. Slash pine and South Florida slash pine are the preferred trees for planting.

This map unit has moderate to high potential for production of desirable range plants and for producing significant amounts of creeping bluestem, panicums, and maidencane. Management of the native range should include the use of cross fencing, cattle rotation to maintain plant vigor, and careful consideration of stocking rates. This soil is in the Slough range site.

This map unit is poorly suited to urban uses. Wetness and the slow or very slow permeability are limitations. Mounding with suitable fill material to raise the filter field a sufficient distance above the seasonal high water table improves septic system performance. Sites for dwellings without basements should also be mounded before construction to prevent moisture problems.

This map unit is poorly suited to recreational purposes. Wetness and sandy textures are limitations. A properly designed drainage system and suitable top soil or resurfacing help to minimize these limitations.

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

7—Pople fine sand

This poorly drained soil is on low flats and on cabbage palm hammocks. Individual areas are irregular in shape. They range from 10 to more than 100 acres in size. Slopes are smooth, are slightly concave or convex, and range from 0 to 2 percent.

Typically, the surface layer is dark gray fine sand about 8 inches thick. The subsurface layer is light gray fine sand to a depth of about 15 inches. The subsoil extends to a depth of 38 inches. It is light brownish yellow fine sand in the upper part, white loamy fine sand that has calcareous material intermixed in the next part, and light gray fine sandy loam in the lower part. The substratum extends to a depth of 80 inches. It is light gray fine sand and loamy fine sand in the upper part, gray loamy sand and fine sand in the next part, and light gray fine sand and loamy fine sand mixed with shell fragments in the lower part.

Included in mapping are small areas of Ft. Drum, Malabar, Pineda, and Valkaria soils. Ft. Drum and Valkaria soils do not have a horizon that has an increase in clay content. Malabar soils have sandy surface and subsurface layers that have a combined thickness of more than 40 inches. Pineda soils do not contain calcium carbonate material. In 80 percent of the areas of this map unit, the included soils make up 9 to 25 percent of the mapped area. In the remaining 20 percent, the included soils make up more than 25 percent or less than 9 percent.

The seasonal high water table is at a depth of 6 to 18 inches from June through September. Permeability is moderately slow or slow. Available water capacity is moderate.

Most areas of this map unit support native vegetation consisting of cabbage palm, live oak, saw palmetto, wax-myrtle, pineland threeawn, and various bluestems. Some areas have been cleared for improved pasture.

This map unit is poorly suited to cultivated crops. Wetness is a limitation. A properly designed water-control system that provides for removal of excess surface water helps to minimize the wetness. The system should also provide irrigation water during dry periods. Fertilizer and lime should be added according to the specific needs of the crop.

This map unit is poorly suited to the production of citrus. If a carefully designed water-control system is installed, citrus trees can be grown. The system should maintain the water table at the proper depth and provide for irrigation. Trees should be planted on bedded rows, and a cover crop should be maintained between the rows to help control erosion.

This map unit is suited to pasture and hayland. Wetness is a limitation. Water-control measures are needed to remove excess surface water after heavy rainfall. Well managed pangolagrass and bahiagrass are the best adapted pasture plants. Plant vigor can be maintained by controlling grazing.

This map unit is suited to woodland. An equipment limitation and plant competition are moderate limitations, and seedling mortality is a severe limitation. Planning harvesting for the drier periods of the year, increasing seedling planting rates, and using proper site preparation help to minimize these limitations. Slash pine and South Florida slash pine are the preferred trees for planting.

This map unit has moderate to high potential for production of desirable range plants and for producing considerable amounts of South Florida bluestem, chalky bluestem, creeping bluestem, and Indiangrass.

Management of the native range should include the use of cross fencing, cattle rotation to maintain plant vigor, and careful consideration of stocking rates. This soil is in the South Florida Flatwoods range site.

This map unit is poorly suited to urban uses. Wetness and the moderately slow or slow permeability are limitations. Mounding with suitable fill material to raise the filter field a sufficient distance above the seasonal high water table improves septic system performance. Sites for dwellings without basements should also be mounded before construction to prevent moisture problems.

This map unit is poorly suited to recreational purposes. Wetness and sandy textures are limitations. A properly designed water-control system and suitable topsoil or resurfacing help to minimize these limitations.

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

8—Gator muck, depressional

This very poorly drained soil is in marshes, swamps, and wet depressions. This map unit is ponded for much of the year. Individual areas are irregular in shape. They range from 5 to more than 50 acres in size. Slopes are smooth and concave. They are 0 to 1 percent.

Typically, the surface layer is black muck about 33 inches thick. The substratum extends to a depth of 80 inches. It is black loamy fine sand in the upper part, dark olive gray fine sandy loam in the next part, and gray fine sand in the lower part.

Included in mapping are small areas of Chobee, Felda, Floridana, Tequesta, and Terra Ceia soils. Chobee, Felda, Floridana, and Tequesta soils are mineral soils. Terra Ceia soils have organic layers that have a combined thickness of more than 52 inches. In 85 percent of the areas of this map unit, the included soils make up 10 to 20 percent of the mapped area. In the remaining 15 percent, the included soils make up more than 20 percent or less than 10 percent.

The seasonal high water table is at the surface to 24 inches above the surface from June through April. Permeability is rapid in the organic matter and moderate in the mineral horizons. Available water capacity is high.

Most areas of this map unit support natural vegetation consisting of pond cypress, red maple, pond pine, cabbage palm, bald cypress, maidencane, sawgrass, arrowhead, pickerelweed, and St. Johnswort.

This map unit is not suited to cultivated crops, pasture and hay crops, the production of citrus, or woodland. Wetness is a severe limitation.

This map unit has very high potential for range plants and for producing significant amounts of maidencane and cutgrass. It is capable of producing excellent forage for cattle during the normally dry winter when the native range is depleted. Management practices should include the use of cross fencing, cattle rotation to maintain plant vigor, and careful consideration of stocking rates. This soil is in the Fresh Water Marsh and Pond range site.

This map unit is not suited to urban uses. Wetness, ponding, and subsidence are severe limitations.

This map unit is not suited to recreational purposes. Wetness, ponding, and excess humus are severe limitations.

The capability subclass is VIIw. This map unit has not been assigned a woodland ordination symbol.

9—Sanibel muck, depressional

This very poorly drained soil is in marshes, swamps, and depressions that have been drained. It is in the southeastern part of the county near Lake Okeechobee. Individual areas are irregular in shape. They range from 10 to 100 acres in size. Slopes are smooth and concave. They range from 0 to 2 percent.

Typically, the surface layer extends to a depth of 18 inches. It is black muck in the upper 10 inches and black sand in the lower part. The substratum extends to a depth of 80 inches. It is dark gray sand in the upper part and light brownish gray sand in the lower part.

Included in mapping are small areas of Dania, Lauderhill, Pahokee, Plantation, and Terra Ceia soils. Dania, Lauderhill, Pahokee, and Terra Ceia soils are organic soils. Plantation soils are moderately deep over limestone. In 90 percent of the areas of this map unit, the included soils make up 0 to 24 percent of the mapped area.

The seasonal high water table is at a depth of 12 inches to 12 inches above the surface from June through April. Permeability is rapid. Available water capacity is high.

Most areas of this map unit have been drained and are used for the production of sugarcane. A few small areas still support natural vegetation consisting of maidencane, sawgrass, arrowhead, and pickerelweed.

This map unit is suited to cultivated crops. Wetness and subsidence are limitations. A well designed and maintained water-control system is needed to minimize the oxidation of the organic layer. Lime and fertilizer should be added according to the specific needs of the crop.

This map unit is not suited to the production of citrus. Wetness and subsidence are severe limitations.

This map unit is suited to pasture and hay crops. Wetness and subsidence are limitations. A water-control system that maintains the water table near the surface minimizes oxidation of the organic layer. Very high yields of pangolagrass, white clover, hermarthria, bahiagrass, and St. Augustine grass are possible if the soil is properly fertilized. Fertilizer that contains phosphates, potash, and trace elements is needed. Proper liming practices are critical to the establishment of improved pastures.

This map unit is not suited to woodland. Wetness and subsidence are severe limitations.

This map unit has high potential for desirable range plants and for producing considerable amounts of maidencane and cutgrass. This soil can provide excellent forage for cattle during the winter months and dry periods. Management should include the use of cross fencing, cattle rotation to maintain plant vigor, and careful consideration of stocking rates. This soil is in the Fresh Water Marsh and Pond range site.

This map unit is not suited to urban uses. Wetness and poor filtering capacity are severe limitations.

This map unit is not suited to recreational purposes. Wetness and excess humus are severe limitations.

The capability subclass is VIIw. This map unit has not been assigned a woodland ordination symbol.

10—Felda fine sand

This poorly drained soil is on broad, low flats and in large drainageways in areas of flatwoods. Individual areas are irregular in shape. They range from 20 to more than 100 acres in size. Slopes are smooth and are slightly convex or concave. They are 0 to 1 percent.

Typically, the surface layer is black fine sand about 4 inches thick. The subsurface layer extends to a depth of about 35 inches. It is light gray fine sand that has light yellowish brown mottles. The subsoil extends to a depth of about 43 inches. It is grayish brown fine sandy loam that has olive brown mottles. The substratum to a depth of 80 inches is light brownish gray fine sand that has shell fragments.

Included in mapping are small areas of Basinger, Floridana, and Pineda soils. Basinger soils do not have a horizon that has an increase in clay content. Floridana soils have a thick, dark surface layer. Pineda soils have a weakly defined subsoil. In 95 percent of the areas of this map unit, the included soils make up 0 to 20 percent of the mapped area.

The seasonal high water table is within a depth of 12 inches from July through March. Permeability is moderate or moderately rapid. Available water capacity is low.

Most areas of this map unit are used for improved pasture or native range. Some areas have been cleared for the production of citrus. The natural vegetation consists of scattered slash pine, cabbage palm, bluestems, sand cordgrass, maidencane, and panicums.

This map unit is poorly suited to cultivated crops. Wetness is a limitation. A water-control system is needed to remove excess surface water and to provide subsurface irrigation during dry periods. Fertilizer should be added according to the specific needs of the crop.

This map unit is poorly suited to the production of citrus. Wetness is a limitation. If a well designed water-control system is used, citrus trees can be grown. Citrus trees should be bedded to help maintain the root system above the water table. Plant cover should be maintained on the rows to help control erosion of the beds. Irrigation should be available during extended dry periods.

This map unit is suited to pasture and hay crops. Wetness is a limitation. A water-control system that removes excess surface water after heavy rainfall is needed to ensure good yields. Properly managed pangolagrass, bahiagrass, and white clover are the best adapted pasture plants. Plant vigor can be maintained by controlling grazing.

This map unit is suited to woodland. An equipment limitation and plant competition are moderate limitations. Seedling mortality is a severe limitation. Harvesting should be planned for the drier periods of the year. Increasing the planting rate helps to compensate for the seedling mortality. Proper site preparation helps to minimize the plant competition. Trees should be planted in bedded rows to ensure highest productivity. Slash pine and South Florida slash pine are the preferred trees for planting.

This map unit has moderate to high potential for the production of desirable range plants and for producing significant amounts of maidencane, chalky bluestem, and bluejoint panicum. Carpetgrass, an introduced plant, tends to dominate the site under conditions of excessive grazing. Management of native range should include cattle rotation, the use of cross fencing, and consideration of the number of cattle per acre based on the condition of the range and the size of the site. This soil is in the Slough range site.

This map unit is poorly suited to urban uses. Wetness and poor filtering capacity are limitations.

Building sites should be mounded before construction. Mounding with suitable fill material to raise the filter field a sufficient distance above the seasonal high water table improves septic system performance and increases the filtering capacity.

This map unit is poorly suited to recreational purposes. Wetness and sandy textures are limitations. A properly designed drainage system and suitable topsoil or resurfacing help to minimize these limitations.

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

11—Tequesta muck, drained

This very poorly drained soil is mainly on the flood plain along the Kissimmee River in former oxbows and dendritic patterns leading into the river. Other areas of the soil are in marshes and depressions that have been drained. Individual areas are irregular in shape. They range from 5 to more than 300 acres in size. Slopes are smooth and concave. They are 0 to 1 percent.

Typically, the upper 9 inches of the surface layer is black muck. The lower part of the surface layer, to a depth of about 24 inches, is dark gray fine sand. The subsurface layer extends to a depth of about 36 inches. It is gray fine sand that has yellowish brown mottles. The subsoil extends to a depth of about 42 inches. It is gray fine sandy loam that has intrusions of gray fine sand. The substratum to a depth of 80 inches is dark grayish brown fine sand.

Included in mapping are small areas of Basinger, Floridana, Gator, and Sanibel soils. The poorly drained Basinger soils do not have a horizon that has an increase in clay content or an organic surface layer. Floridana soils do not have an organic surface layer. Gator soils are organic. Sanibel soils do not have a horizon that has an increase in clay content. In 90 percent of the areas of this map unit, the included soils make up 2 to 23 percent of the mapped area. In the remaining 10 percent, the included soils make up more than 23 percent or less than 2 percent.

The water table is within a depth of 12 inches from January through December. Permeability is rapid in the surface and subsurface layers and moderately slow in the subsoil. Available water capacity is high.

Most areas of this map unit have been cleared and drained and are used for improved pasture. A few small areas still support natural vegetation consisting of arrowhead, maidencane, pickerelweed, sawgrass, and other water-tolerant grasses.

This map unit is poorly suited to cultivated crops. Wetness and subsidence are limitations. A well designed and maintained water-control system is needed to minimize the oxidation of the organic layer.

This map unit is not suited to the production of citrus. Wetness is a severe limitation.

This map unit is suited to pasture and hay crops. Wetness and subsidence are limitations. A water-control system that maintains the water table near the surface minimizes oxidation of the organic layer. High yields of white clover, bahiagrass, and pangolagrass are possible if the soil is properly fertilized. Fertilizer that contains phosphates, potash, and trace elements is needed. Proper liming practices are critical to the establishment of improved pastures.

This map unit is not suited to woodland. Wetness is a severe limitation.

This map unit has high potential for desirable range plants and for producing significant amounts of maidencane and cutgrass. This soil provides excellent forage for cattle during the winter months and dry periods. Management should include the use of cross fencing, cattle rotation to maintain plant vigor, and careful consideration of stocking rates. This soil is in the Fresh Water Marsh and Pond range site.

This map unit is not suited to urban uses. Wetness and the moderately slow permeability in the subsoil are severe limitations.

This map unit is not suited to recreational purposes. Wetness and excess humus are severe limitations.

The capability subclass is IIIw. This map unit has not been assigned a woodland ordination symbol.

12—Chobee loamy fine sand, depressional

This very poorly drained soil is in wet depressions. It is ponded for much of the year. Individual areas are generally circular in shape. They range from 3 to 40 acres in size. Slopes are smooth and concave. They are 0 to 1 percent.

Typically, the surface layer is very dark gray loamy fine sand about 9 inches thick. The subsoil extends to a depth of 50 inches. It is grayish brown sandy clay loam in the upper part and gray fine sandy loam in the lower part. The substratum extends to a depth of 80 inches. In the upper part, it is light yellowish brown fine sand that has about 15 percent shell fragments. In the lower part, it is pale brown sand that has about 25 percent shell fragments.

Included in mapping are small areas of Astor, Felda, Floridana, Gator, Sanibel, and Tequesta soils. Astor and Sanibel soils do not have a horizon that has an increase in clay content. The poorly drained Felda soils do not have a dark surface layer. Floridana soils have a horizon that has an increase in clay content at a depth of 20 to 40 inches. Gator soils are organic. Tequesta soils have organic surface and subsurface layers. Also included are soils that have a fine-textured subsoil below a depth of 40 inches and soils that have a thin layer of muck on the surface. In 80 percent of the areas of this map unit, the included soils make up 3 to 23 percent of the mapped area. In the remaining 20 percent, the included soils make up more than 23 percent or less than 3 percent.

The seasonal high water table is at the surface to 24 inches above the surface from June through March. Permeability is slow or very slow. Available water capacity is moderate.

Most areas of this map unit still support natural vegetation consisting of arrowhead, maidencane, pickerelweed, sawgrass, and other water-tolerant grasses.

This map unit is not suited to cultivated crops, the production of citrus, pasture, hayland, or woodland. Wetness and ponding are severe limitations.

This map unit has moderate to high potential for range productivity and for producing significant amounts of maidencane and cutgrass. Areas of this soil are valuable assets in a native range management program. To maintain the range, a management plan should include such considerations as cross fencing, grazing time, and the number of cattle per acre. This soil is in the Fresh Water Marsh and Pond range site.

This map unit is not suited to urban uses. Ponding, wetness, and the slow or very slow permeability are severe limitations.

This map unit is not suited to recreational purposes. Ponding, the slow or very slow permeability, and wetness are severe limitations.

The capability subclass is VIIw. This map unit has not been assigned a woodland ordination symbol.

13—Boca fine sand

This poorly drained soil is in areas of cabbage palm flatwoods adjacent to sloughs, depressions, and drainageways. Individual areas are irregular in shape. They range from 10 to more than 75 acres in size. Slopes are smooth and are slightly convex or concave. They are 0 to 1 percent.

Typically, the surface layer is dark gray fine sand about 4 inches thick. The subsurface layer is light gray fine sand to a depth of 21 inches. The subsoil extends to a depth of 34 inches. It is brown fine sand in the upper part and light brownish gray fine sandy loam and sandy loam mixed with marl and shell in the lower part. The underlying material to a depth of 80 inches is fractured limestone.

Included in mapping are small areas of Felda, Ft. Drum, Hallandale, and Pople soils. Felda, Ft. Drum, and Pople soils are not underlain by limestone. Hallandale soils are shallow over limestone. In 95 percent of the areas of this map unit, the included soils make up 0 to 2 percent of the mapped area.

The seasonal high water table is at a depth of 6 to 18 inches from June through February. Permeability is moderate. Available water capacity is low.

Most areas of this map unit still support natural vegetation consisting of scattered areas of pine and cabbage palm and an understory of saw palmetto, chalky bluestem, creeping bluestem, lopsided Indiangrass, and pineland threeawn. A few small areas have been cleared for improved pasture and the production of sugarcane.

This map unit is poorly suited to cultivated crops. Wetness is a limitation. It can be minimized by a properly designed water-control system that provides for removal of excess surface water. The system should also provide irrigation water during dry periods. Fertilizer and lime should be added according to the specific needs of the crop.

This map unit is poorly suited to the production of citrus. Wetness is a limitation. If a carefully designed water-control system is installed, citrus trees can be grown. Control of the water table is vital to the success of growing citrus on this soil. Planting the citrus trees on bedded rows and maintaining a cover crop minimize the wetness and help to control erosion. Irrigation should be available during dry periods.

This map unit is suited to pasture and hayland. Wetness is a limitation. A water-control system that removes excess surface water after heavy rainfall is needed to ensure good yields. Well managed pangolagrass and bahiagrass are the best adapted pasture plants. Plant vigor can be maintained by controlling grazing.

This map unit is suited to woodland. An equipment limitation, seedling mortality, and plant competition are moderate limitations. Harvesting should be planned for the drier periods of the year. Increasing the planting rate helps to compensate for the seedling mortality. Proper site preparation helps to minimize the plant competition. South Florida slash pine is the preferred tree for planting.

This map unit has moderate to high potential for producing large amounts of South Florida bluestem, chalky bluestem, creeping bluestem, and Indiangrass. To maintain the range, a management program should include such considerations as cross fencing, grazing time, and the number of cattle per acre. This soil is in the Cabbage Palm Flatwoods range site.

This map unit is poorly suited to urban uses. Wetness, poor filtering capacity, and depth to bedrock are limitations. Mounding with suitable fill material to raise the filter field a sufficient distance above the seasonal high water table improves septic system performance and increases the filtering capacity. Sites for dwellings without basements should also be mounded before construction to prevent moisture problems.

This map unit is poorly suited to recreational purposes. Wetness and sandy textures are limitations. A properly designed drainage system and suitable topsoil or resurfacing help to overcome these limitations.

The capability subclass is IIIw. The woodland ordination symbol is 6W.

14—Basinger fine sand

This poorly drained soil is on low flats and in sloughs and poorly defined drainageways. Individual areas are irregular in shape. They range from 10 to more than 50 acres in size. Slopes are smooth and are slightly convex or concave. They are 0 to 1 percent.

Typically, the surface layer is gray fine sand about 6 inches thick. The subsurface layer is light gray fine sand to a depth of about 32 inches. The subsoil is dark brown fine sand to a depth of about 40 inches. The substratum extends to a depth of 80 inches. It is dark brown fine sand in the upper part, grayish brown fine sand that has dark brown streaks in the next part, and grayish brown fine sand in the lower part.

Included in mapping are small areas of Astor, Immokalee, Myakka, and Valkaria soils. Astor soils have a thicker surface layer than that of the Basinger soil. Immokalee and Myakka soils have a well developed, dark horizon. Valkaria soils have higher chroma than the Basinger soil. In 85 percent of the areas of this map unit, the included soils make up 10 to 25 percent of the mapped area. In the remaining 15 percent, the included soils make up more than 25 percent or less than 10 percent.

The seasonal high water table is within a depth of 12 inches from June through November. Permeability is rapid. Available water capacity is moderate.

Most areas of this map unit still support natural vegetation consisting of scattered slash pine, blue maidencane, low panicum, wax-myrtle, and sand cordgrass. A few areas of this map unit have been cleared and are used for improved pasture.

This map unit is poorly suited to cultivated crops. Wetness is a limitation (fig. 2). A properly designed and maintained water-control system that provides for the removal of excess surface water helps to minimize the wetness. The system should also provide irrigation water during dry periods. Fertilizer and lime should be added according to the specific needs of the crop.

This map unit is poorly suited to the production of citrus. Wetness is a limitation. If a carefully designed water-control system is installed, citrus trees can be grown. Control of the water table is vital to the success of growing citrus on this soil. The citrus trees should be planted on bedded rows, and irrigation should be provided during dry periods. A cover crop should be maintained between rows.

This map unit is suited to pasture and hay crops. Wetness is a limitation. A water-control system that removes excess surface water after heavy rainfall is needed to ensure good yields. Well managed pangolagrass, bahiagrass, and white clover are the best adapted pasture plants. Plant vigor can be maintained by controlling grazing.

This map unit is suited to woodland. An equipment limitation, seedling mortality, and plant competition are severe limitations. Harvesting should be planned for the drier periods of the year to minimize the equipment limitation. Increasing the planting rate helps to compensate for the seedling mortality. Proper site preparation helps to minimize the plant competition. South Florida slash pine and slash pine are the preferred trees for planting.

This map unit has moderate to high potential for producing large amounts of blue maidencane and bluejoint panicum. To maintain the range, a range management plan should include such considerations as cross fencing, grazing time, and the number of cows per acre. This soil is in the Slough range site.

This map unit is poorly suited to urban uses. Wetness and poor filtering capacity are limitations. Mounding with suitable fill material to raise the filter field a sufficient distance above the seasonal high water table improves septic system performance and increases the filtering capacity. Sites for dwellings without basements should also be mounded and backfilled before construction to prevent moisture problems.

This map unit is poorly suited to recreational purposes. Wetness and sandy textures are limitations. A properly designed drainage system and suitable topsoil or resurfacing help to minimize these limitations.

Figure 2.—A canal in an area of Basinger fine sand. Canals are a common form of water management in areas of poorly drained soils in the county.

The capability subclass is IVw. The woodland ordination symbol is 8W.

15—Pineda fine sand

This poorly drained soil is on broad, low flats and in large drainageways in areas of flatwoods. Individual areas are irregular in shape. They range from 20 to more than 100 acres in size. Slopes are smooth and are slightly concave or convex. They are 0 to 1 percent.

Typically, the surface layer is gray fine sand about 4 inches thick. The subsurface layer is light gray fine sand to a depth of about 11 inches. The upper subsoil is very pale brown fine sand to a depth of about 22 inches. A depleted layer of light gray fine sand extends to a depth of about 32 inches. The lower subsoil extends to a depth of 47 inches. It is grayish brown fine sandy loam in the upper part and gray loamy fine sand in the lower part. The substratum to a depth of 80 inches is stratified light gray fine sand mixed with shell fragments.

Included in mapping are small areas of Basinger, Felda, Floridana, and Malabar soils. Basinger soils do not have a weakly defined subsoil. Felda soils have a strongly developed subsoil. The very poorly drained Floridana soils have a thick, dark surface layer. Malabar soils have a horizon that has an increase in clay content below a depth of 40 inches. In 95 percent of the areas of this map unit, the included soils make up 0 to 20 percent of the mapped area.

The seasonal high water table is within a depth of 12 inches from June through November. Permeability is slow or very slow in the upper subsoil. Available water capacity is low.

Most areas of this map unit are used for improved pasture or native range. Some areas have been cleared for the production of citrus. The natural vegetation consists of scattered slash pine, cabbage palm, bluestems, sand cordgrass, maidencane, and panicums.

This map unit is poorly suited to cultivated crops. Wetness is a limitation. A properly designed and maintained water-control system that provides for the removal of excess surface water and that provides subsurface irrigation during dry periods is needed. Fertilizer and lime should be added according to the specific needs of the crop.

This map unit is poorly suited to the production of citrus. Wetness is a limitation. If a well designed water-control system is installed, citrus trees can be grown. The trees should be bedded to help maintain the root system above the water table. Plant cover should be maintained on the rows to help control erosion of the beds.

This map unit is suited to pasture and hay crops. Wetness is a limitation. A water-control system is needed to remove excess surface water after heavy rainfall. Properly managed pangolagrass, bahiagrass, and white clover are the best adapted pasture plants. Plant vigor can be maintained by controlling grazing.

This map unit is suited to woodland. An equipment limitation and plant competition are moderate limitations. Seedling mortality is a severe limitation. Harvesting should be planned for the drier periods of the year in order to minimize the equipment limitation. Increasing the planting rate helps to compensate for the seedling mortality. Proper site preparation helps to minimize the plant competition. South Florida slash pine and slash pine are the preferred trees for planting.

This map unit has moderate to high potential for producing significant amounts of maidencane, chalky bluestem, and bluejoint panicum. Carpetgrass, an introduced plant, tends to dominate the site under conditions of excessive grazing. Management of the native range should include cattle rotation, the use of cross fencing, and consideration of the number of cattle per acre based on the condition of the range and the size of the site. This soil is in the Slough range site.

This map unit is poorly suited to urban uses. Wetness and the slow permeability are limitations. Mounding with suitable fill material to raise the filter field a sufficient distance above the seasonal high water table improves septic system performance. Sites for dwellings without basements should also be mounded before construction to prevent moisture problems.

This map unit is poorly suited to recreational purposes. Wetness, sandy textures, and the slow or very slow permeability are limitations. A properly designed sewage disposal and drainage system and suitable topsoil or resurfacing help to minimize these limitations.

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

16—Floridana fine sand, depressional

This very poorly drained soil is in wet depressions. It is ponded for much of the year. Individual areas generally are circular or elongated in shape. They range from 3 to 40 acres in size. Slopes are smooth and concave. They are 0 to 1 percent.

Typically, the surface layer is black fine sand about 19 inches thick. The subsurface layer is light brownish gray fine sand to a depth of about 25 inches. The subsoil is gray fine sandy loam to a depth of about 45 inches. The substratum to a depth of 80 inches is light gray sandy loam.

Included in mapping are small areas of Astor, Felda, Gator, Sanibel, and Tequesta soils. Astor soils do not have a horizon that has an increase in clay content. The poorly drained Felda soils do not have a thick, dark surface layer. Gator soils are organic. Sanibel and Tequesta soils have an organic surface layer. Also included are areas of soils that have a fine-textured subsoil below a depth of 40 inches. In 80 percent of the areas of this map unit, the included soils make up 3 to 23 percent of the mapped area. In the remaining 20 percent, the included soils make up more than 23 percent or less than 3 percent.

The seasonal high water table is at the surface to 24 inches above the surface from June through March. Permeability is slow or very slow. Available water capacity is moderate.

Most areas of this map unit support natural vegetation consisting of arrowhead, maidencane, pickerelweed, sawgrass, and other water-tolerant grasses.

This map unit is not suited to cultivated crops, the production of citrus, pasture, hayland, or woodland. Wetness and ponding are severe limitations.

This map unit has moderate to high potential for producing significant amounts of maidencane and cutgrass. Areas of this soil are valuable assets in a native range management program. Cattle graze these areas during the winter when other range plants are of reduced value and quantity and the water table is below the surface. To maintain the range, a management plan should include such considerations as grazing time and the number of cattle per acre.

This soil is in the Fresh Water Marsh and Pond range site.

This map unit is not suited to urban uses. Wetness, ponding, and the slow or very slow permeability are severe limitations.

This map unit is not suited to recreational purposes. Wetness and ponding are severe limitations.

The capability subclass is VIIw. This map unit has not been assigned a woodland ordination symbol.

17—Okeelanta muck, depressional

This very poorly drained soil is in depressions, marshes, and swampy areas. It is ponded for much of the year. Individual areas generally are circular or elongated in shape. They range from 10 to 100 acres in size. Slopes are smooth and concave. They are 0 to 1 percent.

Typically, the surface layer is black muck about 31 inches thick. The substratum extends to a depth of 80 inches. It is very dark gray fine sand in the upper part and grayish brown fine sand in the lower part.

Included in mapping are small areas of Astor, Floridana, Lauderhill, Pahokee, Terra Ceia, and Tequesta soils. Astor and Floridana soils are mineral throughout. Lauderhill soils are moderately deep over limestone. Pahokee soils are deep over limestone. Terra Ceia soils have organic layers that have a combined thickness of more than 52 inches. Tequesta soils have a shallow organic layer. In 90 percent of the areas of this map unit, the included soils make up 5 to 10 percent of the mapped area. In the remaining 10 percent, the included soils make up more than 10 percent or less than 5 percent.

The seasonal high water table is at the surface to 12 inches above the surface from June through January. Permeability is rapid. Available water capacity is high.

Most areas of this map unit support native vegetation consisting of sawgrass, sedges, maidencane, primrose willow, and other water-tolerant plants.

This map unit is not suited to cultivated crops, the production of citrus, pasture, hayland, or woodland. Wetness and ponding are severe limitations.

This map unit has high potential for range productivity and for producing significant amounts of maidencane and cutgrass. Areas of this soil produce high quality forage during droughty periods and winter when production of forage in other areas decreases significantly. Areas of this soil are a benefit to a well managed range plan. This soil is in the Fresh Water Marsh and Pond range site.

This map unit is not suited to urban uses. Ponding and poor filtering capacity are severe limitations.

This map unit is not suited to recreational purposes. Wetness and ponding are severe limitations.

This map unit is in capability subclass VIIw. This map unit has not been assigned a woodland ordination symbol.

19—Terra Ceia muck, drained

This very poorly drained soil is in marshes and swamps that have been drained. Individual areas are irregular in shape. They range from 25 to 300 acres in size. Slopes are smooth and concave. They are 0 to 1 percent.

Typically, the surface layer is black muck to a depth of 10 inches. The underlying material to a depth of 80 inches or more is also black muck.

Included in mapping are small areas of Lauderhill, Okeelanta, and Pahokee soils. Lauderhill soils are moderately deep over limestone. Okeelanta soils have organic layers that have a combined thickness of less than 52 inches. Pahokee soils are deep over limestone. In a few areas, the substratum of the included soils and the underlying material of the Terra Ceia soils below a depth of 52 inches consist of shell fragments, limestone, sand, or clay materials or a mixture of these. In 80 percent of the areas of this map unit, the included soils make up 0 to 22 percent of the mapped area.

The seasonal high water table is at the surface to 24 inches above the surface from June through April. Permeability is rapid. Available water capacity is very high.

This map unit is primarily used for the production of sugarcane.

This map unit is suited to cultivated crops. Wetness is a limitation. A well designed water-control system is needed for the production of cultivated crops. A water-control system that maintains the water table near the surface minimizes oxidation and subsidence of the organic matter. The soil can be neutralized by applying suitable amendments.

This map unit is not suited to the production of citrus. Wetness is a severe limitation.

This map unit is suited to pasture and hayland. Wetness is a limitation. A well designed and maintained drainage system is needed for best results. Bahiagrass and pangolagrass are the best adapted pasture plants. Fertilizer and soil amendments should be applied as required.

This map unit has high potential for producing significant amounts of maidencane and cutgrass.

Marshy areas of this soil produce high quality forage during droughty periods and winter when production of forage in other areas decreases significantly. To maintain the range, a management plan should include such considerations as grazing time and proper stocking rates. This soil is in the Fresh Water Marsh and Pond range site.

This map unit is not suited to woodland. Wetness is a severe limitation.

This map unit is not suited to urban uses. Wetness, subsidence, and poor filtering capacity are severe limitations.

The capability subclass is IIIw. This map unit has not been assigned a woodland ordination symbol.

20—EauGallie fine sand

This poorly drained soil is in areas of flatwoods adjacent to sloughs and streams. Individual areas are irregular in shape. They range from 10 to 50 acres in size. Slopes are smooth, are slightly convex or concave, and range from 0 to 2 percent.

Typically, the surface layer is very dark gray fine sand about 8 inches thick. The subsurface layer is gray fine sand to a depth of about 23 inches. The subsoil extends to depth of 55 inches. It is black fine sand in the upper part, very dark grayish brown fine sand in the next part, and light gray sandy clay loam in the lower part. The substratum to a depth of 80 inches or more is pale brown fine sand.

Included in mapping are small areas of Immokalee, Myakka, Oldsmar, and Smyrna soils. Immokalee, Myakka, and Smyrna soils do not have a horizon that has an increase in clay content. Oldsmar soils have surface and subsurface layers that have a combined thickness of more than 30 inches. Also included are soils that have a loamy or clayey layer within a depth of 40 inches. In 90 percent of the areas of this map unit, the included soils make up 9 to 13 percent of the mapped area. In the remaining 10 percent, the included soils make up more than 13 percent or less than 9 percent.

The seasonal high water table is at a depth of 6 to 18 inches from June through September. Permeability is moderate to slow. Available water capacity is low.

Most areas of this map unit are used for native range or improved pasture. The natural vegetation consists of slash pine, saw palmetto, gallberry, chalky bluestem, pineland threeawn, low panicums, creeping bluestems, and other native forbs and grasses.

This map unit is poorly suited to cultivated crops. Wetness is a limitation. A drainage system is needed to remove excess surface water and to control the seasonal high water table. A good system of water control also provides irrigation water. Fertilizer and lime should be added according to the needs of the specific crop.

This map unit is suited to the production of citrus. Wetness is a limitation. A well designed and maintained water-control system includes bedded rows, adequate drainage outlets, and plant cover to help control erosion.

This map unit is suited to pasture and hay crops. Wetness is a limitation. A water-control system is needed to remove excess surface water. Pangolagrass, bahiagrass, and clover are the best adapted species.

This map unit is suited to woodland. An equipment limitation, seedling mortality, and plant competition are moderate limitations. Harvesting should be scheduled for the drier periods to minimize the equipment limitation. Increasing the planting rate helps to compensate for the seedling mortality. Proper site preparation helps to minimize the plant competition. South Florida slash pine and slash pine are the preferred trees for planting.

This map unit has moderate potential for producing significant amounts of creeping bluestem, chalky bluestem, Indiangrass, and panicums. As range condition deteriorates, pineland threeawn and saw palmetto dominate the site. To avoid this deterioration, management should include the use of cross fencing, cattle rotations, and careful consideration of the number of cows per acre based on range condition and the size of the site. This soil is in the South Florida Flatwoods range site.

This map unit is poorly suited to urban uses. Wetness and the moderate to slow permeability are limitations. Mounding with suitable fill material to raise the filter field a sufficient distance above the seasonal high water table improves septic system performance and increases the filtering capacity. Sites for dwellings without basements should also be mounded before construction to prevent moisture problems. Other problems associated with wetness can be corrected by providing adequate drainage and outlets to control the high water table.

This map unit is poorly suited to recreational purposes. Wetness and sandy textures are limitations. A properly designed drainage system and suitable topsoil or resurfacing help to minimize these limitations.

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

22—Astor fine sand, depressional

This very poorly drained soil is in depressions and along the edges of swamps and marshes. It is ponded for much of the year. Individual areas generally are circular or elongated in shape. They range from 3 to 40 acres in size. Slopes are smooth and concave. They are 0 to 1 percent.

Typically, the surface layer is black fine sand about 34 inches thick. The substratum to a depth of 80 inches is dark gray fine sand.

Included in mapping are small areas of Basinger, Felda, Floridana, Gator, Okeelanta, Sanibel, and Tequesta soils. The poorly drained Basinger and Felda soils do not have a thick, dark surface layer. Floridana and Tequesta soils have a horizon that has an increase in clay content. Gator and Okeelanta soils are organic. Sanibel soils have an organic surface layer. Also included are soils that have a fine-textured subsoil below a depth of 40 inches and soils that have a dark surface layer that is less than 24 inches thick. In 80 percent of the areas of this map unit, the included soils make up 3 to 23 percent of the mapped area. In the remaining 20 percent, the included soils make up more than 23 percent or less than 3 percent.

The seasonal high water table is at the surface to 24 inches above the surface from June through January. Permeability is rapid. Available water capacity is low.

Most areas of this map unit support natural vegetation consisting of arrowhead, maidencane, pickerelweed, sawgrass, and other water-tolerant grasses.

This map unit is not suited to cultivated crops, the production of citrus, pasture, hayland, or woodland. Wetness and ponding are severe limitations.

This map unit has moderate to high potential for producing significant amounts of maidencane and cutgrass. Areas of this soil are valuable assets in a native range management program. Cattle graze these areas during the winter when other range plants are of reduced value and quantity and the water table is below the surface. Management considerations should include cattle rotation and the number of cows per acre based on range condition and the size of the site. This soil is in the Fresh Water Marsh and Pond range site.

This map unit is not suited to urban uses. Ponding and poor filtering capacity are severe limitations.

This map unit is not suited to recreational purposes. Wetness and ponding are severe limitations.

The capability subclass is VIw. This map unit has not been assigned a woodland ordination symbol.

23—Oldsmar sand

This poorly drained soil is in areas of flatwoods adjacent to sloughs and streams. Individual areas are irregular in shape. They range from 10 to 50 acres in size. Slopes are smooth, are slightly concave or convex, and range from 0 to 2 percent.

Typically, the surface layer is gray sand about 8 inches thick. The subsurface layer is sand and extends to a depth of 34 inches. It is light brownish gray in the upper part and white in the lower part. The subsoil extends to a depth of 80 inches. It is dark reddish brown sand in the upper part, olive sandy clay loam in the next part, and olive sandy loam in the lower part.

Included in mapping are small areas of EauGallie, Immokalee, Myakka, and Smyrna soils. EauGallie soils have a dark horizon within a depth of 30 inches. Immokalee, Myakka, and Smyrna soils do not have a horizon that has an increase in clay content. Also included are soils that have a loamy or clayey layer within a depth of 40 inches. In 90 percent of the areas of this map unit, the included soils make up 9 to 13 percent of the mapped area. In the remaining 10 percent, the included soils make up more than 13 percent or less than 9 percent.

The seasonal high water table is at a depth of 6 to 18 inches from June through September. Permeability is rapid in the surface and subsurface layers, moderate or moderately rapid in the upper part of the subsoil, and slow or very slow in the lower part of the subsoil. Available water capacity is low. Fertility and the content of organic matter are low.

Most areas of this map unit are used for native range or improved pasture. The natural vegetation consists of slash pine, saw palmetto, gallberry, chalky bluestem, pineland threeawn, low panicums, creeping bluestems, and other native forbs and grasses.

This map unit is poorly suited to cultivated crops. Wetness and seasonal droughtiness are limitations. They can be minimized by a properly designed water-control system that provides for the removal of excess surface water and the addition of irrigation water during dry periods. Fertilizer and lime should be added according to the specific needs of the crop.

This map unit is poorly suited to the production of citrus. Wetness is a limitation. If a carefully designed water-control system is installed, citrus trees can be grown. Planting the citrus trees on bedded rows and maintaining a cover crop minimize the wetness and help to control erosion. Irrigation should be available during extended dry periods.

This map unit is suited to pasture and hayland. Wetness is a limitation. A water-control system that removes excess surface water after heavy rainfall is needed to ensure good yields. Properly managed pangolagrass, bahiagrass, and white clover are the best adapted pasture plants. Plant vigor can be maintained by controlling grazing.

This map unit is suited to woodland. An equipment limitation, seedling mortality, and plant competition are moderate limitations. Harvesting should be planned for the drier periods of the year. Increasing the planting rate helps to compensate for the seedling mortality. Proper site preparation helps to minimize the plant competition. Slash pine and South Florida slash pine are the preferred trees for planting.

This map unit has moderate potential for range productivity and for producing significant amounts of creeping bluestem, chalky bluestem, Indiangrass, and panicums. As range condition deteriorates, pineland threeawn and saw palmetto dominate the site. To avoid this deterioration, management considerations should include the use of cross fencing, cattle rotations, and the number of cattle per acre based on range condition and the size of the site. This soil is in the South Florida Flatwoods range site.

This map unit is poorly suited to urban uses. Wetness and the slow or very slow permeability are limitations. Mounding with suitable fill material to raise the filter field a sufficient distance above the seasonal high water table improves septic system performance and increases the filtering capacity.

This map unit is poorly suited to recreational purposes. Wetness and sandy textures are limitations. A properly designed drainage system and suitable topsoil or resurfacing help to minimize these limitations.

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

24—Hallandale-Pople complex

This map unit consists of the very poorly drained Hallandale and poorly drained Pople soils on low, broad flats and cabbage palm hammocks. These soils occur as areas that are so intricately intermingled or so small that they could not be mapped separately at the scale selected for mapping. Individual areas are irregular in shape. They range from 5 to 50 acres in size. Slopes are smooth, are slightly convex or concave, and range from 0 to 2 percent.

The Hallandale soil makes up 30 to 60 percent of this map unit. It is in the slightly lower depressional areas. Typically, the surface layer is very dark gray fine sand about 4 inches thick. The subsurface layer is dark gray fine sand to a depth of about 9 inches. The subsoil is brown fine sand to a depth of about 19 inches. The underlying material to a depth of 80 inches is hard limestone.

The Pople soil makes up 20 to 40 percent of this map unit. It is in the slightly higher positions. Typically, the surface layer is dark gray fine sand about 8 inches thick. The subsurface layer is light gray fine sand to a depth of about 15 inches. The subsoil extends to a depth of 38 inches. In the upper part, it is light brownish yellow fine sand. In the next part, it is white fine sand. In the lower part, it is light gray fine sandy loam. The substratum extends to a depth of 80 inches. In the upper part, it is gray fine sand and loamy fine sand. In the next part, it is gray loamy sand and fine sand. In the lower part, it is light gray fine sand and fine sand mixed with shell fragments.

Included in mapping are small areas of Boca and Malabar soils. The poorly drained Boca soils are moderately deep over limestone. The poorly drained Malabar soils have a horizon that has an increase in clay content below a depth of 40 inches. In 80 percent of the areas of this map unit, the included soils make up 10 to 20 percent of the mapped area. In the remaining 20 percent, the included soils make up more than 20 percent or less than 10 percent.

The seasonal high water table for the Hallandale and Pople soils is at a depth of 6 to 18 inches from June through September. Permeability is rapid in the Hallandale soil and moderately slow or slow in the Pople soil. Available water capacity is very low in the Hallandale soil and low in the Pople soil.

Most areas of this map unit are woodland. The natural vegetation consists of slash pine, cabbage palm, and live oaks and an understory of saw palmetto, wax-myrtle, chalky bluestem, and panicums.

This map unit is not suited to cultivated crops. Wetness and depth to bedrock in the Hallandale soil are severe limitations.

This map unit is poorly suited to the production of citrus. Wetness is a limitation. A well designed and maintained water-control system that provides for the removal of excess surface water and maintains the water table below the root zone is needed. If citrus is planted, rows should be bedded and irrigation should be provided for periods of low rainfall.

This map unit is suited to pasture and hayland. Wetness is a limitation. Water-control measures should be established. If properly managed, bahiagrass and pangolagrass grow well. Plant vigor can be maintained by controlling grazing.

This map unit is suited to woodland. Equipment restrictions and plant competition are moderate limitations. Seedling mortality is severe in areas of the Pople soil and moderate in areas of the Hallandale soil. Harvesting should be scheduled for the drier periods of the year. Increasing the planting rate helps to compensate for the seedling mortality. Proper site preparation helps to minimize the plant competition. Slash pine and South Florida slash pine are the preferred trees for planting.

This map unit has low potential for range productivity. The dense overstory of slash pine, oak, and cabbage palm allows only a limited potential for production of chalky bluestem and panicums. These areas, however, provide shelter for cattle from intense heat in summer. These soils are in the Wetland Hardwood Hammocks range site.

This map unit is not suited to urban uses. Wetness and depth to bedrock are severe limitations.

This map unit is not suited to recreational purposes. Wetness, the moderately slow or slow permeability, and depth to bedrock are severe limitations.

The capability subclass is IVw in areas of the Hallandale soil and IIIw in areas of the Pople soil. The woodland ordination symbol is 3w in areas of the Hallandale soil and 10w in areas of the Pople soil.

26—Immokalee sand

This poorly drained soil is in broad areas of flatwoods. Individual areas are irregular in shape. They range from 15 to more than 100 acres in size. Slopes are smooth, are slightly complex or concave, and range from 0 to 2 percent.

Typically, the surface layer is very dark gray sand about 8 inches thick. The subsurface layer is also sand and extends to a depth of 38 inches. It is gray in the upper part and white in the lower part. The subsoil is also sand and extends to a depth of 80 inches. It is black in the upper part, yellowish brown in the next part, and brown with dark reddish brown mottles in the lower part.

Included in mapping are small areas of Basinger, Myakka, Oldsmar, Pomello, and Valkaria soils. Basinger and Valkaria soils do not have a dark horizon. Myakka soils have a dark horizon at a depth of 20 to 30 inches. Oldsmar soils have a horizon that has an increase in clay content. Pomello soils are moderately well drained. Also included in mapping are soils that are similar to the Immokalee soil but have a subsoil layer below a depth of 50 inches. In 95 percent of the areas of this map unit, the included soils make up 4 to 18 percent of the mapped area. In the remaining 5 percent, the included soils make up more than 18 percent or less than 4 percent.

The seasonal high water table is at a depth of 6 to 18 inches from June through September. Permeability is very rapid or rapid in the surface and subsurface layers and moderate in the subsoil. Available water capacity is low.

Most areas of this soil are used for improved pasture or native range. The natural vegetation consists of slash pine, saw palmetto, gallberry, fetterbush, pineland threeawn, chalky bluestem, low panicum, and various other native grasses.

This map unit is poorly suited to cultivated crops. Wetness is a limitation. A well designed and maintained water-control system provides for the removal of excess water and for the addition of water during dry periods. Fertilizer and lime should be added according to the specific needs of the crop.

This map unit is suited to the production of citrus. Wetness is a limitation. A well designed and maintained water-control system that maintains the water table below the root zone is needed. Plant cover should be maintained between the rows to help control erosion of the beds.

This map unit is suited to pasture and hay crops. Wetness is a limitation. Water-control measures are needed to remove excess water after heavy rainfall. Pangolagrass, improved bahiagrass, and white clover are the best adapted pasture plants.

This map unit is suited to woodland. An equipment limitation, seedling mortality, and plant competition are moderate limitations. Harvesting should be planned for the drier periods of the year to minimize the equipment limitation. Increasing the planting rate helps to compensate for the seedling mortality. Proper site preparation helps to minimize the plant competition. Trees should be planted in bedded rows to ensure highest productivity. Slash pine and South Florida slash pine are the preferred trees for planting.

This map unit has moderate potential for producing significant amounts of creeping bluestem, chalky bluestem, Indiangrass, and other desirable range plants. As range condition deteriorates, pineland threeawn and saw palmetto dominate the site. Management of the native range should include the use of cross fencing, cattle rotations to help maintain plant vigor, and careful consideration of stocking rates. This soil is in the South Florida Flatwoods range site.

This map unit is poorly suited to urban uses. Wetness and poor filtering capacity are limitations. Mounding with suitable fill material to raise the filter field a sufficient distance above the seasonal high water table improves septic system performance and increases the filtering capacity. Sites for dwellings without basements should also be mounded before construction to prevent moisture problems.

This map unit is poorly suited to recreational purposes. Wetness is a limitation. A properly designed drainage system can help to minimize this limitation.

The capability subclass is IVw. The woodland ordination symbol is 8W.

27—Ft. Drum fine sand

This poorly drained soil is on flats next to sloughs, depressions, and drainageways. Individual areas are irregular in shape. They range from 10 to more than 75 acres in size. Slopes are smooth, are slightly convex or concave, and range from 0 to 2 percent.

Typically, the surface layer is black fine sand about 5 inches thick. The subsurface layer is gray fine sand to a depth of about 15 inches. The subsoil extends to a depth of 32 inches. It is dark brown fine sand in the upper part and light gray fine sandy loam in the lower part. The substratum is fine sand and extends to a depth of 80 inches. It is brownish yellow in the upper part, pale brown in the next part, and gray in the lower part.

Included in mapping are small areas of Malabar, Pineda, Pople, and Valkaria soils. Malabar, Pineda, and Valkaria soils do not have masses or nodules of calcium carbonate in the subsoil. Pople soils have a horizon that has an increase in clay content. In 80 percent of the areas of this map unit, the included soils make up 9 to 25 percent of the mapped area. In the remaining 20 percent, the included soils make up more than 25 percent or less than 9 percent.

The seasonal high water table is at a depth of 6 to 18 inches from June through September. Permeability is moderate. Available water capacity is low.

Most areas of this map unit still support native vegetation consisting of slash pine, cabbage palm, live oak, saw palmetto, wax-myrtle, pineland threeawn, and various bluestems. A few small areas have been cleared and are used for improved pasture.

This map unit is poorly suited to cultivated crops. Wetness is a limitation. A well designed and maintained water-control system that provides for the removal of excess surface water helps to minimize the wetness. The system should provide irrigation water during dry periods. Fertilizer and lime should be added according to the specific needs of the crop.

This map unit is poorly suited to the production of citrus. Wetness is a limitation. A well designed and maintained water-control system is vital to the success of growing citrus trees on this soil. Trees should be planted on bedded rows, and a cover crop should be maintained between the rows to help control erosion of the beds. Irrigation should be available during dry periods.

This map unit is suited to pasture and hayland. Wetness is a limitation. A water-control system that removes excess surface water after heavy rainfall is needed to ensure good yields. Well managed pangolagrass and bahiagrass are the best adapted pasture plants. Plant vigor can be maintained by controlling grazing.

This map unit is suited to woodland. An equipment limitation, seedling mortality, and plant competition are moderate limitations. Harvesting should be planned for the drier periods of the year to minimize the equipment limitation. Increasing the planting rate helps to compensate for the seedling mortality. Proper site preparation helps to minimize the plant competition. South Florida slash pine and slash pine are the preferred trees for planting.

This map unit has moderate to high potential for producing large amounts of South Florida bluestem, chalky bluestem, creeping bluestem, and Indiangrass. A range management program should include such considerations as grazing time and the number of cattle per acre. This soil is in the Cabbage Palm Flatwoods range site.

This map unit is poorly suited to urban uses. Wetness and poor filtering capacity are limitations. Mounding with suitable fill material to raise the filter field a sufficient distance above the seasonal high water table improves septic system performance and increases the filtering capacity. Sites for dwellings without basements should also be mounded before construction to prevent moisture problems.

This map unit is poorly suited to recreational purposes. Wetness and sandy textures are limitations. A properly designed water-control system and suitable topsoil or resurfacing help to minimize these limitations.

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

28—Pomello fine sand

This moderately well drained soil is on slightly elevated knolls. Individual areas are irregular in shape. They range from 4 to 30 acres in size. Slopes are smooth and convex. They range from 0 to 2 percent.

Typically, the surface layer is dark gray fine sand about 3 inches thick. The subsurface layer is fine sand and extends to a depth of 55 inches. It is gray in the upper part and light gray in the lower part. The subsoil is black fine sand to a depth of about 65 inches. The substratum to a depth of 80 inches is brown fine sand.

Included in mapping are small areas of Immokalee, Myakka, and Smyrna soils. These included soils are poorly drained. Also included are soils that have weak, organic-stained layers below a depth of 50 inches and soils that have no staining below a depth of 50 inches. In 90 percent of the areas of this map unit, the included soils make up 10 to 15 percent of the mapped area. In the remaining 10 percent, the included soils make up more than 15 percent or less than 10 percent.

The seasonal high water table is at a depth of 24 to 42 inches from July through November. Permeability is moderately rapid. Available water capacity is low.

Most areas of this map unit are used for native range. The natural vegetation consists of slash pine, scrub oak, saw palmetto, and scattered pineland threeawn.

This map unit is poorly suited to cultivated crops. Droughtiness and rapid leaching of plant nutrients are limitations. If cultivated crops are grown, irrigation is essential. Fertilizer and lime should be added according to the specific needs of the crop.

This map unit is suited to the production of citrus. Seasonal wetness and droughtiness are limitations. Water-control measures are needed to remove excess water from the rooting zone. Irrigation should be provided to maximize yields and reduce tree stress during dry periods.

This map unit is suited to pasture and hay crops. Seasonal droughtiness is a limitation. Grazing should be controlled to prevent rapid deterioration of the pasture. Cattle rotation during extended dry periods helps to maintain productivity. Bahiagrass and pangolagrass are suitable for planting.

This map unit is poorly suited to woodland. An equipment limitation and plant competition are moderate limitations. Seedling mortality is a severe limitation. Scheduling harvesting to avoid periods of extreme wetness or droughtiness and using tandem axles, wide tires, and four-wheel drive vehicles help to minimize the equipment limitation. Increasing the planting rate helps to compensate for the seedling mortality. Proper site preparation helps to minimize the plant competition. South Florida slash and slash pine are the preferred trees for planting.

The potential for producing range plants is very low. The vegetative community, which is a dense woody understory, is seldom grazed by cattle. This soil is in the Sand Pine Scrub range site.

This map unit is poorly suited to urban uses. Seasonal wetness, poor filtering capacity, and seasonal droughtiness are limitations. Most of these limitations can be overcome by simple water-control systems, such as ditching and installing tile drainage. Mounding with suitable fill material to raise the filter field a sufficient distance above the seasonal high water table improves septic system performance. Sites for dwellings without basements should also be mounded before construction to prevent moisture problems. Planting drought-tolerant trees and shrubs, applying water regularly, and using mulch help to overcome the seasonal droughtiness.

This map unit is poorly suited to recreational purposes. Sandy textures and seasonal wetness are limitations. A properly designed drainage system and suitable topsoil or resurfacing help to minimize these limitations.

The capability subclass is VIs. The woodland ordination symbol is 8S.

29—Myakka fine sand

This poorly drained soil is in broad areas of flatwoods. Individual areas are irregular in shape. They range from 15 to 100 acres in size. Slopes are smooth, are slightly convex or concave, and range from 0 to 2 percent.

Typically, the surface layer is very dark gray fine sand about 3 inches thick. The subsurface layer is fine sand and extends to a depth of 27 inches. It is grayish brown in the upper part and light brownish gray in the lower part. The subsoil is fine sand and extends to a depth of 45 inches. It is black in the upper part and dark brown in the lower part. The substratum to a depth of 80 inches is brown fine sand.

Included in mapping are small areas of Basinger, Oldsmar, Pomello, Smyrna, and Valkaria soils. Basinger and Valkaria soils do not have a dark horizon. Oldsmar soils have a horizon with an increase in clay content. Pomello soils are moderately well drained. Smyrna soils have a dark horizon at a depth of 4 to 20 inches. In 95 percent of the areas of this map unit, the included soils make up 0 to 18 percent of the mapped area.

The seasonal high water table is at a depth of 6 to 18 inches from June through September. Permeability is rapid in the surface and subsurface layers and moderate and moderately rapid in the subsoil. Available water capacity is low.

Most areas of this map unit are used for improved pasture and native range. The natural vegetation consists of slash pine, saw palmetto, gallberry, fetterbush, pineland threeawn, chalky bluestem, low panicum, and various other native grasses.

This map unit is poorly suited to cultivated crops. Wetness is a limitation. A well designed and maintained water-control system that provides for the removal of excess water and for the addition of water during dry periods is needed. Fertilizer and lime should be added according to the specific needs of the crop.

This map unit is suited to the production of citrus. Wetness is a limitation. A well designed and maintained water-control system that provides drainage and provides irrigation for extended droughty periods is needed. Citrus trees should be planted on bedded rows to maintain root systems well above the seasonal high water table. Plant cover should be maintained between the rows to help control erosion of the beds.

This map unit is suited to pasture and hayland. Wetness is a limitation. Water-control measures are needed to remove excess water after heavy rainfall. Pangolagrass, improved bahiagrass, and white clover are the best adapted pasture plants.

This map unit is suited to woodland. An equipment limitation, seedling mortality, and plant competition are moderate limitations. Scheduling harvesting for the drier periods of the year helps to minimize the equipment limitation. Increasing the planting rate helps to compensate for the seedling mortality. Proper site preparation helps to minimize the plant competition. Trees should be planted in bedded rows to ensure highest productivity. Slash pine and South Florida slash pine are the preferred trees for planting.

This map unit has moderate potential for producing significant amounts of creeping bluestem, chalky bluestem, Indiangrass, and other desirable range plants. As range condition deteriorates, pineland threeawn and saw palmetto dominate the site. Management of the native range should include the use of cross fencing, cattle rotations to help maintain plant vigor, and careful consideration of stocking rates. This soil is in the South Florida Flatwoods range site.

This map unit is poorly suited to urban uses. Wetness and poor filtering capacity are limitations. Mounding with suitable fill material to raise the filter field a sufficient distance above the seasonal high water table improves septic system performance and increases the filtering capacity. Sites for dwellings without basements should also be mounded before construction to prevent moisture problems.

This map unit is poorly suited to recreational purposes. Wetness and sandy textures are limitations. A properly designed drainage system and suitable topsoil or resurfacing help to minimize these limitations.

The capability subclass is IVw. The woodland ordination symbol is 8W.

32—Floridana, Astor, and Felda soils, frequently flooded

These very poorly drained and poorly drained soils are in hardwood swamps and marshes that are dissected by streams along major drainageways. The composition of the soils in the mapped areas varies, but the mapping was sufficiently controlled to evaluate the soils for the expected uses. Some areas consist mainly of the Floridana soil, some mainly of the Astor soil, and some mainly of the Felda soil. Other areas contain all three soils in variable proportions. Individual areas are generally elongated in shape. Slopes are complex and are slightly convex or concave. They are dominantly 0 to 2 percent, but stream dissection has created numerous short, steep slopes throughout the map unit.

The very poorly drained Floridana soil makes up about 34 percent of the map unit. Typically, the surface layer is black fine sand about 4 inches thick. The subsurface layer is light brownish gray fine sand to a depth of about 25 inches. The subsoil is gray fine sandy loam to a depth of about 45 inches. The substratum, to a depth of 80 inches, is gray fine sand.

The very poorly drained Astor soil makes up about 33 percent of the map unit. Typically, the surface layer is black fine sand about 34 inches thick. The substratum, to a depth of 80 inches, is dark gray fine sand.

The poorly drained Felda soil makes up about 33 percent of the map unit. Typically, the surface layer is black fine sand about 4 inches thick. The subsurface layer extends to a depth of about 35 inches. It is light gray fine sand that has light yellowish brown mottles. The subsoil extends to a depth of about 43 inches. It is grayish brown fine sandy loam that has olive brown mottles. The substratum to a depth of 80 inches is light brownish gray fine sand that has shell fragments.

Included in mapping are small areas of Basinger, Chobee, Gator, Okeelanta, and Terra Ceia soils. The poorly drained Basinger soils do not have a thick, dark surface layer or a horizon that has an increase in clay content. The very poorly drained Chobee soils have a loamy subsoil. The very poorly drained Gator and Terra Ceia soils are organic. The very poorly drained Okeelanta soils have organic layers overlying a mineral substratum. In 90 percent of the areas of this map unit, the included soils make up 5 to 10 percent of the mapped area. In the remaining 10 percent, the included soils make up more than 10 percent or less than 5 percent.

The seasonal high water table in the Floridana and Astor soils is at the surface to a depth of 6 inches from June through October. The seasonal high water table in the Felda soil is at the surface to a depth of 12 inches from July through March. In the Floridana soil, permeability is slow or very slow and available water capacity is moderate. In the Astor soil, permeability is rapid and available water capacity is low. In the Felda soil, permeability is moderate or moderately rapid and available water capacity is low.

Most areas of this map unit still support woodland. The natural vegetation consists of cypress and bay trees in the areas of hardwood swamp and sawgrass, maidencane, pickerelweed, and other water-tolerant species in the marshy backwater areas.

This map unit is not suited to cultivated crops, the production of citrus, pasture, hayland, or woodland. The frequent flooding and the wetness are severe limitations.

This map unit is not suited to urban uses. The frequent flooding and the slow or very slow permeability in areas of the Floridana soil are severe limitations.

This map unit is not suited to recreational purposes. The frequent flooding and the wetness are severe limitations.

The capability subclass is Vw in areas of the Floridana and Felda soils and VIw in areas of the Astor soil. The woodland ordination symbol is 6W.

34—Basinger fine sand, depressional

This very poorly drained soil is in depressional areas. It is ponded for much of the year. Individual areas are irregular in shape. They range from 10 to more than 50 acres in size. Slopes are smooth and concave. They are 0 to 1 percent.

Typically, the surface layer is gray fine sand about 6 inches thick. The subsurface layer is light gray fine sand to a depth of about 32 inches. The subsoil is dark brown fine sand to a depth of about 40 inches. The substratum is fine sand and extends to a depth of 80 inches. It is dark brown in the upper part, grayish brown with dark brown streaks in the next part, and grayish brown in the lower part.

Included in mapping are small areas of Astor, Floridana, Okeelanta, and Sanibel soils. Astor and Floridana soils have a thick, dark surface layer. Okeelanta soils are organic. Sanibel soils have an organic surface layer. In 85 percent of the areas of this map unit, the included soils make up 10 to 25 percent of the mapped area. In the remaining 15 percent, the included soils make up more than 25 percent or less than 10 percent.

The seasonal high water table is at the surface to 24 inches above the surface from June through March. Permeability is rapid. Available water capacity is moderate.

Most areas of this map unit still support natural vegetation consisting of pickerelweed, maidencane, sand cordgrass, St. Johnswort, and other water-tolerant plants.

This map unit is not suited to cultivated crops, the production of citrus, pasture, hay crops, or woodland. Wetness and ponding are severe limitations.

The potential for producing large amounts of blue maidencane and bluejoint panicum is high. The water level fluctuates throughout the year, creating a natural deferment from grazing cattle. This rest period increases forage production, but periods of high water may reduce the grazing value of the site. This soil is in the Fresh Water Marsh and Pond range site.

This map unit is not suited to urban uses. Ponding and poor filtering capacity are severe limitations.

This map unit is not suited to recreational purposes. Wetness, ponding, and sandy textures are severe limitations.

The capability subclass is VIIw. This map unit has not been assigned a woodland ordination symbol.

35—Arents, very steep

Arents consist of unconsolidated soil material that has been excavated from major canals and deposited alongside the channel. This map unit is primarily along the edge of the Herbert Hoover dike, Harney Pond canal, and flood control canals along the Kissimmee River. It is also in scattered areas throughout the county where canals were dug for water control. Individual areas vary in size and shape but generally are long and narrow. Areas of Arents commonly are smoothed at the top and used as access roads. Slopes range from 45 to 60 percent.

The texture and thickness of the layers of the Arents are highly variable. Typically, the surface layer is olive gray fine sand about 2 inches thick. Below this are various layers of fine sand or loamy material from former natural soil horizons. Colors vary from black, gray, and olive brown to white. Some layers contain various amounts of shell fragments.

Included in mapping are Arents that are less than 6 feet deep. These included areas are normally associated with urban uses, and the soil material is added to help maintain structures above a seasonal high water table. These areas may or may not be excessively drained, depending on the thickness of the materials deposited and the properties of the natural soil being covered.

The seasonal high water table is below a depth of 72 inches. Permeability and available water capacity are variable.

This map unit is not suited to cultivated crops, the production of citrus, pasture, hay, or woodland. The slope and the limited size of the areas are severe limitations.

This map unit is not suited to range production and is not assigned a range site designation.

This map unit is not suited to urban uses. The limited size of the areas, the slope, and poor filtering capacity are severe limitations.

This map unit is not suited to recreational purposes. The limited size of the areas and the slope are severe limitations.

The capability subclass is VIIe. This map unit has not been assigned a woodland ordination symbol.

36—Malabar fine sand, high

This poorly drained soil is in the slightly higher areas in flatwoods. Individual areas are irregular in shape. They range from 10 to more than 300 acres in size. Slopes are smooth and slightly convex. They range from 0 to 2 percent.

Typically, the surface layer is black fine sand about 8 inches thick. The subsurface layer is light gray fine sand to a depth of about 35 inches. The subsoil extends to a depth of 60 inches. In the upper part, it is brownish yellow fine sand that has yellowish brown mottles. In the lower part, it is grayish brown fine sandy loam. The substratum is grayish brown fine sand to a depth of 80 inches.

Included in mapping are small areas of Basinger, Felda, Pineda, and Valkaria soils. Basinger and Valkaria soils do not have a horizon that has an increase in clay content. Felda and Pineda soils have a horizon that has an increase in clay content at a depth of 20 to 40 inches. Also included are soils that have a layer of organic staining directly above the loamy part of the subsoil. In 90 percent of the areas of this map unit, the included soils make up 2 to 23 percent of the mapped area. In the remaining 10 percent, the included soils make up more than 23 percent or less than 2 percent.

The seasonal high water table is at a depth of 6 to 18 inches from June through September. Permeability is rapid in the surface and subsurface layers and in the upper layers of the subsoil. It is slow or very slow in the lower, loamy part of the subsoil. Available water capacity is moderate.

Most areas of this map unit are used for improved pasture or native range. The natural vegetation consists of slash pine and cabbage palm and an understory of saw palmetto, creeping bluestem, chalky bluestem, panicums, pineland threeawn, and lopsided Indiangrass.

This map unit is poorly suited to cultivated crops. Wetness is a limitation. A properly designed water-control system that provides for the removal of excess water helps to minimize the wetness. Fertilizer and lime should be added according to the specific needs of the crop.

This map unit is poorly suited to the production of citrus. Wetness is a limitation. Citrus trees can be grown if a well designed water-control system is installed. The system should maintain the water table at the proper depth and provide for irrigation. Trees should be planted on bedded rows, and a cover crop should be maintained between the rows to help control erosion of the beds.

This map unit is suited to pasture and hay crops. Wetness is a limitation. Water-control measures are needed to remove excess surface water after heavy rainfall. Pangolagrass, improved bahiagrass, and white clover are the best adapted pasture plants. Grazing should be controlled to prevent overgrazing of the site and weakening of the plants.

This map unit is suited to woodland. An equipment limitation, seedling mortality, and plant competition are moderate limitations. Harvesting should be planned for the drier periods of the year to minimize the equipment limitation. Increasing the planting rate helps to compensate for the seedling mortality. Proper site preparation helps to minimize the plant competition. Trees should be planted in bedded rows to ensure highest productivity. South Florida slash pine is the preferred tree for planting.

This map unit has moderate to high potential for production of desirable range plants and for producing significant amounts of creeping bluestem, panicums, and maidencane. Management of the native range should include the use of cross fencing, cattle rotation to maintain plant vigor, and careful consideration of stocking rates. This soil is in the South Florida Flatwoods range site.

This map unit is poorly suited to urban uses. Wetness and the slow or very slow permeability are limitations. A properly designed drainage system can help to minimize these limitations. Mounding with suitable fill material to raise the filter field a sufficient distance above the seasonal high water table improves septic system performance and increases the filtering capacity. Sites for small buildings without basements should be mounded to prevent moisture damage.

This map unit is poorly suited to recreational purposes. Wetness and sandy textures are limitations. A properly designed drainage system and suitable top soil or resurfacing help to minimize these limitations.

The capability subclass is IVw. The woodland ordination symbol is 4W.

37—Lauderhill muck, drained

This very poorly drained soil is in depressions, marshes, and swamps that have been drained. Individual areas range from 50 to more than 500 acres in size. Individual areas that are less than 20 acres in size generally are circular in shape. The large areas south of Lake Okeechobee are irregular in shape. Slopes are smooth and concave. They are 0 to 1 percent.

Typically, the surface layer is black muck about 10 inches thick. The subsurface layer is black muck to a depth of about 25 inches. The underlying material to a depth of 80 inches is hard limestone.

Included in mapping are small areas of Dania, Pahokee, Plantation, and Terra Ceia soils. Dania soils are shallow over limestone. Pahokee soils are deep over limestone. Plantation soils have an organic surface layer that is less than 16 inches thick. Terra Ceia soils are very deep. In 90 percent of the areas of this map unit, the included soils make up 0 to 14 percent of the mapped area.

The seasonal high water table is at a depth of 12 inches or less from June through April. Permeability is rapid. Available water capacity is very high.

Most areas of this map unit have been drained and are used for the production of sugarcane.

This map unit is poorly suited to cultivated crops. Wetness and subsidence are limitations. A well designed and maintained water-control system is needed for crop production. The system should maintain the water table at an adequate depth to prevent excessive oxidation and subsidence of the organic matter. Under intense management, high yields of sugarcane can be produced.

This map unit is not suited to the production of citrus. Wetness and subsidence are severe limitations.

This map unit is poorly suited to pasture and hay crops. Wetness and subsidence are limitations. A water-control system that maintains the water table near the surface minimizes oxidation and subsidence of the organic matter. Pangolagrass and bahiagrass are the best adapted pasture plants.

This map unit is not suited to woodland. Wetness and subsidence are severe limitations.

This map unit has moderate potential for producing significant amounts of maidencane and cutgrass. This soil produces high quality forage for cattle during dry periods and the winter. Management practices should include the use of cross fencing, cattle rotation, and careful consideration of stocking rates. This soil is in the Fresh Water Marsh and Pond range site.

This map unit is not suited to urban uses. Wetness, depth to rock, and poor filtering capacity are severe limitations.

This map unit is not suited to recreational purposes. Wetness and excess humus are severe limitations.

The capability subclass is IIIw. This map unit has not been assigned a woodland ordination symbol.

38—Pahokee muck, drained

This poorly drained soil is in depressions, marshes, and swamps that have been drained. Individual areas range from 50 to more than 350 acres in size. The areas that are less than 15 acres in size are generally circular in shape. The large areas south of Lake Okeechobee are irregular in shape. Slopes are smooth and concave. They are 0 to 1 percent.

Typically, the surface layer is black muck about 9 inches thick. The subsurface layer is black muck to a depth of about 48 inches. The underlying material to a depth of 80 inches is hard limestone.

Included in mapping are small areas of Dania, Lauderhill, and Terra Ceia soils. Dania soils are shallow over limestone. Lauderhill soils are moderately deep over limestone. Terra Ceia soils are very deep. In 90 percent of the areas of this map unit, the included soils make up 0 to 14 percent of the mapped area.

The seasonal high water table is at a depth of 12 inches or less from June through February. Permeability is rapid. Available water capacity is very high.

Most areas of this map unit have been drained and are used for the production of sugarcane.

This map unit is poorly suited to cultivated crops. Wetness and subsidence are limitations. A well designed and maintained water-control system is needed for crop production. The system should maintain the water table at an adequate depth to prevent excessive oxidation and subsidence of the organic matter. Under intense management, high yields of sugarcane can be produced.

This map unit is not suited to the production of citrus. Wetness and subsidence are severe limitations.

This map unit is poorly suited to pasture and hay crops. Wetness and subsidence are limitations. A water-control system that maintains the water table near the surface minimizes oxidation and subsidence

Figure 3.—Sugarcane growing in an area of Plantation muck, drained. The production of sugarcane is an important land use in areas of organic soils in the county.

of the organic matter. Pangolagrass and bahiagrass are the best adapted pasture plants.

This map unit is not suited to woodland. Wetness and subsidence are severe limitations.

This map unit has moderate potential for producing significant amounts of maidencane and cutgrass. This soil provides excellent forage for cattle during dry periods and the winter. A well managed range plan should include the use of cross fencing, cattle rotation, and careful consideration of stocking rates. This soil is in the Fresh Water Marsh and Pond range site.

This map unit is not suited to urban uses. Wetness, subsidence, and depth to rock are severe limitations.

This map unit is not suited to recreational purposes. Wetness and excess humus are severe limitations.

The capability subclass is IIIw. This map unit has not been assigned a woodland ordination symbol.

40—Plantation muck, drained

This very poorly drained soil is in marshes and swamps that have been drained. Individual areas are irregular in shape. They range from 50 to more than 500 acres in size. Slopes are smooth and concave. They are 0 to 1 percent.

Typically, the surface layer extends to a depth of 17 inches. It is black muck in the upper 10 inches and black sand in the lower part. The substratum is gray sand to a depth of about 30 inches. The underlying material to a depth of 80 inches is hard limestone.

Included in mapping are small areas of Dania, Lauderhill, Pahokee, and Sanibel soils. Dania, Lauderhill, and Pahokee soils are organic. Sanibel soils are very deep. In 90 percent of the areas of this map unit, the included soils make up 5 to 8 percent of the mapped area. In the remaining 10 percent, the included soils make up more than 8 percent or less than 5 percent.

The seasonal high water table is at the surface to a depth of 12 inches from June through April. Permeability is rapid. Available water capacity is low.

Most areas of this map unit have been drained for the production of sugarcane.

This map unit is poorly suited to cultivated crops. Wetness and subsidence are limitations. A well designed and maintained water-control system is needed for crop production. The system should maintain the water table at an adequate depth to prevent excessive oxidation and subsidence of the organic matter. Under intense management, high yields of sugarcane can be produced (fig. 3).

This map unit is not suited to the production of citrus. Wetness and subsidence are severe limitations.

This map unit is poorly suited to pasture and hay crops. Wetness and subsidence are limitations. A water-control system that maintains the water table near the surface minimizes oxidation and subsidence of the organic matter. Pangolagrass and bahiagrass are the best adapted pasture plants.

This map unit is not suited to woodland. Wetness and subsidence are severe limitations.

This map unit has moderate potential for producing significant amounts of maidencane and cutgrass. It can produce high quality forage for cattle during dry periods and the winter. This soil is a benefit to a well managed range plan. It is in the Fresh Water Marsh and Pond range site.

This map unit is not suited to urban uses. Wetness, depth to rock, and poor filtering capacity are severe limitations.

This map unit is not suited to recreational purposes. Wetness and excess humus are severe limitations.

The capability subclass is IVw. This map unit has not been assigned a woodland ordination symbol.

41—Dania muck, drained

This very poorly drained soil is in depressions, marshes, and swamps that have been drained. Individual areas range from 50 to more than 200 acres in size. The areas that are less than 25 acres in size generally are circular in shape. The large areas south of Lake Okeechobee are irregular in shape. Slopes are smooth and concave. They are 0 to 1 percent.

Typically, the surface layer is black muck about 16 inches thick. The underlying material to a depth of 80 inches is hard limestone.

Included in mapping are small areas of Lauderhill, Pahokee, and Plantation soils. Lauderhill soils are moderately deep over limestone. Pahokee soils are deep over limestone. Plantation soils have a thin, organic surface layer and are moderately deep over limestone. In 90 percent of the areas of this map unit, the included soils make up 0 to 12 percent of the mapped area.

The seasonal high water table is at the surface to a depth of 12 inches from June through April. Permeability is rapid. Available water capacity is low.

Most areas of this map unit have been drained and are used for the production of sugarcane.

This map unit is poorly suited to cultivated crops. Wetness and subsidence are limitations. A well designed and maintained water-control system is needed for crop production. The system should maintain the water table at an adequate depth to prevent excessive oxidation and subsidence of the organic matter. Under intense management, high yields of sugarcane can be produced.

This map unit is not suited to the production of citrus. Wetness, subsidence, and depth to bedrock are severe limitations.

This map unit is poorly suited to pasture and hay crops. Wetness is a limitation. A water-control system that maintains the water table near the surface minimizes oxidation and subsidence of the organic matter. Pangolagrass and bahiagrass are the best adapted pasture plants.

This map unit is not suited to woodland. Wetness, subsidence, and depth to bedrock are severe limitations.

This map unit has the potential for producing significant amounts of desirable range plants. Maidencane and cutgrass are the most desirable. This soil can produce excellent forage for cattle during dry periods and the winter. A well managed range plan should include the use of cross fencing, cattle rotation, and careful consideration of stocking rates. This soil is in the Fresh Water Marsh and Pond range site.

This map unit is not suited to urban uses. Wetness and depth to rock are severe limitations.

This map unit is not suited to recreational purposes. Wetness and excess humus are severe limitations.

The capability subclass is Vw. This map unit has not been assigned a woodland ordination symbol.

42—Okeelanta and Dania soils, depressional

These very poorly drained soils are in swamps, marshes, and other depressional areas. This map unit is ponded for much of the year. The composition of the soils in the mapped areas varies, but the mapping was sufficiently controlled to evaluate the soils for the expected uses. Some areas consists mainly of the Okeelanta soil, some mainly of the Dania soil, and some contain both soils in variable proportions. Individual areas are irregular in shape. They range from 10 to more than 100 acres in size. Slopes are smooth and concave. They are 0 to 1 percent.

Okeelanta and similar soils make up about 60 percent of the map unit. Typically, the surface layer is black muck to a depth of 31 inches. The substratum extends to a depth of 80 inches. It is very dark gray mucky fine sand in the upper part and grayish brown fine sand in the lower part.

Dania and similar soils make up about 40 percent of the map unit. Typically, the surface layer is black muck about 16 inches thick. The underlying material to a depth of 80 inches is hard limestone.

Included in mapping are small areas of Astor, Floridana, Lauderhill, Pahokee, Terra Ceia, and

Tequesta soils. Astor and Floridana soils are mineral throughout. Lauderhill soils are moderately deep over limestone. Pahokee soils are deep over limestone. Terra Ceia soils have organic layers that have a combined thickness of more than 52 inches. Tequesta soils have a thin, organic surface layer. In 90 percent of the areas of this map unit, the included soils make up 5 to 10 percent of the mapped area. In the remaining 10 percent, the included soils make up more than 10 percent or less than 5 percent.

The seasonal high water table is at the surface to 24 inches above the surface from June through April. Permeability is rapid in the muck layers of these soils and moderate rapid in the substratum of the Okeelanta soil. Available water capacity is high in the Okeelanta soil and low in the Dania soil.

Most areas of this map unit support native vegetation consisting of sawgrass, maidencane, cutgrass, pickerelweed, sedges, cypress, and bay trees.

This map unit is not suited to cultivated crops. Wetness, ponding, and subsidence are severe limitations.

This map unit is not suited to the production of citrus. Wetness, ponding, subsidence, and depth to bedrock in areas of the Dania soil are severe limitations.

This map unit is not suited to pasture and hay crops. Wetness, ponding, and subsidence are severe limitations.

This map unit is not suited to woodland. Wetness, ponding, subsidence, and depth to bedrock in areas of the Dania soil are severe limitations.

This map unit has moderate potential for producing significant amounts of maidencane and cutgrass. It can produce excellent forage for cattle during dry periods and the winter. A well managed range plan should include the use of cross fencing, cattle rotation, and careful consideration of stocking rates. This map unit is in the Fresh Water Marsh and Pond range site.

This map unit is not suited to urban uses. Ponding, subsidence, and depth to bedrock are severe limitations.

This map unit is not suited to recreational purposes. Wetness, ponding, excess humus, and depth to bedrock in areas of the Dania soil are severe limitations.

The capability subclass is VIIw. This map unit has not been assigned a woodland ordination symbol.

43—Sanibel muck, drained

This very poorly drained soil is in marshes, swamps, and depressions. It is ponded for much of the year. Individual areas are irregular in shape. They range from 10 to 100 acres in size. Slopes are smooth and concave. They range from 0 to 2 percent.

Typically, the surface layer extends to a depth of 18 inches. It is black muck in the upper 10 inches and black sand in the lower 8 inches. The substratum is sand and extends to a depth of 80 inches. It is dark gray in the upper part and light brownish gray in the lower part.

Included in mapping are small areas of Astor, Floridana, and Okeelanta soils. Astor and Floridana soils do not have an organic surface layer. Okeelanta soils have an organic layer that is more than 16 inches thick. In 90 percent of the areas of this map unit, the included soils make up 0 to 24 percent of the mapped area.

The seasonal high water table is at the surface to a depth of 12 inches from June through April. Permeability is rapid. Available water capacity is high.

Most areas of this map unit still support natural vegetation consisting of maidencane, sawgrass, arrowhead, cutgrass, pickerelweed, and St. Johnswort.

This map unit is not suited to cultivated crops, the production of citrus, pasture, hay, or woodland. Wetness and ponding are severe limitations.

This map unit has high potential for producing significant amounts of maidencane and cutgrass. It can provide excellent forage for cattle during the winter months and dry periods. Marshes and swamps are some of the most productive areas of native range in the county. This soil is in the Fresh Water Marsh and Pond range site.

This map unit is not suited to urban uses. Ponding and poor filtering capacity are severe limitations.

This map unit is not suited to recreational purposes. Wetness and ponding are severe limitations.

The capability subclass is IIIw. This map unit has not been assigned a woodland ordination symbol.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent 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 behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

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

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

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

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

Pasture and Crops

Dan Rutledge, district conservationist, Natural Resources Conservation Service, helped prepare this section.

General management needed for pasture and crops is suggested in this section. The estimated yields of the main crops and pasture plants are listed for each soil, the system of land capability classification used by the Natural Resources Conservation Service is explained, and prime farmland is described.

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

About 200,000 acres in Glades County is used for pasture and crops. Of this total, 142,000 acres is used for pasture, more than 9,000 acres is used for citrus crops, and 37,000 acres is used for sugarcane. The remaining acreage is planted to specialty crops, including tomatoes, cucumbers, watermelons, sod, and nursery plants.

Pasture

Pasture plants that commonly are referred to as “improved” generally are introduced species, are adapted to the climate, and commonly provide improved forage quality.

Warm-season perennial grasses are the dominant introduced forage in Glades County. These grasses produce most of their growth in the summer. Bahiagrass is the most common grass in the county. The scarcity of digitgrass, limpograss, and bermudagrass is attributed to their need for more intensive management. Annual grasses include ryegrass, which is a cool-season forage, and sorghum-sudangrass hybrids, which are warm-season forages. Grasses can be supplemented with legumes to increase forage production, palatability, and digestibility. Legumes also fix atmospheric nitrogen, which is then supplied to the grasses. Legumes can reduce or eliminate the need for applications of nitrogen fertilizer. White clover is the major cool-season legume. Warm-season legumes include perennials, such as carpon desmodium and phasey bean, and annuals, such as jointvetch, hairy indigo, and alyce clover.

Some introduced plants are not adapted to the natural environment of Florida. To insure the survival and optimum performance of these plants, the environment must be modified to compensate for the shortcomings of the introduced plants. Environmental modifications include water-control measures, such as drainage and irrigation, and soil amendments, such as applications of fertilizer and adjustment of pH. Rotation grazing provides adequate rest periods during the growing season for the forage to reproduce and replenish root reserves. These rest periods ensure healthy, productive, nutritious forage.

A prevalence of weeds and brush indicates the need for improved management. Other common problems include excessive or inadequate moisture, low fertility or pH, uncontrolled grazing, and improper plant selection.

Pasture is used to produce forage for beef and dairy cattle. Commercial cow-calf operations are the major livestock enterprises in the county. They range from less than one hundred animals to several hundred. Large operations generally use a combination of rangeland and improved, or introduced, perennial plants for forage. Small operations generally use only improved pasture plants.

In recent years, the higher cost of fertilizer and equipment has slowed the conversion of rangeland to pastureland. Some ranchers, aware of the value of native grasses, have switched from the intensive agronomic management approach to a more ecologically based management of native grasses.

Pomello soils are moderately suited to bahiagrass, improved bermudagrass, and pangolagrass. If properly managed, hairy indigo, alsike clover, and jointvetch can be grown in summer and fall. Improved bermudagrass and legumes, such as sweet clover, can be grown if adequate amounts of lime and fertilizer are applied.

If drained, Basinger, Felda, Immokalee, Malabar, Myakka, Oldsmar, Pineda, Smyrna, and Valkaria soils are well suited to bahiagrass and hermarthria grass. Subsurface irrigation increases the length of the growing season and the total production of forage. These soils are well suited to legumes, such as white clover, if adequate amounts of lime and fertilizer are added.

Very poorly drained soils are very wet during rainy periods. Examples are Astor, Chobee, Gator, and Okeelanta soils. In most areas of these soils, water stands on the surface and the production of good quality forage is not possible unless artificial drainage is used.

The design of surface drainage and subsurface irrigation systems varies with the kind of soil and the forage species. For intensive production of forage, a combination of these systems is needed. Information regarding the drainage and irrigation needed for each kind of soil is available at the local office of the Natural Resources Conservation Service.

In some parts of the county, the pastures are greatly depleted by excessive grazing. Yields can be increased mainly by good grassland management and by adding lime and fertilizer. Differences in the size of yields and kinds of pasture plants are closely related to differences in the soils. Management of pasture is based on the relationship of soils, pasture plants, lime, fertilizer, and moisture.

The latest information about pasture can be obtained from the local offices of the Natural Resources Conservation Service and the Cooperative Extension Service.

Crops

On many of the soils in the county, extensive drainage is required for the production of crops.

Erosion caused by water is not a serious problem in Glades County. Erosion generally is a hazard on sloping soils where a cover of vegetation does not protect the surface. Erosion can reduce productivity and result in the sedimentation of streams. Productivity is reduced as the surface layer erodes and more of the subsoil is incorporated into the plow layer. Controlling erosion minimizes the pollution of streams and improves the quality of water for municipal uses, for recreational uses, and for fish and wildlife.

Erosion control practices provide a protective surface cover, help to control runoff, and increase the rate of water infiltration. A cropping system that keeps a plant cover on the surface for extended periods can hold soil losses to an amount that does not reduce the productive capacity of the soils. Including grasses and legumes in the cropping system helps to control erosion and improves tilth for the crops that follow in the rotation. The legumes also increase the nitrogen levels in the soils

Tillage practices that leave crop residue on the surface help to control runoff and erosion. These practices can be adapted to most soils in the county.

Soil blowing and wind erosion are major hazards on the sandy and organic soils in the county. Strong winds can damage soils and tender crops in open, unprotected areas, especially if the soils are dry and are not protected by a plant cover or crop residue.

About three-fourths of the cropland in the county is subject to soil blowing and wind erosion. Keeping a plant cover or mulch on the surface helps to control these hazards.

Wind erosion reduces soil fertility by removing the finer soil particles and organic matter from the soil; damages or destroys crops by sandblasting; spreads diseases, insects, and weed seeds; and creates health hazards and cleaning problems. Control of wind erosion maintains soil quality, protects crops, reduces the spread of insects and disease, and improves air quality.

Field windbreaks of adapted trees and shrubs, such as Carolina cherry laurel, slash pine, southern redcedar, and Japanese privet, and strips of small grains help to control 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 regarding conservation practices, including the design of systems to control wind erosion, is available from the local office of the Natural Resources Conservation Service.

Drainage is a major management concern on much of the cropland in the county. Some soils are naturally so wet that unless they are drained the production of crops commonly grown in the area generally is not practical. Examples are the poorly drained Basinger, EauGallie, Felda, Immokalee, Malabar, Myakka, Pineda, Smyrna, and Valkaria soils.

Most of the soils in the county have naturally low fertility, have a sandy surface layer, and are a light color. Felda, Malabar, and Pineda soils have a loamy subsoil. Astor and Valkaria soils have sandy material to a depth of 80 inches or more. Basinger, EauGallie, Immokalee, Myakka, Pomello, and Smyrna soils have a dark, sandy subsoil that contains organic carbon.

Most of the soils have a surface layer that is strongly acid or very strongly acid. Applications of ground limestone are required to raise the pH level sufficiently for the production of crops. The levels of nitrogen, potassium, and available phosphorus are naturally low in most of the soils in the county. On all of the soils, additions of lime and fertilizer should be based on the results of soil tests, on the needs of the crops, and on the expected yields. The Cooperative Extension Service can help in determining the kind and amount of fertilizer and lime to apply.

Soil tilth is an important factor in the germination of seeds and in the infiltration of water into the soil. Soils that have good tilth are granular and porous.

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

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

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

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

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

Crops other than those shown in the table 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 Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

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

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

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

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *w* or s, to the class numeral, for example, IIw. 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.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 and IIIe-6.

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

Rangeland

Sid Brantly, State range conservationist, Natural Resources Conservation Service, helped prepare this section.

Livestock producers manage about 37,000 head of cattle on approximately 280,000 acres of rangeland in Glades County. This land also provides food and cover for wildlife and filtration and storage for freshwater.

The native vegetation on rangeland is predominantly grasses, grass-like plants, forbs, and shrubs that are suitable for grazing. In Glades County, areas of rangeland include natural grasslands, savannahs, and lightly wooded lands. Many acres of this rangeland have been farmed and are returning to native vegetation. Much of this area has been invaded by brush. A good management plan for rangeland includes proper grazing use, a planned grazing system, weed and brush control, and deferred grazing.

Proper grazing use requires manipulating the length and intensity of grazing so that a maximum of 50 percent of the current year’s growth of desirable plants is removed each year. This is best accomplished by implementing a planned grazing system that allows for deferment periods of at least two months during the growing season.

Weed and brush control can bring brush and weed cover and distribution back to a level that approximates the natural conditions. Mechanical treatment, chemical treatment, and prescribed burning can be used individually or in combination. Deferred grazing that includes completely resting a site from all livestock use improves the condition and vigor of range plants. Normally, a deferment of at least 30 days should follow prescribed burning and a deferment of 90 days should follow mechanical treatment.

A *range site* is a distinctive kind of rangeland that produces a characteristic natural plant community that differs from natural plant communities on other range sites in kind, amount, and proportion of range plants. The relationship between soils and vegetation was established during this survey; thus, range sites generally can be determined directly from the soil map. Soil properties that affect the moisture supply and plant nutrients have the greatest influence on the productivity of range plants.

Range condition is a measure of the present plant community in relation to its potential. Four classes are used to measure range condition. They are:

- Excellent condition—Sites that produce more than 75 percent of their potential

- Good condition—Sites that produce 51 to 75 percent of their potential
- Fair condition—Sites that produce 26 to 50 percent of their potential
- Poor condition—Sites that produce less than 26 percent of their potential

The productivity of a site is closely related to the natural drainage of the soil. The wettest soils, such as those in marshes, generally produce the greatest amounts of vegetation. Deep, droughty, sandy soils generally produce the least amount.

In the following paragraphs, the range sites that are most important for wildlife and livestock in Glades County are described.

The *South Florida Flatwoods* range site is in nearly level areas. It consists of scattered to numerous pine trees and scattered saw palmetto, gallberry, and other woody plants. It produces an abundant quantity of grasses. Creeping bluestem is the dominant grass. Indiangrass, chalky bluestem, panicums, and pineland threeawn also occur in significant amounts. If areas of this range site are allowed to deteriorate because of uncontrolled livestock grazing and annual burning, the amount of saw palmetto and pineland threeawn increases significantly and the amount of bluestems, Indiangrass, and panicums decreases.

The *Slough* range site is generally open grassland in nearly level areas that act as broad natural drainage courses. The potential plant community is dominated by blue maidencane, chalky bluestem, and bluejoint panicum. These grasses are all readily utilized by livestock. If overgrazing occurs for a prolonged period, carpetgrass and sedges replace the better grasses.

The *Freshwater Marsh and Pond* range site is open grassland marshes and ponds. It has potential for producing significant amounts of maidencane. The water level fluctuates throughout the year, and during periods of high water levels a natural deferment from livestock grazing occurs. This site is a preferred grazing area for cattle. Prolonged overgrazing causes deterioration of the site. The amount of pickerelweed, sawgrass, willows, and primroses increases if overgrazing continues.

The *Sand Pine Scrub* range site is on nearly level to gently sloping uplands. It has limited potential for producing native forage plants. It supports a relatively dense woody understory. Livestock do not use this site if other range sites are available. The principal forage plants are lopsided Indiangrass, bluestems, and low panicums.

The *Cabbage Palm Flatwoods* range site is in nearly level areas. It is characterized by cabbage palm trees scattered throughout the landscape. If areas of this site are in excellent condition, they are preferred livestock grazing areas and produce a large quantity of high quality forage plants. Creeping bluestem, chalky bluestem, and several species of panicum are the dominant forage grasses. The amount of pineland threeawn and saw palmetto increases if the condition of the range site deteriorates.

The *Wetland Hardwood Hammocks* range site is forested, nearly level, and somewhat poorly drained or poorly drained. Laurel oak, live oak, water oak, red maple, and cypress dominate the overstory, and switchgrass, maidencane, perennial blue maidencane, and chalky bluestem are important forage plants in the understory. Areas of this site commonly are not very productive because of the canopy. Common carpetgrass is regularly found if the site degrades to poor condition.

In Glades County, 50,000 acres of pastureland provides habitat for a host of wildlife species, provides filtration and storage of freshwater, and supports about 20,000 brood cows. Bahiagrass, pangola digitgrass, limpograss, bermudagrass, and jointvetch are managed on much of the pastureland in the county. A good management plan for pastureland includes weed control, applications of fertilizer and lime, planned grazing, and water control.

Stubble height on bahiagrass is successfully managed at about 2 inches. Short grazing periods are followed by 3-week rest periods. Stubble height on pangola digitgrass is best managed at 4 to 6 inches. Five-week rest periods are appropriate. Stubble height on limpograsses is successfully managed at about 6 inches. Nine-week rest periods are appropriate.

Woodland Management and Productivity

Table 4 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce in a pure stand under natural conditions. The number 1 indicates low potential productivity; 2 or 3, moderate; 4 or 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *W* indicates excess water in or on the soil, and *S* indicates sandy texture.

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

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

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

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

The *volume*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic meters per hectare per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

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

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

Recreation

The soils of the survey area are rated in table 5 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines (fig. 4). 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 uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

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

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

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and

Figure 4.—A canal constructed as a water management practice through areas of poorly drained soils, such as this area of Boca fine sand. Boating is a popular recreational activity in the county.

are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

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

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

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

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

John Vance, biologist, Natural Resources Conservation Service, helped prepare this section.

Glades County is largely rural, and good wildlife habitat is available in most areas of the county. A large acreage remaining in native rangeland, the wetlands along Fisheating Creek, and 44,000 acres of wetlands inside the dike around Lake Okeechobee provide the most valuable habitat.

The primary game species are white-tailed deer, wild turkey, bobwhite quail, gray squirrel, mourning dove, and feral hogs. Other wildlife species include gray fox, skunks, otter, burrowing owls, snipe, raccoon, opossum, bobcat, armadillo, and a variety of songbirds, woodpeckers, wading birds, reptiles, and amphibians. The wood duck is a year-round resident of the wooded swamps and the Florida duck is found in the marsh areas.

Lake Okeechobee is a prime fishing area, primarily for largemouth bass, speckled perch (black crappie), and catfish. The lake and the Kissimmee River, Fisheating Creek, and the Caloosahatchee River also provide habitat for a variety of other fishes, including bluegill, redear, spotted and redbreast sunfish, warmouth, chain and redfin pickerel, bowfin, and gar.

A number of endangered and threatened species are found in Glades County, ranging from the seldom seen red-cockaded woodpecker to more commonly apparent species, such as caracara and wood stork. A detailed list of species and information on range and habitat are available at the local office of the Natural Resources Conservation Service.

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

In table 6, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

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

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

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

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are bahiagrass, pangolagrass, deervetch, clover, and gesbania.

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

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, palmetto, sugarberry, redbay, wild grape, hawthorn, mulberry, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are firethorn, persimmon, and beautyberry.

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

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, cordgrass, rushes, sedges, and reeds.

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

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

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

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

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

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. Ratings are given for 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 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

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

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

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

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

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

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

Building Site Development

Table 7 shows the degree and kind of soil limitations that affect shallow excavations, dwellings without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations, if any, are minor and easily overcome; *moderate* if soil properties or site features are somewhat restrictive for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable that special design, soil reclamation, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and 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 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, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

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

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

Sanitary Facilities

Table 8 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations, if any, are minor and easily overcome; *moderate* if soil properties or site features are moderately favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or alteration.

The table also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

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

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

The table gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

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

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

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

The ratings in the table are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench 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 sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

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

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 the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 9 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

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

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

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

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of 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. They are used in many kinds of construction. Specifications for each use vary widely. In the table, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

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

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

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

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

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

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

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, or have a seasonal high water table at or near the surface.

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

Water Management

Table 10 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations, if any, are minor and are easily overcome;

moderate if soil properties or site features are somewhat restrictive for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are unfavorable for the use. Special design, possibly increased maintenance, or alteration are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

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

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and 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.

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 and 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.

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 to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 11 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading “Soil Series and Their Morphology.”

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. “Loam,” for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, “gravelly.” Textural terms are defined in the Glossary.

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

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

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

Rock fragments from 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

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

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

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

Physical and Chemical Properties

Table 12 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $^{1}/_{3}$-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

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

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

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

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

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

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

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.64. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are as follows:

1. Coarse sands, sands, fine sands, and very fine sands.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, ash material, and sapric soil material.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material.

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 the table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Soil and Water Features

Table 13 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

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

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

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

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a 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 the table have two hydrologic groupings, a B/D listing means that under natural conditions this soil would be in Group D, but because of applied management practices, such as ditching and pumping, the soil may be assigned to Group C or B, depending on the extent of practices applied. Because management practices vary from site to site, it is recommended that site specific investigations be made to determine the proper hydrologic group.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes or in a closed depression is considered ponding rather than flooding.

The table gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of flooding is more than 50 percent in any year). *Common* is used when the occasional and frequent classes are grouped for certain purposes. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on observations of the water table at selected sites and on the evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. Indicated in the table are the depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in the table.

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.

Two numbers in the column showing depth to the water table 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 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.

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 results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

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

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

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(13, 15)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 14 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 Histisol.

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 Saprist (meaning the soil has more sapric soil material than any other kind of organic soil material).

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; type of saturation; 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 Medisaprist (*Med*, meaning of mid latitude, plus *saprist*, the suborder of the Histisols that consists almost completely of decomposed plant remains).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup 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 taxonomic class. 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 Medisaprist.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle size, mineral content, soil temperature regime, soil depth, and reaction. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is euic, hyperthermic Typic Medisaprist.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each 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” *(14)*. Many of the technical terms used in the descriptions are defined in “Soil Taxonomy” *(13)* and in “Keys to Soil Taxonomy” *(15)*. Unless otherwise indicated, 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.”

Astor Series

The Astor series consists of very deep, very poorly drained soils that formed in thick beds of sandy marine sediments. These soils are in depressional areas of the flatwoods and along the edges of swamps and marshes. Under natural conditions these soils are ponded much of the year. Slopes are less than 2 percent. These soils are sandy, siliceous, hyperthermic Cumulic Haplaquolls.

Astor soils are closely associated with Basinger, Chobee, Felda, Floridana, Okeelanta, and Tequesta soils. Basinger soils do not have a mollic epipedon. Chobee soils have an argillic horizon. Felda soils do not have a mollic epipedon. Okeelanta soils are organic soils. Tequesta soils have a histic epipedon.

Typical pedon of Astor fine sand, depressional; 900 feet south of the northwest corner of sec. 10, T. 39 S., R. 33 E.

A—0 to 34 inches; black (10YR 2/1) fine sand; single grained; nonsticky, nonplastic; few fine and medium roots; slightly acid; clear smooth boundary.

Cg—34 to 80 inches; dark grayish brown (10YR 4/2) fine sand; singled grained; nonsticky, nonplastic; slightly acid.

Reaction ranges from slightly acid to moderately alkaline. Some pedons have a thin layer of muck above the A horizon.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2.

The Cg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. The number of mottles in shades of gray, yellow, or brown ranges from none to common. In some pedons the lower part of the C horizon has a mixture of shell fragments and fine sand.

Basinger Series

The Basinger series consists of very deep, poorly drained and very poorly drained soils that formed in marine sands. These soils are on low flats and in sloughs, depressions, and poorly defined drainageways. Slopes range from 0 to 2 percent. These soils are siliceous, hyperthermic Spodic Psammaquents.

Basinger soils are closely associated with Astor, Immokalee, Myakka, and Valkaria soils. Astor soils have a thicker surface horizon than that of the Basinger soils. Immokalee and Myakka soils are in slightly higher positions than the Basinger soils and have a better developed spodic horizon. Valkaria soils have higher-chroma material.

Typical pedon of Basinger fine sand; 1,000 feet west of the northeast corner of sec. 23, T. 40 S., R. 31 E.

Ap—0 to 6 inches; gray (10YR 5/1) fine sand; single grained; loose; many uncoated sand grains; many fine and medium roots; slightly acid; clear smooth boundary.

Eg—6 to 32 inches; light gray (10YR 7/1) fine sand; single grained; loose; slightly acid; clear wavy boundary.

Bh/Eg—32 to 40 inches; dark brown (7.5YR 3/2) fine sand; weak fine granular structure; very friable; common streaks and lenses of dark brown (10YR 4/3) fine sand; few fine roots; neutral; gradual wavy boundary.

Cg1—40 to 52 inches; brown (10YR 5/3) fine sand; single grained; loose; neutral; gradual wavy boundary.

Cg2—52 to 60 inches; grayish brown (10YR 5/2) fine sand; single grained; loose; common streaks of dark brown (10YR 3/3) fine sand; neutral.

Cg3—60 to 80 inches; grayish brown (10YR 5/2) fine sand; single grained; loose; neutral.

Reaction ranges from moderately acid to neutral. The texture is sand or fine sand throughout.

The A, Ap, or Ag horizon has hue of 10YR, value of 2 to 6, and chroma of 1.

The E or Eg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 to 4.

The Bh part of the Bh/Eg horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 to 4. The Eg part has colors similar to those of the Eg horizon. The Bh/Eg horizon has few to many masses of iron accumulation, weakly cemented bodies, or streaks having hue of 5YR or 7.5YR, value of 2 or 3, and chroma of 3 to 8. Some pedons have a Bh horizon, which has colors and textures similar to those of the Bh part of the Bh/Eg horizon. The texture of the Bh/Eg horizon is sand or fine sand.

The Cg horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2.

Boca Series

The Boca series consists of moderately deep, poorly drained soils that formed in sandy and loamy beds of marine sediments over limestone. These soils are in areas of flatwoods. Slopes are 0 to 1 percent. These soils are loamy, siliceous, hyperthermic Arenic Ochraqualfs.

Boca soils are closely associated with Felda, Ft. Drum, Hallandale, and Pople soils. Hallandale soils have rock within a depth of 20 inches. Felda, Ft. Drum, and Pople soils are not underlain by limestone.

Typical pedon of Boca fine sand; in an area of cabbage palm flatwoods, 1,100 feet north and 120 feet west of the southeast corner of sec. 18, T. 38 S., R. 34 E.

Ap—0 to 4 inches; dark gray (10YR 4/1) fine sand; weak fine granular structure; very friable; many fine and medium roots; moderately acid; clear smooth boundary.

E—4 to 21 inches; light gray (10YR 7/2) fine sand; single grained; loose; moderately acid; abrupt wavy boundary.

EB—21 to 25 inches; brown (10YR 5/3) fine sand; single grained; loose; moderately acid; abrupt wavy boundary.

Btg—25 to 34 inches; light brownish gray (2.5Y 6/1) fine sandy loam; moderate medium subangular blocky structure; strongly effervescent; moderately alkaline; abrupt irregular boundary.

R—34 to 80 inches; fractured limestone.

The thickness of the solum and depth to limestone range from 25 to 40 inches. Some pedons have thin layers of marl, shells, and small rock fragments between the Btg horizon and the fractured limestone. Reaction ranges from moderately acid to neutral in the A and E horizons and from neutral to moderately alkaline in the Btg horizon.

The A or Ap horizon has hue of 10YR, value of 2 to 5, and chroma of 1 or 2.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 to 3.

The Btg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2.

The Btkg horizon, if it occurs, has colors and textures similar to those of the Btg horizon.

The R layer consists of fractured limestone.

Chobee Series

The Chobee series consists of very deep, very poorly drained soils that formed in thick beds of loamy marine sediments. These soils are in depressional areas of the flatwoods and along the edges of swamps and marshes. Slopes are less than 2 percent. These soils are fine-loamy, siliceous, hyperthermic Typic Argiaquolls.

Chobee soils are associated with Astor, Basinger, Felda, Floridana, and Tequesta soils. Astor soils have a mollic epipedon over a sandy C horizon. Basinger soils do not have a mollic epipedon or an argillic horizon. Felda soils do not have a mollic epipedon. Floridana soils have an argillic horizon at a depth of 20 to 40 inches. Tequesta soils have a histic epipedon.

Typical pedon of Chobee loamy fine sand, depressional; in a marsh 2,400 feet west and 2,500 feet south of the northeast corner of sec. 30, T. 42 S., R. 30 E.

A—0 to 9 inches; very dark gray (10YR 3/1) loamy fine sand; weak medium granular structure; friable; many or common fine and medium roots; moderately acid; abrupt smooth boundary.

Btg1—9 to 22 inches; grayish brown (10YR 5/2) sandy clay loam; moderate medium subangular blocky structure; friable; pockets and nodules of calcium carbonate (marl); strongly effervescent; moderately alkaline; gradual wavy boundary.

Btg2—22 to 50 inches; gray (10YR 6/1) fine sandy loam; weak medium subangular blocky structure; friable; about 15 percent shells and shell fragments; strongly effervescent; moderately alkaline; gradual wavy boundary.

Cg1—50 to 62 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose; about 15 percent shell fragments; strongly effervescent; moderately alkaline; gradual wavy boundary.

Cg2—62 to 80 inches; pale brown (10YR 6/3) gravelly sand; single grained; loose; about 15 percent shells and shell fragments; strongly effervescent; moderately alkaline.

The solum is more than 60 inches thick. Reaction ranges from moderately acid to neutral in the A horizon and from neutral to moderately alkaline in the Btg and Cg horizons.

The thin Oa horizon, if it occurs, has hue of 10YR, value of 2, and chroma of 1 or 2.

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

The Btg horizon has hue of 10YR, value of 2 to 6, and chroma of 1 or 2. The number of mottles in shades of brown ranges from none to common. The texture dominantly is sandy clay loam, but in some pedons it is sandy loam or fine sandy loam. The number of nodules of calcium carbonate ranges from none to common.

The Cg horizon has hue of 10YR, value of 5 or 6, and chroma of 1 to 4; or it has hue of 5GY, value of 5 or 6, and chroma of 1. The texture is sand, fine sand, loamy sand, or gravelly sand. The number of shells and shell fragments ranges from none to many. In some pedons the horizon has a mix of sand and shell fragments.

Dania Series

The Dania series consists of shallow, very poorly drained soils that formed in well decomposed organic materials overlying hard limestone in freshwater marshes or swamps. These soils are in large swamps and marshes south of Lake Okeechobee and in small depressional areas throughout the county. Slopes are 0 to 1 percent. These soils are euic, hyperthermic, shallow Lithic Medisaprists.

Dania soils are closely associated with Lauderhill, Okeelanta, Pahokee, Plantation, Sanibel, and Terra Ceia soils. Okeelanta, Sanibel, and Terra Ceia soils do not have limestone within the profile. Lauderhill and Pahokee soils have more than 20 inches of organic materials over limestone. Plantation soils have hard limestone at a depth of more than 20 inches.

Typical pedon of Dania muck, drained; approximately 1,300 feet south and 2,500 feet west of the northeast corner of sec. 36, T. 42 S., R. 32 E.

Oap—0 to 16 inches; black (N 2/0) muck; about 10 percent fiber unrubbed, 2 percent rubbed; moderate medium granular structure; very friable; dark brown (10YR 4/3) sodium pyrophosphate extract; pH 7.0 in 0.01M $CaCl_2$; abrupt smooth boundary.

2R—16 to 80 inches; hard limestone.

The thickness of the soil ranges from 8 to 20 inches. The organic materials have pH of more than 4.5 in 0.01M calcium chloride and pH of 6.1 to 8.4 by the Hellige-Troug method. Hard limestone is within a depth of 20 inches.

The Oa or Oap horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 or 2; or it is neutral in hue and has value of 2. The content of fiber is about 5 to 20 percent unrubbed and ranges from less than 1 percent to 5 percent rubbed.

The 2C horizon, if it occurs, has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. The texture is sand, or it is loamy sand that has pockets of sandy clay loam. In some pedons the horizon contains carbonatic materials, marl, or fragments of limestone.

The 2R layer is hard limestone.

EauGallie Series

The EauGallie series consists of very deep, poorly drained soils that formed in marine sediments. These soils are in broad areas of flatwoods adjacent to sloughs and streams. Slopes range from 0 to 2 percent. These soils are sandy, siliceous, hyperthermic Alfic Haplaquods.

EauGallie soils are closely associated with Felda, Immokalee, Myakka, Oldsmar, and Smyrna soils. Felda soils do not have a spodic horizon. Immokalee, Myakka, and Smyrna soils do not have an argillic horizon. Oldsmar soils have an A horizon and an E horizon that have a combined thickness of more than 30 inches.

Typical pedon of EauGallie fine sand; 2,200 feet east of the northwest corner of sec. 12, T. 41 S., R. 28 E.

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

E—8 to 23 inches; gray (10YR 6/1) fine sand; single grained; loose; strongly acid; abrupt clear boundary.

Bh1—23 to 26 inches; black (10YR 2/1) fine sand; weak fine granular structure; very friable; sand grains coated with organic materials; very strongly acid; gradual wavy boundary.

Bh2—26 to 42 inches; very dark grayish brown (10YR 3/2) fine sand; weak fine granular structure; friable; sand grains coated with organic materials; extremely acid; abrupt wavy boundary.

Btg—42 to 55 inches; light gray (10YR 7/1) sandy clay loam; weak fine subangular blocky structure; massive; moderately acid; gradual wavy boundary.

C—55 to 80 inches; pale brown (10YR 6/3) fine sand; single grained; loose; moderately acid.

The thickness of the solum ranges from 46 to more than 80 inches. Reaction ranges from very strongly acid to moderately acid in the A and E horizons, except where the surface has been limed or irrigated with alkaline artesian water, and from extremely acid to slightly alkaline in all other horizons.

The A or Ap horizon has hue of 10YR, value of 2 to 4, and chroma of 1.

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

The Bh horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 to 3; or it is neutral in hue and has value of 2. The texture is sand or fine sand.

The BE horizon, if it occurs, has hue of 10YR, value of 4 to 7, and chroma of 3 or 4.

The E´ horizon, if it occurs, has hue of 10YR, value of 4 to 6, and chroma of 1 to 3. The texture is sand or fine sand.

The Btg horizon has hue of 10YR, 5Y, or 2.5Y, value of 4 to 7, and chroma of 1 or 2. The texture is sandy loam, fine sandy loam, or sandy clay loam.

Felda Series

The Felda series consists of very deep, poorly drained soils that formed in sandy and loamy marine sediments. These soils are in large drainageways and broad sloughs in areas of the flatwoods. Slopes are 0 to 1 percent. These soils are loamy, siliceous, hyperthermic Arenic Ochraqualfs.

Felda soils are closely associated with Malabar, Pineda, Pople, and Valkaria soils. Malabar, Pineda, and Valkaria soils have a Bw horizon. Pople soils have carbonates above and within the Bt horizon.

Typical pedon of Felda fine sand; about 1,400 feet south and 2,450 feet east of the northwest corner of sec. 34, T. 40 S., R. 32 E.

A—0 to 4 inches; black (10YR 2/1) fine sand; weak fine granular structure; very friable; slightly acid; clear smooth boundary.

Eg—4 to 35 inches; light gray (10YR 7/2) fine sand; common medium distinct light yellowish brown (10YR 6/4) mottles; single grained; loose; slightly acid; abrupt wavy boundary.

Btg—35 to 43 inches; light brownish gray (2.5Y 6/2) fine sandy loam; common medium distinct olive brown (2.5Y 4/4) mottles; weak medium subangular blocky structure; neutral; gradual wavy boundary.

Cg—43 to 80 inches; light brownish gray (2.5Y 6/2) fine sand; massive; loose; about 70 percent, by volume, shells and shell fragments; moderately alkaline.

The thickness of the solum ranges from 30 to 80 inches. Reaction ranges from strongly acid to slightly alkaline in the A and Eg horizons, from slightly acid to slightly alkaline in the Btg horizon, and from slightly acid to moderately alkaline in the Cg horizon.

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

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

The Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 7, and chroma of 1 or 2. The number of mottles in shades of brown, yellow, and red ranges from none to common. The texture is sandy loam, fine sandy loam, or sandy clay loam.

The Cg horizon has hue of 10YR or 2.5Y, value of 4 to 8, and chroma of 1 or 2. The texture is sand, fine sand, or loamy sand or their gravelly to extremely gravelly analogs. The content of shells and shell fragments is as much as 70 percent, by volume, and generally increases with depth.

Floridana Series

The Floridana series consists of very deep, very poorly drained soils that formed in thick beds of loamy marine sediments. These soils are in depressional areas in the flatwoods and along the edges of swamps and marshes. Slopes range from 0 to 2 percent. These soils are loamy, siliceous, hyperthermic Arenic Argiaquolls.

Floridana soils are closely associated with Astor, Basinger, Chobee, Felda, and Tequesta soils. Astor soils have a mollic epipedon over a sandy C horizon. Basinger soils do not have a mollic epipedon or an argillic horizon. Chobee soils have a Bt horizon of sandy clay loam within a depth of 20 inches. Felda soils do not have a mollic epipedon. Tequesta soils have a histic epipedon.

Typical pedon of Floridana fine sand, depressional; about 100 feet west and 2,300 feet north of the southeast corner of sec. 7, T. 38 S., R. 34 E.

A—0 to 19 inches; black (10YR 2/1) fine sand; weak fine granular structure; very friable; moderately alkaline; clear smooth boundary.

Eg—19 to 25 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; moderately alkaline; clear smooth boundary.

Btg—25 to 45 inches; gray (N 6/0) fine sandy loam; weak fine subangular blocky structure; friable; moderately alkaline; gradual wavy boundary.

2Cg—45 to 80 inches; light gray (10YR 6/1) sandy loam; massive; few lenses of loamy sand; moderately alkaline.

The thickness of the solum ranges from 35 to more than 80 inches. Reaction ranges from slightly acid to moderately alkaline. Some pedons have a surface layer of mucky fine sand or muck. This layer is less than 8 inches thick.

The A or Ag horizon has hue of 10YR, value of 2 or 3, and chroma of 1. The texture is sand or fine sand.

The E or Eg horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. The texture is sand or fine sand.

The Btg horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2; or it is neutral in hue and has value of 4 to 6. The number of mottles in shades of brown, yellow, and gray ranges from none to common. The texture is sandy loam, fine sandy loam, or sandy clay loam.

The Cg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. The texture is loamy sand or sandy loam. In some pedons the lower part of the Cg horizon has shell fragments.

Ft. Drum Series

The Ft. Drum series consists of very deep, poorly drained soils that formed in marine sands influenced by calcareous deposits. These soils are on low flats and ridges that border sloughs, depressions, and drainageways. Slopes range from 0 to 2 percent. These soils are sandy, siliceous, hyperthermic Aeric Haplaquepts.

Ft. Drum soils are associated with Malabar, Pineda, Pople, and Valkaria soils. Malabar, Pineda, and Valkaria soils do not have masses and nodules of calcium carbonate. Pople soils have an argillic horizon below the Bk horizon.

Typical pedon of Ft. Drum fine sand; in an area of rangeland about 100 feet east and 1,500 feet south of the northwest corner of sec. 29, T. 40 S., R. 32 E.

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

E—5 to 10 inches; gray (10YR 5/1) fine sand; single grained; loose; slightly acid; gradual wavy boundary.

Bw—10 to 22 inches; dark brown (10YR 4/3) fine sand; single grained; loose; slightly acid; clear smooth boundary.

Bkg—22 to 32 inches; light gray (10YR 7/1) fine sandy loam; weak fine granular structure; very friable; slightly effervescent; moderately alkaline; gradual wavy boundary.

Ck1—32 to 45 inches; brownish yellow (10YR 6/6) fine sand; single grained; loose; few nodules of calcium carbonate; slightly effervescent; moderately alkaline; gradual wavy boundary.

Ck2—45 to 65 inches; pale brown (10YR 6/3) fine sand; single grained; loose; few nodules of calcium carbonate; slightly effervescent; moderately alkaline; gradual wavy boundary.

Ckg—65 to 80 inches; gray (10YR 5/1) fine sand; single grained; loose; few nodules of calcium carbonate; slightly effervescent; moderately alkaline.

Reaction ranges from strongly acid to neutral in the A horizon and from slightly acid to moderately alkaline below the A horizon.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 1 to 3.

The E horizon, if it occurs, has hue of 10YR, value of 5 to 7, and chroma of 1 or 2.

The Bw horizon, if it occurs, has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 3 or 4. The number of mottles in shades of yellow, brown, and gray ranges from none to common. The texture is fine sand or loamy fine sand.

The Bkg horizon has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 1 or 2. The number of mottles in shades of brown or yellow ranges from none to common. The texture is fine sand, loamy fine sand, or fine sandy loam.

The Ckg or Cg horizon, if it occurs, has hue of 10YR, value of 5 to 7, chroma of 1 to 6. The number of nodules of calcium carbonate ranges from none to common. The texture is fine sand or sand.

Gator Series

The Gator series consists of very deep, very poorly drained soils that formed in deep deposits of sapric material underlain by loamy mineral layers. These soils are in marshes, swamps, and depressional areas. Slopes are 0 to 1 percent. These soils are loamy, siliceous, euic, hyperthermic Terric Medisaprists.

Gator soils are closely associated with Chobee, Felda, Floridana, and Tequesta soils. These associated soils are mineral soils. Also, Tequesta soils have a histic epipedon.

Typical pedon of Gator muck, depressional; 2,290 feet north and 2,260 feet west of the southeast corner of sec. 21, T. 38 S., R. 33 E.

Oa—0 to 33 inches; black (N 2/0) muck; about 10 percent fiber unrubbed, 1 percent rubbed; weak fine granular structure; very friable; many fine and very fine roots; moderately acid; pH 5.85 in 0.01M $CaCl_2$; gradual wavy boundary.

Cg1—33 to 40 inches; black (10YR 2/1) fine sandy loam; massive; neutral; gradual wavy boundary.

Cg2—40 to 50 inches; dark olive gray (5Y 3/2) fine sandy loam; massive; slightly sticky, slightly plastic; neutral; gradual wavy boundary.

Cg3—50 to 80 inches; gray (5Y 6/1) fine sand; single grained; loose; neutral.

The thickness of the organic material ranges from 16 to 40 inches. The organic material has pH of 4.5 or more in 0.01 molar calcium chloride solution and pH of 6.5 to 7.5 by the Hellige-Troug method. Reaction ranges from slightly acid to moderately alkaline in the Cg horizon.

The Oa horizon has hue of 5YR to 10YR, value of 2, and chroma of 2 or less; or it is neutral in hue and has value of 2.

The Cg horizon has hue of 10YR to 5Y, value of 2 to 7, and chroma of 1 or 2. The texture is dominantly fine sandy loam, sandy loam, or sandy clay loam and ranges to fine sand or sand in the lower parts.

Hallandale Series

The Hallandale series consists of shallow, very poorly drained soils that formed in thin deposits of marine sediments over limestone. These soils are on low, broad flats and on cabbage palm hammocks. Slopes range from 0 to 2 percent. These soils are siliceous, hyperthermic Lithic Psammaquents.

Hallandale soils are closely associated with Boca, Ft. Drum, Felda, Pineda, and Pople soils. Boca soils are moderately deep over limestone. Ft. Drum, Felda, Pineda, and Pople soils are not underlain by limestone.

Typical pedon of Hallandale fine sand; on a cabbage palm hammock, about 300 feet east of the northwest corner of sec. 21, T. 39 S., R. 33 E.

A—0 to 4 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; very friable; moderately acid; gradual wavy boundary.
E—4 to 9 inches; dark gray (10YR 4/1) fine sand; single grained; loose; neutral; gradual wavy boundary.
Bw—9 to 19 inches; brown (10YR 5/3) fine sand; single grained; loose; moderately alkaline; abrupt irregular boundary.
2R—19 to 80 inches; hard limestone.

The thickness of the solum ranges from 7 to 20 inches. Reaction ranges from strongly acid to neutral in the A horizon and from moderately acid to moderately alkaline in the rest of the profile. Some pedons have a mixture of sand, loamy sand, and shell fragments in solution holes and fractures in the limestone.

The A horizon has hue of 10YR, value of 2 to 6, and chroma of 1.

The E horizon, if it occurs, has hue of 10YR, value of 4 to 7, and chroma of 1 or 2.

The Bw horizon, if it occurs, has hue of 10YR, value of 5 to 7, and chroma of 3.

The 2R layer is hard limestone.

Immokalee Series

The Immokalee series consists of very deep, poorly drained soils that formed in sandy marine sediments. These soils are in broad areas of flatwoods. Slopes range from 0 to 2 percent. These soils are sandy, siliceous, hyperthermic Arenic Haplaquods.

Immokalee soils are associated with Basinger, Felda, Myakka, and Pomello soils. Basinger soils are in lower positions than the Immokalee soils and do not have a spodic horizon. Felda soils have an argillic horizon. Myakka soils have a spodic horizon at a depth of 20 to 30 inches. Pomello soils are better drained than the Immokalee soils.

Typical pedon of Immokalee sand; about 700 feet north and 700 feet east of the southwest corner of sec. 21, T. 41 S., R. 31 E.

Ap—0 to 8 inches; very dark gray (10YR 3/1) sand; single grained; loose, very friable; common fine and medium roots; very strongly acid; gradual wavy boundary.
E1—8 to 16 inches; gray (10YR 5/1) sand; single grained; loose; common fine and medium roots; very strongly acid; clear wavy boundary.
E2—16 to 38 inches; white (10YR 8/1) sand; single grained; loose; few fine roots; moderately acid; abrupt wavy boundary.
Bh—38 to 48 inches; black (10YR 2/1) sand; weak fine subangular blocky structure; very friable; few fine roots; very strongly acid; gradual wavy boundary.
BC1—48 to 55 inches; yellowish brown (10YR 5/4) sand; single grained; loose; few fine roots; very strongly acid; gradual wavy boundary.
BC2—55 to 80 inches; brown (10YR 5/3) sand; single grained; loose; common medium dark reddish brown (5YR 3/3) sand lenses; very strongly acid.

The thickness of the solum ranges from 72 to more than 80 inches. Reaction ranges from very strongly acid to moderately acid throughout.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1.

The E horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2.

The Bh horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 2 or less.

The BC horizon has hue of 10YR, value of 3 to 5, and chroma of 3 or 4; or it has hue of 7.5YR, value of 4, and chroma of 2.

The C horizon, if it occurs, has hue of 10YR, value of 4 to 6, and chroma of 1 or 2.

Lauderhill Series

The Lauderhill series consists of moderately deep, very poorly drained soils that formed in well decomposed organic materials overlying hard limestone. These soils are in large swamps and marshes south of Lake Okeechobee and in small depressional areas throughout the county. Slopes are 0 to 1 percent. These soils are euic, hyperthermic Lithic Medisaprists.

Lauderhill soils are associated with Dania, Okeelanta, Pahokee, Plantation, Sanibel, and Terra Ceia soils. Dania soils are underlain by limestone at a depth of less than 20 inches. Okeelanta, Sanibel, and Terra Ceia soils do not have limestone within the profile. Pahokee soils have 36 to 51 inches of organic materials over limestone. Plantation soils have less than 16 inches of organic materials.

Typical pedon of Lauderhill muck; about 2,600 feet west and 2,400 feet south of the northeast corner of sec. 23, T. 42 S., R. 32 E.

Oap—0 to 10 inches; black (10YR 2/1) muck; about 10 percent fiber unrubbed, 2 percent rubbed;

moderate medium granular structure; very friable; dark brown (10YR 4/3) sodium pyrophosphate extract; pH 7.0 in 0.01M $CaCl_2$; clear smooth boundary.

Oa—10 to 25 inches; black (10YR 2/1) muck; about 5 percent fiber unrubbed, less than 2 percent rubbed; massive; friable; dark brown (10YR 4/3) sodium pyrophosphate extract; pH 7.1 in 0.01M $CaCl_2$; clear smooth boundary.

2R—25 to 80 inches; hard limestone.

The thickness of the organic materials ranges from 16 to 36 inches. The organic materials have pH of more than 4.5 in 0.01M calcium chloride and pH of 6.1 to 8.4 by the Hellige-Troug method. Depth to limestone is 20 to 40 inches.

The Oap and Oa horizons have hue of 5YR or 10YR, value of 2 or 3, and chroma of 1 or 2; or they are neutral in hue and have value of 2. The content of fiber is about 5 to 20 percent unrubbed and ranges from less than 1 percent to 5 percent rubbed.

The Cg horizon, if it occurs, has hue of 10YR, value of 2 to 8, chroma of 1 or 2. The texture is mucky sand, sand, or loamy sand. The number of nodules of calcium carbonate or marl mixed with limestone fragments ranges from none to common.

The 2R layer is hard limestone.

Malabar Series

The Malabar series consists of very deep, poorly drained soils that formed in sandy and loamy marine sediments. These soils are in narrow to broad sloughs or in poorly defined drainageways in the flatwoods portion of the county. Slopes range from 0 to 2 percent. These soils are loamy, siliceous, hyperthermic Grossarenic Ochraqualfs.

Malabar soils are associated with Basinger, Felda, Myakka, Pineda, and Valkaria soils. Basinger, Myakka, and Valkaria soils do not have an argillic horizon. Felda and Pineda soils have an argillic horizon at a depth of 20 to 40 inches.

Typical pedon of Malabar fine sand; about 2,480 feet north and 300 feet west of the southeast corner of sec. 33, T. 40 S., R. 32 E.

A—0 to 8 inches; black (10YR 2/1) fine sand; weak fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

E—8 to 35 inches; light gray (10YR 7/2) fine sand; single grained; loose; few fine and medium roots; moderately acid; clear wavy boundary.

Bw—35 to 42 inches; brownish yellow (10YR 6/6) fine sand; few fine faint brownish yellow (10YR 6/8) mottles; single grained; loose; moderately acid; clear smooth boundary.

Btg—42 to 60 inches; grayish brown (2.5Y 5/1) fine sandy loam; weak coarse subangular blocky structure; slightly acid; gradual wavy boundary.

Cg—60 to 80 inches; grayish brown (2.5Y 5/2) fine sand; single grained; loose; neutral.

The thickness of the solum ranges from 46 to 80 inches. Reaction ranges from strongly acid to moderately alkaline throughout the profile.

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 2 to 4. The texture is sand or fine sand.

The Bw horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 4 to 8. The texture is sand or fine sand.

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

The Btg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. The texture is fine sandy loam, sandy loam, or sandy clay loam. The number of pockets of coarser material ranges from none to common.

The C horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. The texture is sand or fine sand. The number of pockets and lenses of loamy material or a mixture of loamy material and shell fragments ranges from none to common. The content of shell fragments ranges from 0 to 35 percent, by volume.

Myakka Series

The Myakka series consists of very deep, poorly drained soils that formed in sandy marine sediments. These soils are in broad areas of flatwoods. Slopes range from 0 to 2 percent. These soils are sandy, siliceous, hyperthermic Aeric Haplaquods.

Myakka soils are associated with Basinger, Felda, Immokalee, Pomello, and Smyrna soils. Basinger soils are in lower positions than the Myakka soils and do not have a spodic horizon. Felda soils have an argillic horizon. Immokalee soils have a spodic horizon at a depth of 30 to 50 inches. Pomello soils are moderately well drained. Smyrna soils have a spodic horizon at a depth of 4 to 20 inches.

Typical pedon of Myakka fine sand; about 2,000 feet south of the northeast corner of sec. 7, T. 42 S., R. 29 E.

A—0 to 3 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; very friable; strongly acid; clear wavy boundary.
E1—3 to 14 inches; grayish brown (10YR 5/2) fine sand; single grained; loose; strongly acid; clear wavy boundary.
E2—14 to 27 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; strongly acid; abrupt wavy boundary.
Bh1—27 to 31 inches; black (5YR 2/1) fine sand; weak fine subangular blocky structure; very friable; sand grains coated with organic materials; very strongly acid; clear wavy boundary.
Bh2—31 to 45 inches; dark brown (7.5YR 3/2) fine sand; weak fine subangular blocky structure; very friable; sand grains coated with organic materials; very strongly acid; clear wavy boundary.
C—45 to 80 inches; brown (10YR 5/3) fine sand; single grained; loose; strongly acid.

The solum is more than 30 inches thick. Reaction ranges from very strongly acid to slightly acid throughout the profile.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1.

The E horizon has hue of 10YR, value of 4 to 8, and chroma of 1 or 2.

The Bh horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 to 3.

The BC horizon, if it occurs, has hue of 5YR to 10YR, value of 4 or 5, and chroma of 3 or 4.

The E´ and Bh´ horizons, if they occur, have colors similar to those of the E and Bh horizons.

The C horizon has hue of 10YR, value of 4 to 7, and chroma of 1 to 4.

Okeelanta Series

The Okeelanta series consists of very deep, very poorly drained soils that formed in well decomposed plant remains over mineral materials. These soils are in fresh water marshes, swamps, and small depressional areas. Many areas have been cleared of natural vegetation and drained by canals. Slopes are 0 to 1 percent. These soils are sandy or sandy-skeletal, siliceous, euic, hyperthermic Terric Medisaprists.

Okeelanta soils are associated with Astor, Lauderhill, Pahokee, Terra Ceia, and Tequesta soils. Astor soils are mineral throughout. Lauderhill and Pahokee soils have muck over limestone. Terra Ceia soils have more than 51 inches of muck. Tequesta soils have a histic epipedon.

Typical pedon of Okeelanta muck, depressional; about 2,000 feet south of the northwest corner of sec. 23, T. 42 S., R. 33 E.

Oap—0 to 4 inches; black (10YR 2/1) muck; about 5 percent fiber unrubbed, 1 percent rubbed; massive; friable; moderately acid; gradual wavy boundary.
Oa—4 to 31 inches; black (5YR 2/1) muck; 10 percent fiber unrubbed, about 2 percent rubbed; massive; friable; moderately acid; abrupt wavy boundary.
Cg1—31 to 50 inches; very dark gray (10YR 3/1) mucky fine sand; single grained; loose; moderately acid; gradual wavy boundary.
Cg2—50 to 80 inches; grayish brown (10YR 5/2) fine sand; single grained; loose; moderately acid.

Reaction in the organic materials ranges from moderately acid to slightly alkaline by the Hellige-Troug method and is 4.5 or more in 0.01M calcium chloride. Reaction ranges from slightly acid to moderately alkaline in the C horizon. The thickness of the organic materials ranges from 16 to 40 inches.

The Oap and Oa horizons have hue of 5YR to 10YR, value of 2, and chroma of 1 or 2.

The Cg horizon has hue of 10YR, value of 2 to 5, and chroma of 1; or it has hue of 10YR, value of 5, and chroma of 2. The number of shell fragments ranges from none to common.

Oldsmar Series

The Oldsmar series consists of very deep, poorly drained soils that formed in marine sediments. These nearly level soils are in broad areas of flatwoods. Slopes range from 0 to 2 percent. These soils are sandy, siliceous, hyperthermic Alfic Arenic Haplaquods.

Oldsmar soils are associated with EauGallie, Felda, Immokalee, Myakka, and Smyrna soils. EauGallie soils are on the same landscape as the Oldsmar soils but have a spodic horizon within a depth of 30 inches. Felda soils have an argillic horizon at a depth of 20 to 40 inches. Immokalee, Myakka, and Smyrna soils have a spodic horizon and do not have an argillic horizon.

Typical pedon of Oldsmar sand; about 800 feet west and 3,000 feet south of the northeast corner of sec. 16, T. 42 S., R. 28 E.

A—0 to 8 inches; gray (10YR 5/1) sand; single grained; loose; very strongly acid; clear smooth boundary.
E1—8 to 13 inches; light brownish gray (10YR 6/2) sand; single grained; loose; moderately acid; abrupt wavy boundary.

E2—13 to 34 inches; white (10YR 8/1) sand; single grained; loose; moderately acid; abrupt wavy boundary.

Bh—34 to 46 inches; dark reddish brown (5YR 2/2) sand; weak fine granular structure; very friable; sand grains coated with organic materials; moderately acid; gradual wavy boundary.

Btg1—46 to 62 inches; olive (5Y 5/3) sandy clay loam; weak fine subangular blocky structure; moderately acid; gradual wavy boundary.

Btg2—62 to 80 inches; light olive gray (5Y 6/2) sandy loam; weak fine granular structure; slightly sticky, slightly plastic; slightly acid.

The solum is more than 60 inches thick. Reaction ranges from extremely acid to neutral in the A, E, and Bh horizons and from strongly acid to moderately alkaline in the Bt and C horizons.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1.

The E horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2. The texture is fine sand or sand.

The Bh horizon has hue of 5YR to 10YR, value of 2 to 4, and chroma of 1 to 3. The texture is fine sand, sand, or loamy sand.

The Bt horizon, if it occurs, has hue of 10YR to 5GY, value of 4 to 7, and chroma of 3 or 4. The texture is fine sandy loam, sandy loam, or sandy clay loam.

The Btg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. The texture is fine sandy loam, sandy loam, or sandy clay loam.

The C horizon, if it occurs, has hue of 10YR, value of 5 to 7, and chroma of 2 to 4; or it has hue of 5Y, value of 5, and chroma of 1. The texture is fine sand or sand.

Pahokee Series

The Pahokee series consists of deep, very poorly drained soils that formed in well decomposed organic materials overlying hard limestone. These soils are in large swamps and marshes south of Lake Okeechobee and in small depressional areas throughout the county. Slopes are 0 to 1 percent. These soils are euic, hyperthermic Lithic Medisaprists.

Pahokee soils are associated with Dania, Lauderhill, Okeelanta, and Terra Ceia soils. Dania soils have hard limestone at a depth of less than 20 inches. Okeelanta and Terra Ceia soils do not have limestone within the profile. Lauderhill soils have hard limestone within a depth of 36 inches.

Typical pedon of Pahokee muck, drained; about 1,200 feet north and 1,100 feet west of the southeast corner of sec. 25, T. 42 S., R. 33 E.

Oap—0 to 9 inches; black (N 2/0) muck; about 6 percent fiber unrubbed, less than 1 percent rubbed; moderate medium granular structure; very friable; dark brown (10YR 4/3) sodium pyrophosphate extract; pH 7.0 in 0.01M $CaCl_2$; abrupt smooth boundary.

Oa—9 to 48 inches; black (N 2/0) muck; about 10 percent fiber unrubbed, about 2 percent rubbed; massive; friable; dark brown (10YR 4/3) sodium pyrophosphate extract; pH 7.2 in 0.01M $CaCl_2$; clear wavy boundary.

2R—48 to 80 inches; hard limestone.

The thickness of the organic materials ranges from 36 to 51 inches. The organic materials have pH of more than 4.5 in 0.01M calcium chloride and pH of 6.1 to 8.4 by the Hellige-Troug method. Limestone is at depth of 36 to 51 inches.

The Oap and Oa horizons have hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 or 2; or they are neutral in hue and have value of 2. Some pedons have a thin strata of hemic material that is less than 2 inches thick. The content of fiber is about 5 to 20 percent unrubbed and ranges from less than 1 percent to 5 percent rubbed.

The 2R layer is hard limestone.

Pineda Series

The Pineda series consists of very deep, poorly drained soils that formed in sandy and loamy marine sediments. These soils are in large drainageways and broad sloughs in areas of the flatwoods. Slopes are 0 to 1 percent. These soils are loamy, siliceous, hyperthermic Arenic Glossaqualfs.

Pineda soils are associated with Felda, Malabar, Pople, and Valkaria soils. Felda soils do not have a Bw horizon. Malabar soils have an argillic horizon below a depth of 40 inches. Pople soils have nodules of calcium carbonate above and in the Bt horizon. Valkaria soils do not have an argillic horizon.

Typical pedon of Pineda fine sand; about 900 feet north and 600 feet east of the southwest corner of sec. 20, T. 39 S., R. 33 E.

A—0 to 4 inches; gray (10YR 5/1) fine sand; single grained; loose; many fine and medium roots; strongly acid; clear smooth boundary.

E—4 to 11 inches; light gray (10YR 7/2) fine sand; single grained; loose; strongly acid; gradual wavy boundary.

Bw—11 to 22 inches; very pale brown (10YR 7/4) fine sand; single grained; loose; moderately acid; gradual wavy boundary.

E´—22 to 32 inches; light gray (10YR 7/2) fine sand; single grained; loose; moderately acid; abrupt wavy boundary.

Btg/E—32 to 36 inches; 80 percent grayish brown (10YR 5/2) fine sandy loam (Btg), 20 percent tongues or intrusions of light gray (10YR 7/2) fine sand (E); common medium distinct yellowish brown (10YR 5/8) mottles; weak fine granular structure; slightly acid; abrupt wavy boundary.

BC—36 to 47 inches; gray (5Y 6/1) loamy fine sand; weak fine subangular blocky structure; very strongly acid; abrupt wavy boundary.

Cg—47 to 80 inches; stratified light gray (10YR 7/1) fine sand; about 40 percent, by volume, shell fragments; massive; moderately alkaline.

The thickness of the solum ranges from 40 to 80 inches. Reaction ranges from very strongly acid to neutral in the A, E, and Bw horizons and from slightly acid to moderately alkaline in the Btg and Cg horizons.

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

The E horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2.

The E´ horizon, if it occurs, has the same colors as the E horizon.

The Bw horizon has hue of 10YR, value of 4 to 8, and chroma of 3 to 8.

The Btg/E horizon has hue of 10YR or 5Y, value of 4 to 7, and chroma of 1 or 2. It has intrusions or tonguing of sand or fine sand from the overlaying horizons and has pockets of sand.

The BC horizon, if it occurs, has colors similar to those of the Btg/E horizon.

The Cg horizon has hue of 10YR to 5GY, value of 5 to 8, and chroma of 1 or 2. The texture is sand or loamy sand. The content of shell fragments ranges from 0 to 50 percent, by volume.

Plantation Series

The Plantation series consists of moderately deep, very poorly drained soils that formed in well decomposed organic materials overlying hard limestone. These soils are in large swamps and marshes south of Lake Okeechobee. Slopes are 0 to 1 percent. These soils are sandy, siliceous, hyperthermic Histic Humaquepts.

Plantation soils are associated with Dania, Lauderhill, Pahokee, and Sanibel soils. Dania soils have limestone within a depth of 20 inches. Lauderhill and Pahokee soils have more than 16 inches of organic materials over limestone. Sanibel soils do not have limestone within the profile.

Typical pedon of Plantation muck, drained; about 2,600 feet west and 2,300 feet south of the northeast corner of sec. 19, T. 42 S., R. 33 E.

Oap—0 to 10 inches; black (N 2/0) muck; about 10 percent fiber unrubbed, about 2 percent rubbed; moderate medium granular structure; very friable; dark brown (10YR 4/3) sodium pyrophosphate extract; pH 7.0 in 0.01M $CaCl_2$; clear smooth boundary.

A—10 to 17 inches; black (10YR 2/1) sand; weak fine granular structure; very friable; moderately alkaline; gradual wavy boundary.

Cg—17 to 30 inches; gray (10YR 5/1) sand; few fine faint yellowish brown (10YR 5/6) mottles; single grained; loose; moderately alkaline; abrupt wavy boundary.

2R—30 to 80 inches; hard, fractured limestone.

The thickness of the solum ranges from 20 to 40 inches. The thickness of the organic layer ranges from 8 to 16 inches. The organic materials have pH of more than 4.5 in 0.01M calcium chloride. Reaction ranges from slightly acid to moderately alkaline in the mineral layers.

The Oa or Oap horizon has hue of 10YR, value of 2, and chroma of 1; or it is neutral in hue and has value of 2. The content of fiber is about 5 to 20 percent unrubbed and ranges from less than 1 percent to 5 percent rubbed.

The A horizon has hue of 10YR, value of 2 or 3, chroma of 1 or 2; or it is neutral in hue and has value of 2. The texture is sand, fine sand, or mucky fine sand.

The Cg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. The number of mottles in shades of yellow ranges from none to common. The texture is sand or fine sand. At the limestone contact in some pedons, the horizon has finer-textured materials that may include calcium carbonates, marl, or fragments of limestone.

Pomello Series

The Pomello series consists of very deep, moderately well drained soils that formed in marine sands. These soils are found on slightly elevated knolls. Slopes range from 0 to 2 percent. The soils of the Pomello series are hyperthermic Arenic Haplohumods.

Pomello soils are associated with Immokalee, Myakka, and Smyrna soils. Immokalee soils are poorly drained. Myakka and Smyrna soils have a Bh horizon within a depth of 30 inches and are poorly drained.

Typical pedon of Pomello fine sand; about 2,000 feet north of the southeast corner of sec. 27, T. 41 S., R. 28 E.

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

E1—3 to 15 inches; gray (10YR 6/1) fine sand; single grained; loose; moderately acid; clear wavy boundary.

E2—15 to 55 inches; light gray (10YR 7/2) fine sand; single grained; loose; strongly acid; clear wavy boundary.

Bh—55 to 65 inches; black (5YR 2/1) fine sand; weak fine subangular blocky structure; friable; sand grains coated with organic materials; strongly acid; clear wavy boundary.

C—65 to 80 inches; brown (7.5YR 5/2) fine sand; single grained; loose; strongly acid.

The solum is more than 40 inches thick. Reaction ranges from very strongly acid to moderately acid throughout the profile.

The A horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2.

The E horizon has hue of 10YR, value of 6 to 8, and chroma of 1 or 2.

The Bh horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 or 2.

The C horizon, if it occurs, has hue of 10YR, value of 5 to 7, and chroma of 1.

The Pomello soils in this survey area are taxadjuncts to the Pomello series because the Bh horizon is slightly deeper than is definitive for the series. The Bh horizon is below a depth of 50 inches. This difference, however, does not significantly affect the use and management of the soils because of the close similarities in physical characteristics and landscape position. In this survey area, the Pomello soils are sandy, siliceous, hyperthermic Grossarenic Haplohumods.

Pople Series

The Pople series consists of very deep, poorly drained soils that formed in sandy and loamy marine sediments influenced by alkaline materials. These soils are on cabbage palm flatwoods and hammocks throughout the county. Slopes range from 0 to 2 percent. These soils are loamy, siliceous, hyperthermic Arenic Ochraqualfs.

Pople soils are associated with Boca, Ft. Drum, Hallandale, and Malabar soils. Boca and Hallandale soils are underlain by limestone. Ft. Drum soils do not have an argillic horizon. Malabar soils have sandy layers that have a combined thickness of more than 40 inches.

Typical pedon of Pople fine sand; about 1,300 feet west and 900 feet north of the southeast corner of sec. 16, T. 39 S., R. 33 E.

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

E—8 to 15 inches; light gray (10YR 7/2) fine sand; single grained; loose; slightly acid; gradual wavy boundary.

Bw—15 to 25 inches; light yellowish brown (10YR 6/4) fine sand; single grained; loose; iron stains on sand grains; slightly alkaline; gradual wavy boundary.

Bk—25 to 30 inches; white (10YR 8/2) loamy fine sand; weak fine subangular blocky structure; strongly effervescent; slightly alkaline; abrupt smooth boundary.

Btkg—30 to 38 inches; light gray (5Y 7/1) fine sandy loam; weak fine subangular blocky structure; strongly effervescent; moderately alkaline; abrupt wavy boundary.

Cg1—38 to 48 inches; light gray (5Y 7/1) fine sand and loamy fine sand; single grained; loose; strongly effervescent; moderately alkaline; gradual wavy boundary.

Cg2—48 to 56 inches; gray (N 6/0) loamy sand and fine sand; single grained; loose; strongly effervescent; moderately alkaline; gradual wavy boundary.

Cg3—56 to 80 inches; light gray (10YR 7/1) fine sand and loamy fine sand; massive; about 40 percent, by volume, sand-sized shell fragments; strongly effervescent; moderately alkaline.

The thickness of the solum ranges from 35 to 60 inches. Reaction ranges from moderately acid to moderately alkaline in the A, E, and Bw horizons and is slightly alkaline or moderately alkaline in the Bk, Btkg, BC, and Cg horizons. Depth to accumulations of secondary calcium carbonate ranges from 10 to 40 inches.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. The texture is sand or fine sand. Where value is 2 or 3 and chroma is 1, the horizon is less than 7 inches thick.

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

The Bw horizon, if it occurs, has hue of 10YR, value of 5 or 6, and chroma of 4 to 8. The texture is sand or fine sand.

The Bk horizon, if it occurs, has hue of 10YR, value of 5 to 8, and chroma of 1 or 2. Accumulations of secondary calcium carbonate occur as coatings on sand grains, in interstices between sand grains, and as root casts. The texture is loamy sand, loamy fine sand, sandy loam, or fine sandy loam.

The Btkg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. The number of mottles in shades of gray, brown, yellow, or red ranges from none to common. Accumulations of secondary calcium carbonate occur as coatings on sand grains, in interstices between sand grains, and as root casts. The texture is sandy loam, fine sandy loam, or sandy clay loam.

The BCg horizon, if it occurs, has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. The texture is loamy sand or loamy fine sand.

The Cg horizon has hue of 10YR to 5GY, value of 5 to 7, and chroma of 2 or less; or it is neutral in hue and has value of 5 to 7. The texture is sand, fine sand, loamy sand, loamy fine sand, or a mix of these. In some pedons the sand-sizes fraction contains up to 60 percent, by volume, shell fragments.

Sanibel Series

The Sanibel series consists of very deep, very poorly drained soils that formed in sandy marine sediments. These soils are in marshes, swamps, and depressional areas. Slopes range from 0 to 2 percent. These soils are sandy, siliceous, hyperthermic Histic Humaquepts.

Sanibel soils are associated with Astor, Basinger, Okeelanta, and Tequesta soils. Astor and Basinger soils do not have a layer of organic materials on the surface. Okeelanta soils have an organic layer that is more than 16 inches thick. Tequesta soils have an argillic horizon.

Typical pedon of Sanibel muck, drained; in a cypress swamp, about 2,500 feet west and 1,800 feet north of the southeast corner of sec. 15, T. 40 S., R. 30 E.

Oa—0 to 10 inches; black (10YR 2/1) muck; massive; very friable; slightly acid; gradual wavy boundary.

A—10 to 18 inches; black (10YR 2/1) sand; single grained; loose; few fine roots; few distinct lenses of mucky sand; neutral; gradual wavy boundary.

Cg1—18 to 38 inches; dark gray (10YR 4/1) sand; single grained; loose; few fine roots; neutral; gradual wavy boundary.

Cg2—38 to 80 inches; light brownish gray (10YR 6/2) sand; single grained; loose; neutral.

The thickness of the soil is more than 80 inches. Reaction ranges from strongly acid to neutral throughout. The thickness of the Oa horizon ranges from 8 to 15 inches.

The Oa horizon has hue of 10YR to 5YR, value of 2, and chroma of 1; or it is neutral in hue and has value of 2. It is sapric organic materials.

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

The Cg horizon has hue of 10YR, value of 4 to 8, and chroma of 1 or 2. The texture is sand or fine sand.

Smyrna Series

The Smyrna series consists of very deep, poorly drained soils that formed in sandy marine sediments in broad areas of flatwoods. Slopes are 0 to 1 percent. These soils are sandy, siliceous, hyperthermic Aeric Haplaquods.

Smyrna soils are associated with Basinger, Felda, Immokalee, Myakka, and Pomello soils. Basinger soils are in lower positions on the landscape than the Smyrna soils and do not have a spodic horizon. Felda soils have an argillic horizon. Immokalee soils have a spodic horizon at a depth of 30 to 50 inches. Myakka soils have a spodic horizon at a depth of 20 to 30 inches. Pomello soils are moderately well drained.

Typical pedon of Smyrna fine sand; about 1,300 feet east and 100 feet north of the southwest corner of sec. 5, R. 29 E., T. 42 S.

Ap—0 to 4 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; friable; common medium and fine roots; very strongly acid; abrupt smooth boundary.

E—4 to 15 inches; gray (10YR 5/1) fine sand; single grained; loose; common medium and fine roots; very strongly acid; abrupt wavy boundary.

Bh1—15 to 18 inches; black (5YR 2/1) fine sand; weak fine subangular blocky structure; very friable; few fine roots; sand grains coated with organic materials; very strongly acid; clear wavy boundary.

Bh2—18 to 20 inches; black (5YR 2/1) and brown (10YR 5/3) fine sand; single grained; loose; sand grains coated with organic materials; strongly acid; clear wavy boundary.

C1—20 to 50 inches; brown (10YR 5/3) fine sand;

single grained; loose; strongly acid; clear wavy boundary.

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

The solum is more than 15 inches thick. Reaction ranges from very strongly acid to moderately acid throughout.

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

The E horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2. The texture is fine sand or sand.

The Bh horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 or 2; or it is neutral in hue and has value of 2. The texture is fine sand or sand.

The BC horizon, if it occurs, has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 or 4. The texture is fine sand or sand.

The C horizon has hue of 10YR, value of 4 to 6, and chroma of 2; or it has hue of 10YR, value of 6 or 7, and chroma of 3 or 4. The texture is fine sand or sand.

Tequesta Series

The Tequesta series consists of very deep, very poorly drained soils that formed in sandy and loamy marine sediments. These soils are in marshes and depressional areas. Slopes are 0 to 1 percent. These soils are loamy, siliceous, hyperthermic Arenic Glossaqualfs.

Tequesta soils are associated with Basinger, Chobee, Floridana, and Okeelanta soils. Basinger, Chobee, and Floridana soils do not have an organic surface layer. Okeelanta soils have an organic surface layer that is more than 16 inches thick.

Typical pedon of Tequesta muck, drained; 200 feet north and 700 feet east of the southwest corner of sec. 4, T. 38 S., R. 34 E.

Oa—0 to 9 inches; black (N 2/0) muck; less than 5 percent fiber rubbed; moderate coarse subangular blocky structure; friable; neutral; clear smooth boundary.

A—9 to 24 inches; dark gray (10YR 4/1) fine sand; single grained; loose; moderately alkaline; gradual wavy boundary.

Eg—24 to 36 inches; gray (10YR 5/1) fine sand; few medium distinct yellowish brown (10YR 5/8) mottles; single grained; loose; moderately alkaline; gradual wavy boundary.

Btg—36 to 42 inches; gray (5Y 5/1) fine sandy loam and tongues or intrusions of gray (10YR 5/1) fine sand; weak fine subangular blocky structure; friable; moderately alkaline; gradual wavy boundary.

Cg—42 to 80 inches; dark grayish brown (10YR 4/2) fine sand; single grained; loose; few distinct lenses of loamy sand; moderately alkaline.

The solum is more than 30 inches thick. Reaction ranges from strongly acid to moderately alkaline in the Oa, A, and Eg horizons and from slightly acid to moderately alkaline in the Btg and Cg horizons.

The Oa horizon has hue of 10YR to 5YR, value of 2, and chroma of 1; or it is neutral in hue and has value of 2.

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

The Eg horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. The texture is sand or fine sand.

The Btg horizon has hue of 10YR or 5Y, value of 4 or 5, and chroma of 1 or 2. The number of mottles in shades of brown, yellow, and gray ranges from none to common. The texture is sandy loam, fine sandy loam, or sandy clay loam.

The Cg horizon has hue of 10YR, value of 4 to 8, and chroma of 1 or 2. The texture is sand, fine sand, or loamy sand.

Terra Ceia Series

The Terra Ceia series consists of very deep, very poorly drained organic soils that formed in moderately thick beds of well decomposed, hydrophytic, nonwoody plant remains. These soils are in marshes and swamps. Slopes are 0 to 1 percent. These soils are euic, hyperthermic Typic Medisaprists.

Terra Ceia soils are associated with Astor, Lauderhill, Pahokee, and Okeelanta soils. Astor soils are mineral soils. Lauderhill, Pahokee, and Okeelanta soils have less than 51 inches of organic materials.

Typical pedon of Terra Ceia muck, drained; about 1,500 feet east and 1,200 feet south of the northwest corner of sec. 25, T. 42 S., R. 32 E.

Oap—0 to 10 inches; black (N 2/0) muck; less than 1 percent fiber rubbed, about 5 percent unrubbed; moderate medium granular structure; very friable; many fine and common medium roots; moderately alkaline; clear smooth boundary.

Oa—10 to 80 inches; black (N 2/0) muck; less than 2 percent fiber rubbed, about 10 percent unrubbed; massive; very friable; moderately alkaline.

The thickness of the organic layers is more than 51 inches. The organic materials have pH of more than 4.5 in calcium chloride solution and are moderately acid to moderately alkaline by the Hellige-Troug method. The underlying mineral layer, if it occurs, is moderately acid to moderately alkaline.

The Oa and Oap horizons have hue of 5YR to 10YR, value of 2, and chroma of 1 or 2; or they are neutral in hue and have value of 2. The content of fiber ranges from 5 to 30 percent unrubbed and from 5 percent to less than 1 percent rubbed.

The Cg horizon, if it occurs, has hue of 10YR, value of 2 to 6, and chroma of 1 or 2. The texture ranges from sand to clay. In some pedons the horizon has shell fragments or limestone.

Valkaria Series

The Valkaria series consists of very deep, poorly drained soils that formed in marine sands. These soils are in low areas of flatwoods and in poorly defined drainageways. Slopes range from 0 to 2 percent. These soils are siliceous, hyperthermic Spodic Psammaquents.

Valkaria soils are associated with Basinger, Immokalee, Malabar, Myakka, and Pineda soils. Basinger soils do not have higher-chroma material. Immokalee and Myakka soils are in slightly higher landscape positions than the Valkaria soils and have a dark, well defined spodic horizon. Malabar and Pineda soils have an argillic horizon.

Typical pedon of Valkaria fine sand; about 1,100 feet west and 800 feet south of the northeast corner of sec. 2, T. 39 S., R. 33 E.

Ap—0 to 4 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; loose; common fine roots; slightly acid; clear smooth boundary.

E—4 to 13 inches; light gray (10YR 7/1) fine sand; single grained; loose; few fine roots; slightly acid; clear wavy boundary.

Bw1—13 to 28 inches; brownish yellow (10YR 6/8) fine sand; single grained; loose; few fine roots; neutral; gradual wavy boundary.

Bw2—28 to 38 inches; very pale brown (10YR 7/4) fine sand; single grained; loose; neutral; gradual wavy boundary.

C—38 to 80 inches; light brownish gray (2.5Y 6/2) fine sand; single grained; loose; neutral.

The thickness of the solum ranges from 35 to more than 60 inches. Reaction ranges from strongly acid to neutral in the solum and from strongly acid to slightly alkaline in the substratum.

The A or Ap 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 7, and chroma of 1 or 2.

The Bw horizon has hue of 10YR, value of 5 to 7, and chroma of 4 to 8. The texture is fine sand or sand.

The C horizon has hue of 10YR or 2.5Y, value of 4 to 8, and chroma of 1 or 2. The texture is fine sand or sand. The number of shell fragments ranges from none to common.

Formation of the Soils

In this section, the factors and processes of soil formation and physiography and geomorphology are described and related to the soils in the survey area.

Factors of Soil Formation

Soil is produced by forces of weathering acting on parent material that has been deposited or accumulated by geologic agencies. The kind of soil that develops depends on five major factors. These factors are the type of parent material; the climate under which soil material has existed since accumulation; the plant and animal life in and on the soil; the relief, or lay of the land; and the length of time the forces of soil formation have acted on the soil material.

The five soil-forming factors are interdependent; each modifies the effect of the others. Any one of the five factors can have more influence than the others on the formation of a soil and can account for most of its properties. For example, if the parent material is quartz-sand, the soil generally has weakly expressed horizons.

In some places, the effect of the parent material is modified greatly by the effects of climate, relief, and plants and animals in and on the soil. As a soil forms, it is influenced by each of the five factors, but in some places one factor has a predominant effect. A modification or variation in any of these factors results in a different kind of soil.

Parent Material

Parent material is the unconsolidated mass from which a soil is formed. It determines the limits of the chemical and mineralogical composition of the soil.

The parent material of the soils in Glades County consists primarily of beds of sandy and clayey 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

The climate of Glades County is generally warm and humid. The average rainfall is about 55 inches per year. In summer, the climate is uniform throughout the county.

Few differences between the soils in the county are caused by the climate; however, the climate promotes the rapid decomposition of organic matter and hastens chemical reaction in the soil. Heavy rainfall leaches the soils of most plant nutrients and produces a strongly acid condition in many of the sandy soils. Water also carries the less soluble fine particles downward.

Because of the climatic conditions, many of the soils in the county have low a content of organic matter, low natural fertility, and a low available water capacity.

Plants and Animals

Plants have been the principal biological factor in the formation of the soils in the survey area. Animals, insects, bacteria, and fungi have also been important agents. Plants and animals furnish organic matter to the soil and bring nutrients from the lower layers of the soil to the upper layers. They cause differences in the amount of organic matter, nitrogen, and nutrients in the soil and cause differences in soil structure and porosity. For example, crayfish and the roots of trees have penetrated the loamy subsoil and have mixed sandy layers with the subsoil.

Microorganisms, including bacteria and fungi, help to weather and break down minerals and to decompose organic matter. These organisms are most numerous in the upper few inches of the soil. Earthworms and other small animals inhabit the soil, alter its chemical composition, and mix it with other soil material. In Glades County, the native vegetation has had more effect than other living organisms on soil formation.

Human activities, such as clearing forests, cultivating soils, draining wet areas, and introducing different kinds of plants, influence the formation of soils. The complex interactions of living organisms that affect soil formation have been drastically altered by of these activities. These activities, however, have had little effect on the soils in the county except for causing a loss of organic matter.

Relief

Relief has affected the formation of the soils in Glades County mainly through its influence on the relationships between soil and water and through its effect on erosion in the central ridge part of the county. Other factors of soil formation generally associated with relief, such as temperature and plant cover, are of minor importance.

Among the three general areas in the county—flatwoods, swamps, and the central ridge—some differences between the soils are directly related to relief. The soils on the flatwoods have a high water table, and periodically the surface is wet. The soils in the swamps are covered by water for long periods, and in many places, the content of organic matter in the surface layer is high.

Time

Time is an important factor affecting soil formation. The physical and chemical changes brought about by climate, living organisms, and relief are slow. The length of time needed to convert raw geological material into soil varies according to the nature of the geological material and the interaction of the other factors. Some basic minerals from which soils are formed weather relatively rapidly; other minerals are chemically inert and show little change over long periods. The translocation of fine particles within a soil to form horizons varies under differing conditions, but the processes always take a relatively long time.

Processes of Soil Formation

Soil genesis refers to the formation of soil horizons. The differentiation of soil horizons in Glades County is the result of accumulation of organic matter, leaching of carbonates, reduction and transfer of iron, or accumulation of silicate clay minerals. In places, more than one of these processes is involved.

Some organic matter has accumulated in the upper layers of most of the soils in the county. The content of organic matter is low in some of the soils and fairly high in others.

Carbonates and salts have been leached to varying degrees in all of the soils in the county. In some soils, the effects of leaching have been indirect because the leaching permitted the subsequent translocation of silicate clay materials.

Except for in the organic soils, the reduction and transfer of iron have occurred in most of the soils in the county. In some of the wet soils, iron in the subsoil has formed yellowish brown horizons and some concretions. The Pineda soil, for example, has a yellowish brown layer that has common segregated iron concretions.

Physiography and Geomorphology

Kenneth M. Campbell, geologist, Florida Department of Natural Resources, Florida Geological Survey, prepared this section.

Glades County lies partially within the Central and Southern physiographic zones. Several authors have discussed the geomorphology of the Florida peninsula; the classification described in “Geomorphology of the Florida Peninsula: Florida Bureau of Geology Bulletin 51” is used in this section *(16)*. The dominant geomorphic features in the county include the DeSoto Plain, the Caloosahatchee Incline, the Okeechobee Plain, and the Caloosahatchee River Valley (fig. 5).

The DeSoto Plain is located primarily in Manatee, Hardee, DeSoto, Highlands, Charlotte, and Glades Counties. It slopes very gently to the south and ranges in elevation from 85 feet at the northern end to 60 feet at the southern end. In Glades County, it is only in the northwestern corner of the county. It was a submarine plain and probably formed under Pleistocene Wicomico seas, which were 70 to 100 feet above the present sea level. A notable lack of relict shoreline features is evidence of the submarine origin of the plain *(16)*.

The Caloosahatchee Incline forms the southern bounding scarp of the DeSoto Plain and the eastern bounding scarp between the Okeechobee Plain and the Lake Wales Ridge. The crest of the incline is at 60 feet above mean sea level (MSL) while the roe is at 30 to 35 feet. The Caloosahatchee Incline may have been the steeper slope at the distal end of a submarine shoal that was preserved during emergence due to a low energy environment *(16)*.

The Okeechobee Plain is located primarily in Okeechobee, Highlands, and Glades Counties and ranges in elevation from 30 to 40 feet at the southern edge of the Osceola Plain to about 20 feet at the north shore of Lake Okeechobee *(16)*. The Okeechobee Plain includes Lake Okeechobee.

The Caloosahatchee Valley is a relatively low-lying feature through which the Caloosahatchee River flows. The valley is bordered on the east by Lake Okeechobee, on the northwest by the Caloosahatchee Incline, and on the south by the Immokalee Rise *(16)*.

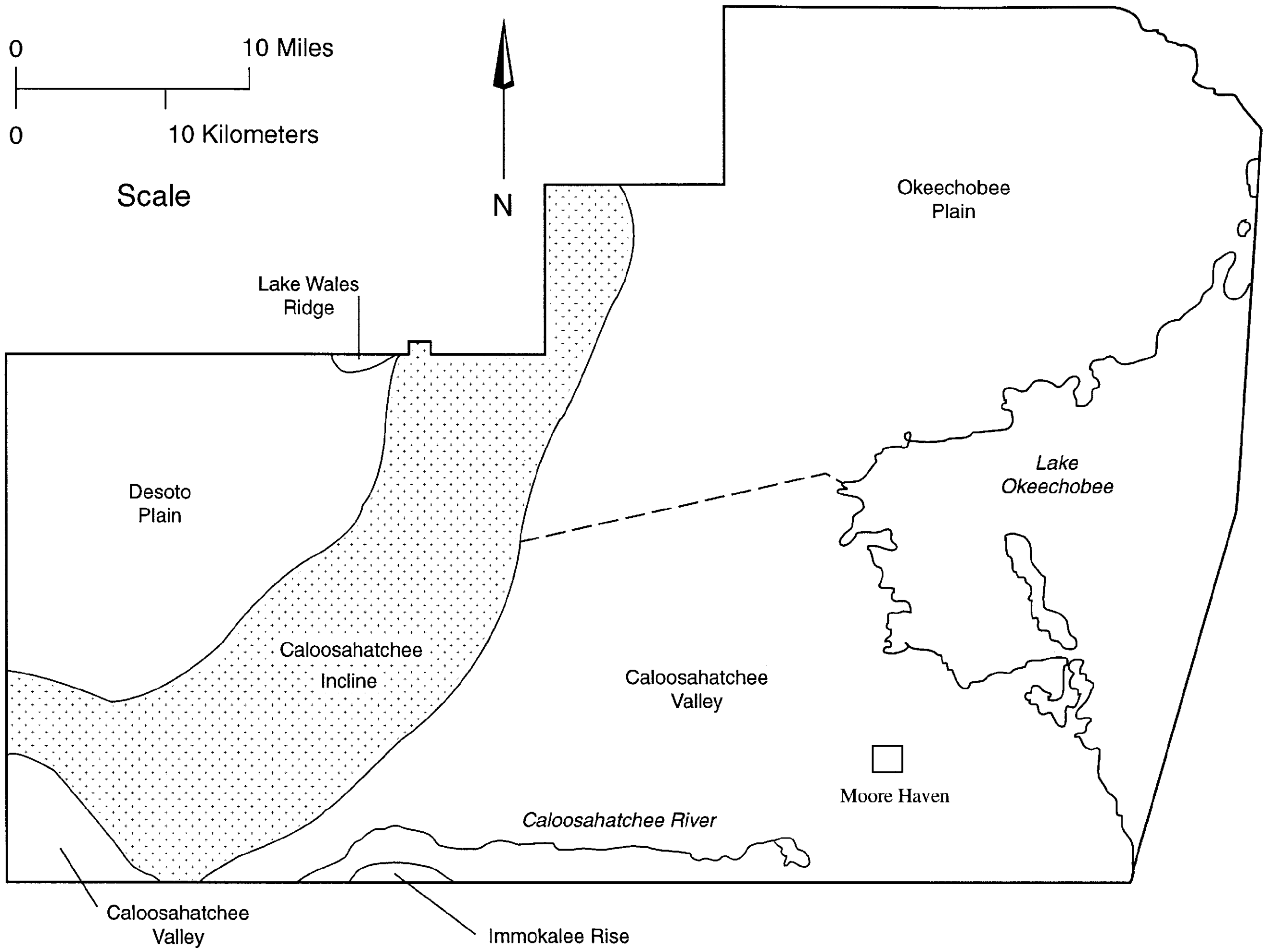


Figure 5.—Geomorphic features of Glades County.

In ascending order, the geologic formations within 1,000 feet of the land surface in Glades County include Avon Park Formation; Ocala Group; Suwannee Limestone; Hawthorn Group, which includes the Arcadia and Peace River Formations; Tamiami, Caloosahatchee, and Fort Thompson Formations; and undifferentiated surficial sediments.

See the cross-section locator map (fig. 6), cross section of sites A to A' (fig. 7), and cross section of sites B to B' (fig. 8) in conjunction with the following text.

The Middle Eocene Avon Park Formation is the oldest lithologic unit commonly encountered in wells in Glades County. The formation underlies all of Glades County *(5)*. In previous usage, the Avon Park and Lake City Limestone were separate. They are combined into the Avon Park Formation in order to reflect the lithologic similarities of the two units and the presence of considerable quantities of dolostone *(6)*.

The Avon Park Formation in the county consists primarily of tan to white, slightly porous, calcilutitic and fossiliferous limestone (packstone); well indurated, granular limestone (grainstone); and finely crystalline dolostone.

The top of the Avon Park Formation is about 840 feet below MSL in the northern part of the county. It dips to the south and southeast. In the southwest corner of the county, the top of the Avon Park Formation is 1,050 feet below MSL. In the southeast corner of the county, the top is 1,220 feet below MSL. The thickness of the formation varies, but generally increases to the south and southeast and ranges from about 600 to more than 1,200 feet *(5)*. The Avon Park Formation is unconformably overlain by the Ocala Group.

The Upper Eocene Ocala Group consists of three formations. In ascending order they are the Inglis, Williston, and Crystal River Formations *(9)*.

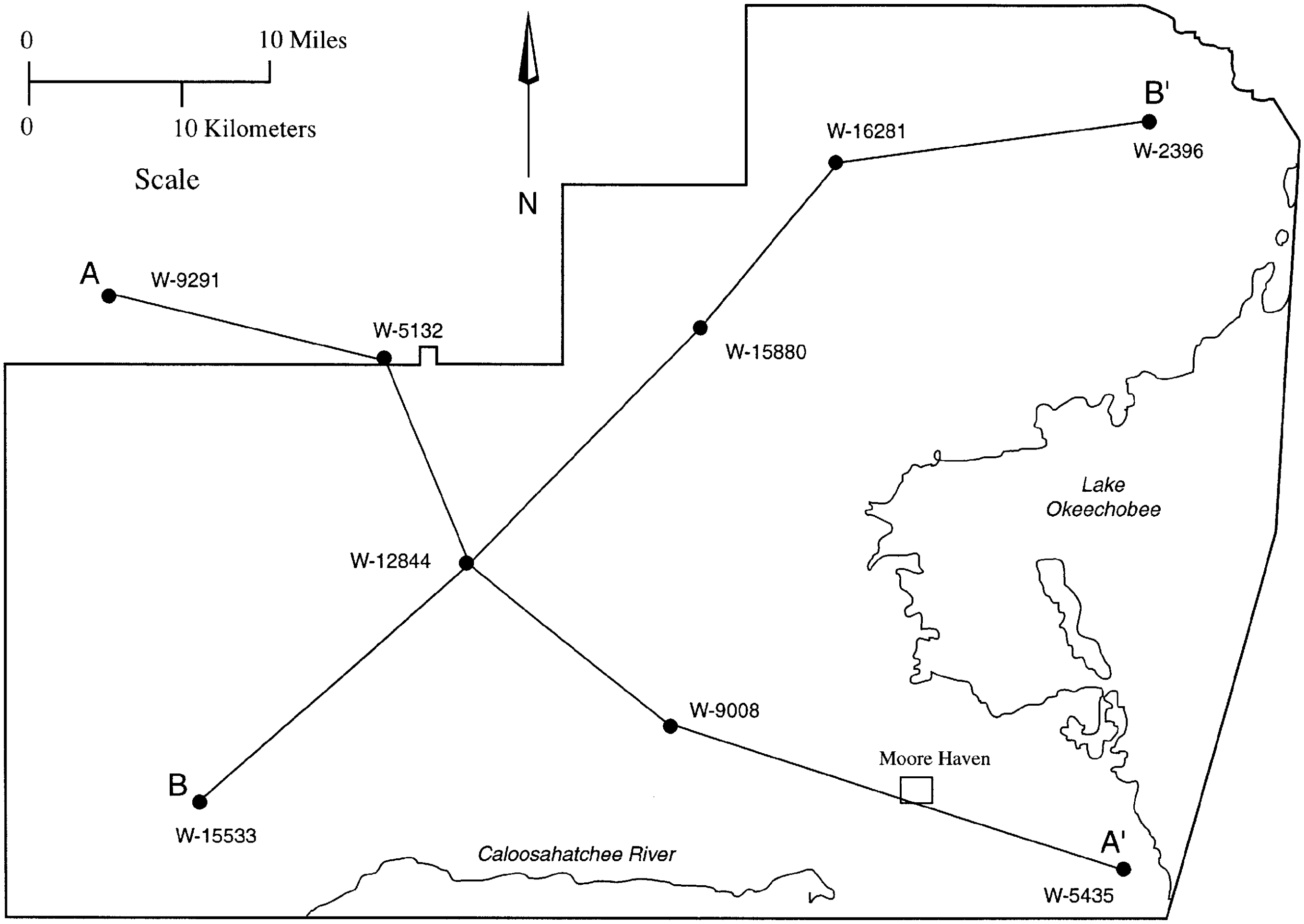


Figure 6.—Locator map for cross sections.

In Glades County, the Ocala Group consists primarily of white, cream, or tan, poorly indurated, calcarenitic limestone (packstone or wackestone) and tan, granular dolostone. The limestone is commonly a foraminiferal coquina. The top of the Ocala Group in the county is at 600 to 800 feet below MSL. It dips generally to the south. The thickness of the group in examined wells ranges from 265 feet in the northeastern part of the county to over 320 feet in the central and southeastern parts of the county.

The Oligocene Suwannee Limestone underlies most, if not all, of Glades County. The Suwannee Limestone is in all parts of the county except the northeast corner. It has an extrapolated maximum thickness of over 400 feet in the southern part of the county *(5)*. Samples reveal areas of lesser thickness, ranging from 25 to 140 feet. The areas of greatest thickness are in the central and southwestern parts of the county. The top of the Suwannee Limestone dips gently to the south-southeast.

The Suwannee Limestone in the county consists primarily of white, cream, or tan, recrystallized limestone (packstone or wackestone) and tan, granular or sucrosic dolostone. The limestone is moderately to well indurated, variably calcarenitic quartz. It is sandy and slightly phosphatic. The Suwannee Limestone is commonly shelly or microcoquinoid. Well-preserved fossils, however, are rare and shells are commonly replaced by sparry calcite.

The Hawthorn Group was previously classified as the Miocene Hawthorn Formation *(10)*. In the south Florida area, the Hawthorn Group consists of two formations. In ascending order, they are the Arcadia and the Peace River Formations.

The Arcadia Formation is a predominantly carbonate unit. It corresponds to the “Hawthorn carbonate unit” of previous usage and includes the Tampa Formation of previous usage as a member *(10)*. The Tampa Member is not in Glades County. The Arcadia Formation consists predominantly of white, light gray, and yellowish gray, poorly to well indurated, calcarenitic and very finely crystalline limestone (wackestone to mudstone); dolomitic limestone; and dolostone.

The Arcadia Formation contains variable amounts of clay, silt, quartz- and phosphate-sand, and phosphate-gravel. Beds of clay, dolosilt, and sand are common. The Arcadia Formation is commonly somewhat fossiliferous, primarily oysters, pectens, bryozoans, and diatoms and foraminifera in some clayey intervals.

The top of the Arcadia Formation is 100 feet below MSL in the northwest corner of the county. It dips in a generally southeasterly direction to about 370 feet below MSL in the eastern part of the county. The thickness of the Arcadia Formation ranges from about 200 to 460 feet. The unit is thinnest in the northeastern part of the county and thickens to the southwest.

The Peace River Formation consists of materials previously referred to as the "upper Hawthorn siliciclastics" and the siliciclastics previously classified in the Tamiami Formation *(7, 10)*. The Murdock Station and Bayshore Clay Members of the Tamiami Formation consist primarily of white, light gray, and light olive, interbedded, poorly to moderately indurated sands, silts, clays, and carbonates. The siliciclastic components are dominant. Carbonate material is primarily calcilutite or dolosilt. All lithologies typically contain variable amounts of quartz- and phosphate-sand.

The top of the Peace River Formation is about 40 feet above MSL in the northwest corner of the county. The formation dips generally to the east and southeast to a depth of about 90 feet below MSL in the south-central part of the county. The thickness of the Peace River Formation typically ranges from about 140 to 280 feet. The greatest thickness is in the eastern part of the county.

The Tamiami Formation has been restricted by later classification *(4, 7, 10)*. In the new classification, the Tamiami Formation consists of the Ochopee and Buckingham Limestone Members and the Pinecrest Sand Member. The Tamiami Formation is difficult to identify where sandy sediments are devoid of shell material and recognizable limestone units do not occur.

The Tamiami Formation is in scattered areas in Glades County, primarily in the southern and western parts of the county. The top of the Tamiami Formation is 10 to 56 feet below MSL. The formation is as much as 70 feet thick.

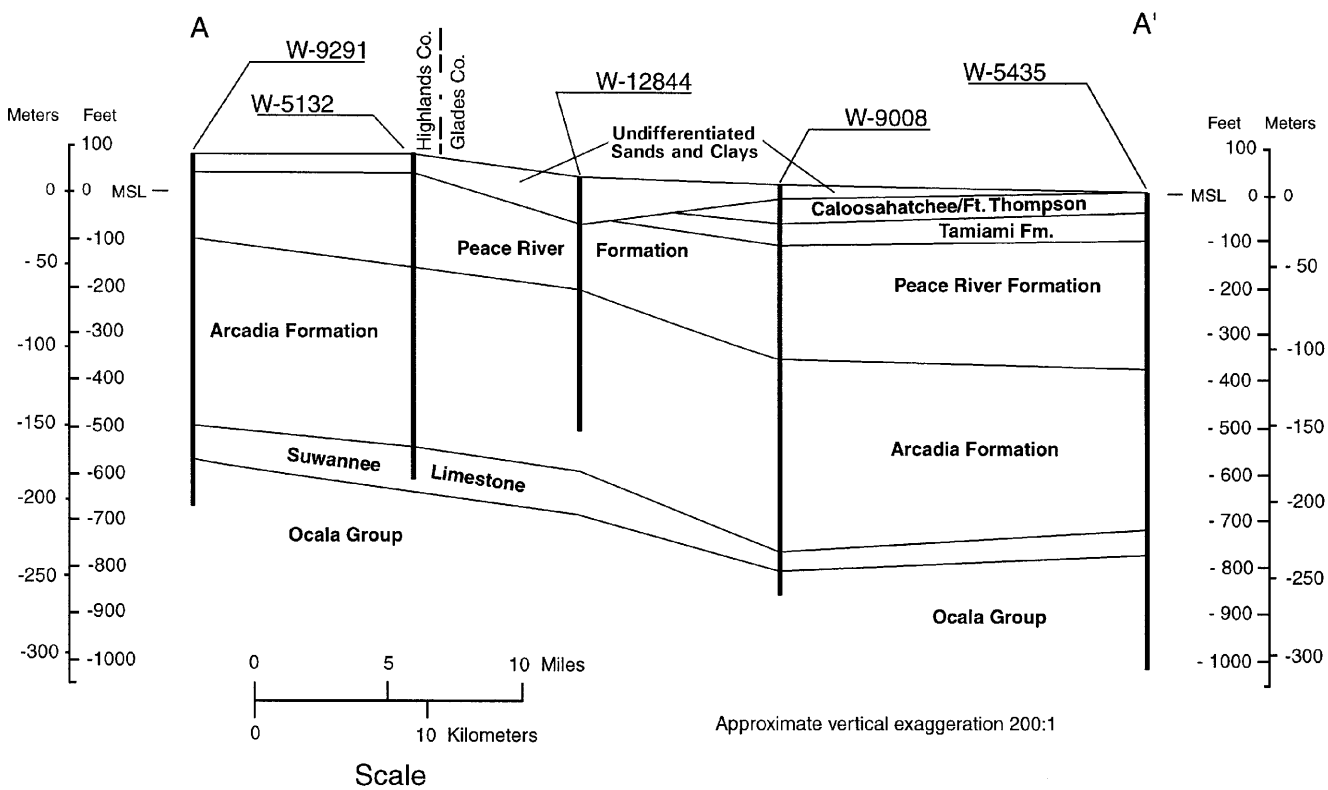


Figure 7.—Cross section of geologic materials at sites A to A'.

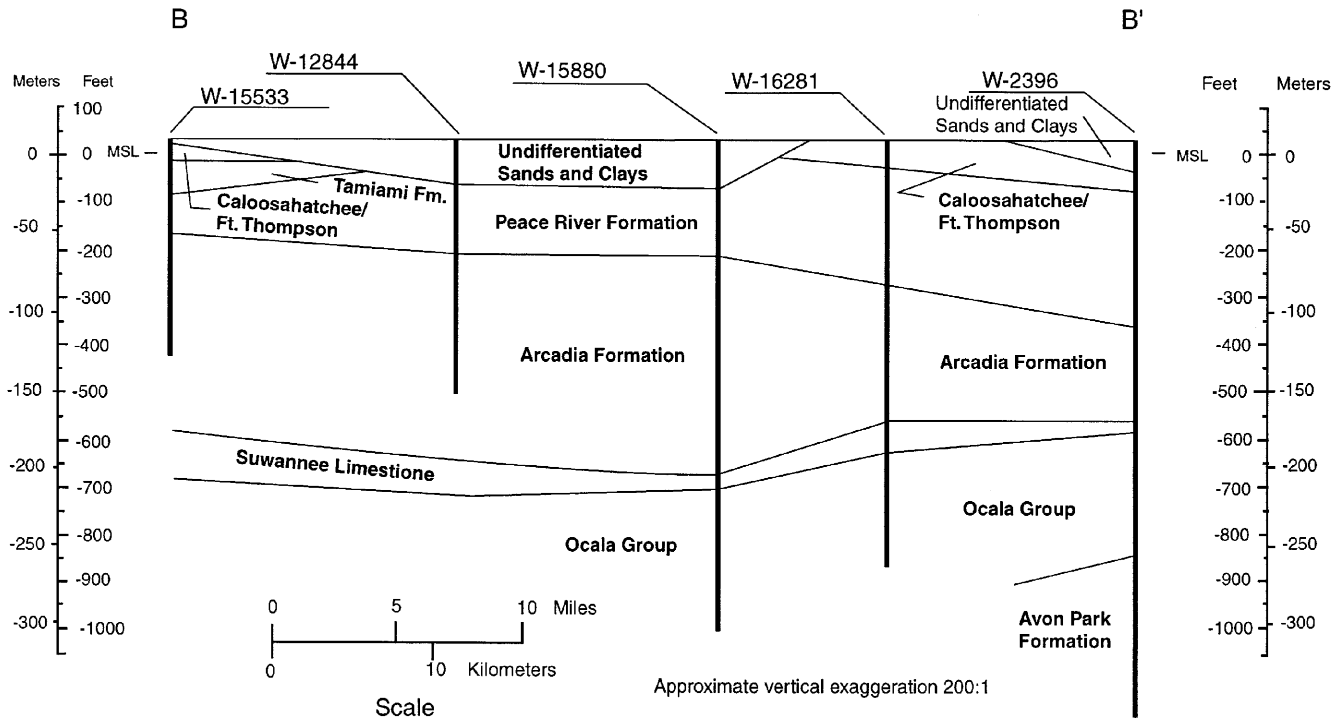


Figure 8.—Cross section of geologic materials at sites B to B'.

The Tamiami Formation consists primarily of yellowish gray, shelly, quartz-sandy, slightly phosphatic limestone that has a calcilutite or recrystallized calcite matrix. Molds of aragonitic fossils are common. The degree of induration and the content of quartz-sand and shells vary.

The Caloosahatchee and Fort Thompson Formations were originally defined on the basis of the fossils they contain. They are undifferentiated here because of a lack of lithologic characteristics on which to differentiate them. The Caloosahatchee Formation typically consists of unconsolidated sand, sandy marl, and limestone containing abundant marine mollusks. The Fort Thompson Formation consists of alternating marine and freshwater limestones and marl *(5)*. These sediments are in the northeast corner of the county in a band along the west edge of Lake Okeechobee and in the southern part of the county along the Caloosahatchee River Valley. The top of the Caloosahatchee/Fort Thompson undifferentiated unit ranges from about 25 feet above MSL to about 45 feet below MSL. The maximum thickness of the unit is about 60 feet.

The undifferentiated surficial sediments consist of terrace sands, organic soils, and marl of Pleistocene and Holocene age. Undifferentiated surficial sediments blanket most, if not all, of the county. The thickness of these sediments ranges to slightly more than 100 feet. The sediments are thickest in the central part of the county in the vicinity of the Caloosahatchee Incline.

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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.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

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.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Aspect. The direction in which a slope faces.

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, and K), expressed as a percentage of the total cation-exchange capacity.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Cable yarding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

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.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

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 depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

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 plant community. 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 textured soil. Sand or loamy sand.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas 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 or miscellaneous areas are somewhat similar in all areas.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the “Soil Survey Manual.”

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.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

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.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Delta. A body of alluvium having a surface that is nearly flat and fan shaped; deposited at or near the mouth of a river or stream where it enters a body of relatively quiet water, generally a sea or lake.

Dendritic drainage pattern. A drainage pattern in which the streams branch randomly in all directions and at almost any angle.

Depression. An area that is 6 inches to 2 feet lower in elevation than the surrounding landscape and is ponded for long periods.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the “Soil Survey Manual.”

Drainage, surface. Runoff, or surface flow of water, from an area.

Duff. A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

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.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Excess sodium (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. Area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

Flatwoods (colloquial). Broad, nearly level landscapes of poorly drained, dominantly sandy soils vegetated by open slash pine woodlands.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

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.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Ground water. Water filling all the unblocked pores of the material below the water table.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

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 material and the more decomposed sapric material.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the “Soil Survey Manual.” The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

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 soil material. 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.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it 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 potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

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

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Knoll. A small, low, rounded hill rising above adjacent landforms.

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-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

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. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon. A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

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. Peat in turn may become parent material for soils. The principal general kinds of peat, according to origin are:

Sedimentary peat.—The remains mostly of floating aquatic plants, such as algae, and the remains and fecal material of aquatic animals, including coprogenous earth.

Moss peat.—The remains of mosses, including Sphagnum.

Herbaceous peat.—The remains of sedges, reeds, cattails, and other herbaceous plants.

Woody peat.—The remains of trees, shrubs, and other woody plants.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow	0.0 to 0.01 inch
Very slow	0.01 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid or very rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

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.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor on the basis of how much the present plant community has departed from the potential.

Rangeland. Land on which the potential climax vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct climax plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly 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

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Relief. The elevations or inequalities of a land surface, considered collectively.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

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.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

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. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

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. In this survey, classes for simple slopes are as follows:

Nearly level	0 to 3 percent
Gently sloping	1 to 8 percent
Strongly sloping	4 to 16 percent
Moderately steep	10 to 30 percent
Steep	20 to 60 percent
Very steep	45 percent and higher

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Sodic (alkali) soil. A 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.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

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 material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

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. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

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). 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.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The uprooting and tipping over of trees by the wind.

Tables

Table 1.--Temperature and Precipitation

(Recorded in the period 1932-89 at Archbold Biological Station in Highlands County, Florida)

Month	Rainfall			Temperature				
	Mean total	Minimum total	Maximum total	Mean daily	Mean daily maximum	Mean daily minimum	Highest recorded	Lowest recorded
	In	In	In	°F	°F	°F	°F	°F
January	1.87	0.00	7.9	61.4	75.0	47.1	88	13
February	2.50	0.09	10.8	62.3	75.0	48.8	90	22
March	3.00	0.05	9.7	67.0	81.2	52.8	94	23
April	2.42	0.08	6.1	71.6	86.4	56.7	97	34
May	4.31	0.23	12.5	75.9	90.5	61.2	103	40
June	8.11	1.70	20.7	79.5	91.6	66.8	102	48
July	8.67	1.26	15.9	81.6	93.7	69.0	101	57
August	7.57	1.26	15.5	81.5	93.5	69.6	101	57
September	8.47	1.20	21.8	79.7	90.0	68.5	100	55
October	4.03	0.13	17.0	74.7	86.4	63.0	98	38
November	1.67	0.01	5.1	67.3	80.5	54.2	96	26
December	1.57	0.02	5.6	61.9	74.8	48.7	90	17

Table 2.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
2	Hallandale fine sand	2,650	0.5
4	Valkaria fine sand	27,199	5.6
5	Smyrna fine sand	12,189	2.5
6	Malabar fine sand	19,165	3.9
7	Pople fine sand	14,410	3.0
8	Gator muck, depressional	5,680	1.2
9	Sanibel muck, depressional	2,474	0.5
10	Felda fine sand	27,089	5.5
11	Tequesta muck, drained	3,454	0.7
12	Chobee loamy fine sand, depressional	4,595	0.9
13	Boca fine sand	17,046	3.5
14	Basinger fine sand	51,182	10.4
15	Pineda fine sand	23,242	4.8
16	Floridana fine sand, depressional	17,908	3.7
17	Okeelanta muck, depressional	9,954	2.0
19	Terra Ceia muck, drained	2,296	0.5
20	EauGallie fine sand	4,445	0.9
22	Astor fine sand, depressional	11,384	2.3
23	Oldsmar sand	18,457	3.8
24	Hallandale-Pople complex	10,595	2.2
26	Immokalee sand	105,374	21.5
27	Ft. Drum fine sand	4,218	0.9
28	Pomello fine sand	7,115	1.5
29	Myakka fine sand	25,423	5.2
32	Floridana, Astor, and Felda soils, frequently flooded	16,638	3.4
34	Basinger fine sand, depressional	5,609	1.1
35	Arents, very steep	5,529	1.1
36	Malabar fine sand, high	13,949	2.9
37	Lauderhill muck, drained	5,657	1.2
38	Pahokee muck, drained	2,593	0.5
40	Plantation muck, drained	3,423	0.7
41	Dania muck, drained	1,315	0.3
42	Okeelanta and Dania soils, depressional	3,314	0.7
43	Sanibel muck, drained	1,000	0.2
	Areas of water less than 40 acres in size	1,729	0.4
	Total	488,300	100.0

Table 3.--Land Capability Classes and Yields per Acre of Crops and Pasture

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil.)

Soil name and map symbol	Land capability	Oranges	Grapefruit	Tomatoes	Watermelons	Sugarcane	Bahiagrass
		Boxes	Boxes	Tons	Tons	Tons	AUM*
2--------------- Hallandale	IVw	---	---	---	---	---	8.0
4--------------- Valkaria	IVw	325	450	12	---	---	8.0
5--------------- Smyrna	IVw	350	550	15	9	---	8.0
6--------------- Malabar	IVw	325	525	12	7	---	8.0
7--------------- Pople	IIIw	425	575	13	---	---	---
8--------------- Gator	VIIw	---	---	---	---	---	---
9--------------- Sanibel	VIIw	---	---	---	---	---	---
10-------------- Felda	IIIw	425	600	13	---	---	9.0
11-------------- Tequesta	IIIw	---	---	6	---	---	15.0
12-------------- Chobee	VIIw	---	---	---	---	---	---
13-------------- Boca	IIIw	425	575	15	---	---	8.0
14-------------- Basinger	IVw	250	525	12	7	---	8.0
15-------------- Pineda	IIIw	425	600	13	9	---	9.0
16-------------- Floridana	VIIw	---	---	---	---	---	---
17-------------- Okeelanta	VIIw	---	---	---	---	---	---
19-------------- Terra Ceia	IIIw	---	---	---	---	40	15
20-------------- EauGallie	IVw	350	550	15	9	---	8.0
22-------------- Astor	VIw	---	---	---	---	---	---
23-------------- Oldsmar	IVw	350	550	15	9	---	8.0

See footnote at end of table.

Table 3.--Land Capability Classes and Yields per Acre of Crops and Pasture--Continued

Soil name and map symbol	Land capability	Oranges	Grapefruit	Tomatoes	Watermelons	Sugarcane	Bahiagrass
		Boxes	Boxes	Tons	Tons	Tons	AUM*
24:		395	530	15	---	---	---
Hallandale	IVw						
Pople	IIIw						
26: Immokalee	IVw	350	550	15	9	---	8.0
27: Ft. Drum	IVw	375	500	9	---	---	8.0
28: Pomello	VIs	350	450	---	---	---	---
29: Myakka	IVw	350	550	15	9	---	9.0
32:		---	---	---	---	---	8.0
Floridana	Vw						
Astor	VIw						
Felda	Vw						
34: Basinger	VIIw	---	---	---	---	---	---
35: Arents	VIIe	---	---	---	---	---	---
36: Malabar	IVw	425	---	550	---	---	8.0
37: Lauderhill	IIIw	---	---	---	---	40	15
38: Pahokee	IIIw	---	---	---	---	40	15
40: Plantation	IVw	---	---	---	---	---	15
41: Dania	Vw	---	---	---	---	---	15
42: Okeelanta and Dania	VIIw	---	---	---	---	---	---
43: Sanibel	IIIw	---	---	---	---	---	15

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

Table 4.--Woodland Management and Productivity

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available.)

Soil name and map symbol	Ordination symbol	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
2-----------------Hallandale	3W	Moderate	Moderate	South Florida slash pine -------------	35	3	South Florida slash pine.
				Live oak-----------	---	---	
				Cabbage palm--------	---	---	
4-----------------Valkaria	8W	Severe	Moderate	Slash pine----------	70	8	Slash pine, South Florida slash pine.
				South Florida slash pine--------------	35	3	
5-----------------Smyrna	10W	Moderate	Moderate	Slash pine----------	80	10	Slash pine, South Florida slash pine.
				South Florida slash pine--------------	45	4	
				Live oak-----------	---	---	
6-----------------Malabar	10W	Moderate	Severe	Slash pine----------	80	10	Slash pine, South Florida slash pine.
				South Florida slash pine--------------	45	4	
				Cabbage palm--------	---	---	
7-----------------Pople	10W	Moderate	Severe	Slash pine----------	80	10	Slash pine, South Florida slash pine.
				South Florida slash pine--------------	42	4	
				Cabbage palm--------	---	---	
				Live oak-----------	---	---	
10----------------Felda	10W	Moderate	Severe	Slash pine----------	80	10	Slash pine, South Florida slash pine.
				South Florida Slash pine--------------	45	---	
				Cabbage palm--------	---	---	
13----------------Boca	6W	Moderate	Moderate	South Florida slash pine -------------	55	6	South Florida slash pine.
				Cabbage palm--------	---	---	
14----------------Basinger	8W	Severe	Severe	Slash pine----------	70	8	Slash pine, South Florida slash pine.
				South Florida Slash pine-------------	35	3	
15----------------Pineda	10W	Moderate	Severe	Slash pine----------	80	10	Slash pine, South Florida slash pine.
				South Florida Slash pine--------------	45	4	
				Cabbage palm--------	---	---	
20----------------EauGallie	10W	Moderate	Moderate	Slash pine----------	80	10	Slash pine, South Florida slash pine.
				South Florida slash pine--------------	45	4	
23----------------Oldsmar	10W	Moderate	Moderate	Slash pine----------	80	10	Slash pine, South Florida slash pine.
				South Florida slash pine--------------	45	4	

See footnote at end of table.

Table 4.--Woodland Management and Productivity--Continued

Soil name and map symbol	Ordi-nation symbol	Management concerns: Equip-ment limita-tion	Management concerns: Seedling mortal-ity	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
24:							
Hallandale--------	3W	Moderate	Moderate	South Florida slash pine -------------	35	3	South Florida slash pine.
				Cabbage palm--------	---	---	
				Live oak------------	---	---	
Pople-------------	10W	Moderate	Severe	Slash pine----------	80	10	Slash pine, South Florida slash pine.
				South Florida slash pine---------------	42	4	
				Cabbage palm--------	---	---	
				Live oak------------	---	---	
26----------------- Immokalee	8W	Moderate	Moderate	Slash pine----------	70	8	Slash pine, South Florida slash pine.
				South Florida slash pine---------------	35	3	
				Live oak------------	---	---	
27----------------- Ft. Drum	10W	Moderate	Moderate	Slash pine----------	80	10	Slash pine, South Florida slash pine.
				South Florida slash pine -------------	45	4	
				Cabbage palm--------	---	---	
				Live oak------------	---	---	
28----------------- Pomello	8S	Moderate	Severe	Slash pine----------	70	8	Slash pine, South Florida slash pine.
				South Florida slash pine---------------	35	3	
				Cabbage palm--------	---	---	
				Live oak------------	---	---	
29----------------- Myakka	8W	Moderate	Moderate	Slash pine----------	70	8	Slash pine, South Florida slash pine.
				South Florida slash pine---------------	35	3	
36----------------- Malabar	4W	Moderate	Moderate	South Florida slash pine -------------	45	4	South Florida slash pine.

* Volume 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.

Table 5.--Recreational Development

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definition of "severe." Absence of an entry indicates that the soil was not rated.)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
2 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, depth to rock.
4 Valkaria	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, droughty.
5 Smyrna	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
6 Malabar	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
7 Pople	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
8 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.
9 Sanibel	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
10 Felda	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
11 Tequesta	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
12 Chobee	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.
13 Boca	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
14 Basinger	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
15 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.
16 Floridana	Severe: ponding, percs slowly, too sandy.	Severe: ponding, too sandy, percs slowly.	Severe: too sandy, ponding, percs slowly.	Severe: ponding, too sandy.	Severe: ponding.

Table 5.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
17: Okeelanta	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
19: Terra Ceia	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
20: EauGallie	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
22: Astor	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: ponding.
23: Oldsmar	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
24:					
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, depth to rock.
Pople	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
26: Immokalee	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
27: Ft. Drum	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
28: Pomello	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
29: Myakka	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
32:					
Floridana	Severe: flooding, wetness, percs slowly.	Severe: wetness, too sandy, percs slowly.	Severe: too sandy, wetness, flooding.	Severe: wetness, too sandy.	Severe: wetness, flooding.
Astor	Severe: flooding, wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness, flooding.	Severe: wetness, too sandy.	Severe: wetness, flooding.
Felda	Severe: flooding, wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness, flooding.	Severe: wetness, too sandy.	Severe: wetness, droughty, flooding.

Table 5.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
34 Basinger	Severe: ponding.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
35 Arents	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
36 Malabar	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
37 Lauderhill	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
38 Pahokee	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
40 Plantation	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
41 Dania	Severe: wetness, excess humus, depth to rock.	Severe: wetness, excess humus, depth to rock.	Severe: excess humus, wetness, depth to rock.	Severe: wetness, excess humus.	Severe: wetness, depth to rock, excess humus.
42:					
Okeelanta	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.
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, depth to rock, excess humus.
43 Sanibel	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness, excess humus.

Table 6.--Wildlife Habitat

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated.)

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
2------------------ Hallandale	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor.
4------------------ Valkaria	Poor	Fair	Fair	Fair	Fair	Good	Fair	Poor	Poor	Good.
5------------------ Smyrna	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair.
6------------------ Malabar	Poor	Poor	Poor	Poor	Poor	Fair	Fair	Poor	Poor	Fair.
7------------------ Pople	Poor	Fair	Fair	Poor	Poor	Good	Fair	Fair	Poor	Fair.
8------------------ Gator	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Good	Good	Very poor.	Very poor.	Good.
9------------------ Sanibel	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
10----------------- Felda	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Poor	Fair.
11----------------- Tequesta	Fair	Good	Poor	Poor	Poor	Good	Good	Good	Poor	Good.
12----------------- Chobee	Very poor.	Very poor.	Very poor.	Fair	Very poor.	Good	Good	Very poor.	Poor	Good.
13----------------- Boca	Poor	Fair	Fair	Poor	Poor	Good	Fair	Fair	Poor	Fair.
14----------------- Basinger	Poor	Poor	Fair	Poor	Poor	Good	Fair	Poor	Poor	Fair.
15----------------- Pineda	Poor	Fair	Fair	Poor	Poor	Good	Fair	Fair	Poor	Fair.
16----------------- Floridana	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
17----------------- Okeelanta	Very poor.	Very poor.	Poor	Poor	Very poor.	Good	Good	Very poor.	Poor	Good.
19----------------- Terra Ceia	Very poor.	Very poor.	Poor	Poor	Very poor.	Good	Good	Very poor.	Poor	Good.
20----------------- EauGallie	Poor	Poor	Fair	Poor	Poor	Poor	Poor	Poor	Poor	Poor.
22----------------- Astor	Very poor.	Poor	Poor	Fair	Poor	Good	Good	Poor	Fair	Good.
23----------------- Oldsmar	Poor	Fair	Fair	Poor	Fair	Poor	Poor	Fair	Fair	Poor.

Table 6.--Wildlife Habitat-Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
24:										
Hallandale	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor.
Pople	Poor	Fair	Fair	Poor	Poor	Good	Fair	Fair	Poor	Fair.
26 Immokalee	Poor	Poor	Fair	Poor	Poor	Fair	Poor	Poor	Poor	Poor.
27 Ft. Drum	Poor	Poor	Fair	Fair	Fair	Poor	Poor	Poor	Fair	Poor.
28 Pomello	Poor	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
29 Myakka	Poor	Fair	Fair	Poor	Poor	Fair	Poor	Fair	Poor	Poor.
32:										
Floridana	Very poor.	Poor	Fair	Poor	Poor	Good	Good	Poor	Poor	Good.
Astor	Very poor.	Very poor.	Poor	Fair	Poor	Good	Good	Very poor.	Fair	Good.
Felda	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Poor	Fair.
34 Basinger	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
35 Arents	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
36 Malabar	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Poor	Fair.
37 Lauderhill	Fair	Good	Poor	Poor	Very poor.	Good	Good	Good	Poor	Good.
38 Pahokee	Fair	Fair	Very poor.	Very poor.	Very poor.	Good	Good	Fair	Poor	Good.
40 Plantation	Fair	Fair	Fair	Very poor.	Very poor.	Good	Good	Fair	Very poor.	Good.
41 Dania	Very poor.	Poor	Poor	Very poor.	Very poor.	Good	Good	Poor	Very poor.	Good.
42:										
Okeelanta	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Good	Good	Very poor.	Very poor.	Good.
Dania	Very poor.	Poor	Poor	Very poor.	Very poor.	Good	Good	Poor	Very poor.	Good.
43 Sanibel	Fair	Fair	Poor	Poor	Poor	Good	Good	Fair	Poor	Good.

Table 7.--Building Site Development

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definition of "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
2----------------- Hallandale	Severe: depth to rock, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty, depth to rock.
4----------------- Valkaria	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
5----------------- Smyrna	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
6----------------- Malabar	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
7----------------- Pople	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
8----------------- Gator	Severe: cutbanks cave, excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: ponding, excess humus.
9----------------- Sanibel	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, excess humus.
10---------------- Felda	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
11---------------- Tequesta	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, excess humus.
12---------------- Chobee	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
13---------------- Boca	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
14---------------- Basinger	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
15---------------- Pineda	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
16---------------- Floridana	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.

Table 7.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
17---------------- Okeelanta	Severe: cutbanks cave, excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: ponding, excess humus.
19---------------- Terra Ceia	Severe: excess humus, wetness.	Severe: subsides, wetness, low strength.	Severe: subsides, wetness, low strength.	Severe: subsides, wetness.	Severe: wetness, excess humus.
20---------------- EauGallie	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
22---------------- Astor	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
23---------------- Oldsmar	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
24:					
Hallandale-------	Severe: depth to rock, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty, depth to rock.
Pople------------	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
26---------------- Immokalee	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
27---------------- Ft. Drum	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
28---------------- Pomello	Severe: cutbanks cave, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.
29---------------- Myakka	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
32:					
Floridana--------	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
Astor------------	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
Felda------------	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, droughty, flooding.

Table 7.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
34----------------Basinger	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
35----------------Arents	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
36----------------Malabar	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
37----------------Lauderhill	Severe: depth to rock, excess humus, wetness.	Severe: subsides, wetness, low strength.	Severe: subsides, wetness, low strength.	Severe: subsides, wetness.	Severe: wetness, excess humus.
38----------------Pahokee	Severe: depth to rock, excess humus, wetness.	Severe: subsides, wetness, low strength.	Severe: subsides, wetness, low strength.	Severe: subsides, wetness.	Severe: wetness, excess humus.
40----------------Plantation	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, excess humus.
41----------------Dania	Severe: depth to rock, wetness.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness.	Severe: wetness, depth to rock, excess humus.
42:					
Okeelanta---------	Severe: cutbanks cave, excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: ponding, excess humus.
Dania-------------	Severe: depth to rock, ponding.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, depth to rock, excess humus.
43----------------Sanibel	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, excess humus.

Table 8.--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 but does not eliminate the need for onsite investigation.)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
2-------------------Hallandale	Severe: depth to rock, wetness.	Severe: seepage, depth to rock, wetness.	Severe: depth to rock, seepage, wetness.	Severe: depth to rock, wetness.	Poor: depth to rock, seepage, too sandy.
4-------------------Valkaria	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
5-------------------Smyrna	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
6-------------------Malabar	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
7-------------------Pople	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
8-------------------Gator	Severe: ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: ponding, thin layer.
9-------------------Sanibel	Severe: ponding, poor filter.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
10------------------Felda	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
11------------------Tequesta	Severe: wetness, percs slowly.	Severe: seepage, excess humus, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
12------------------Chobee	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: seepage, ponding.
13------------------Boca	Severe: depth to rock, wetness, poor filter.	Severe: seepage, depth to rock, wetness.	Severe: depth to rock, wetness, too sandy.	Severe: depth to rock, seepage, wetness.	Poor: depth to rock, seepage, too sandy.

Table 8.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
14: Basinger	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
15: Pineda	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
16: Floridana	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: ponding.	Severe: seepage, ponding.	Poor: ponding.
17: Okeelanta	Severe: ponding, poor filter.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
19: Terra Ceia	Severe: subsides, wetness, poor filter.	Severe: seepage, excess humus, wetness.	Severe: seepage, wetness, excess humus.	Severe: seepage, wetness.	Poor: wetness, excess humus.
20: EauGallie	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
22: Astor	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
23: Oldsmar	Severe: wetness, percs slowly.	Severe: seepage.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
24:					
Hallandale	Severe: depth to rock, wetness.	Severe: seepage, depth to rock, wetness.	Severe: depth to rock, seepage, wetness.	Severe: depth to rock, wetness.	Poor: depth to rock, seepage, too sandy.
Pople	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
26: Immokalee	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
27: Ft. Drum	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.

Table 8.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
28. Pomello	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
29. Myakka	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
32:					
Floridana	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding.	Severe: flooding, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness.
Astor	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
Felda	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
34. Basinger	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
35. Arents	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: seepage, slope.
36. Malabar	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
37. Lauderhill	Severe: depth to rock, wetness, poor filter.	Severe: seepage, depth to rock, excess humus.	Severe: depth to rock, seepage, wetness.	Severe: depth to rock, seepage, wetness.	Poor: depth to rock, wetness, excess humus.
38. Pahokee	Severe: subsides, depth to rock, wetness.	Severe: seepage, depth to rock, excess humus.	Severe: depth to rock, seepage, wetness.	Severe: depth to rock, seepage, wetness.	Poor: depth to rock, wetness, excess humus.
40. Plantation	Severe: depth to rock, wetness, poor filter.	Severe: seepage, depth to rock, excess humus.	Severe: depth to rock, seepage, wetness.	Severe: depth to rock, seepage, wetness.	Poor: depth to rock, seepage, too sandy.
41. Dania	Severe: depth to rock, wetness.	Severe: seepage, depth to rock, excess humus.	Severe: depth to rock, seepage, wetness.	Severe: depth to rock, wetness.	Poor: depth to rock, wetness, excess humus.

Table 8.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
42:					
Okeelanta	Severe: ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: ponding, thin layer.
Dania	Severe: depth to rock, ponding.	Severe: seepage, depth to rock, excess humus.	Severe: depth to rock, seepage, ponding.	Severe: depth to rock, ponding.	Poor: depth to rock, ponding, excess humus.
43: Sanibel	Severe: wetness, poor filter.	Severe: seepage, excess humus, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.

Table 9.--Construction Materials

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "poor," "probable," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
2: Hallandale	Poor: depth to rock, wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: depth to rock, too sandy, wetness.
4: Valkaria	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness, too sandy.
5: Smyrna	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
6: Malabar	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
7: Pople	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
8: Gator	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness.
9: Sanibel	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
10: Felda	Poor: wetness.	Probable	Probable	Poor: too sandy, wetness.
11: Tequesta	Poor: wetness.	Probable	Improbable: too sandy, excess humus.	Poor: too sandy, wetness.
12: Chobee	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
13: Boca	Poor: depth to rock, wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
14: Basinger	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
15: Pineda	Poor: wetness.	Probable	Probable	Poor: too sandy, wetness.
16: Floridana	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.

Table 9.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
17------------------- Okeelanta	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: excess humus, wetness.
19------------------- Terra Ceia	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: excess humus, wetness.
20------------------- EauGallie	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: too sandy, wetness.
22------------------- Astor	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: too sandy, wetness.
23------------------- Oldsmar	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
24:				
Hallandale----------	Poor: depth to rock, wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: depth to rock, too sandy, wetness.
Pople---------------	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: too sandy, wetness.
26------------------- Immokalee	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: too sandy, wetness.
27------------------- Ft. Drum	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: too sandy, wetness.
28------------------- Pomello	Fair: wetness.	Probable------------	Improbable: too sandy.	Poor: too sandy.
29------------------- Myakka	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: too sandy, wetness.
32:				
Floridana-----------	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
Astor---------------	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: too sandy, wetness.
Felda---------------	Poor: wetness.	Probable------------	Probable------------	Poor: too sandy, wetness.
34------------------- Basinger	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: too sandy, wetness.

Table 9.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
35: Arents	Poor: slope.	Probable	Improbable: too sandy.	Poor: slope.
36: Malabar	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
37: Lauderhill	Poor: depth to rock, wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
38: Pahokee	Poor: depth to rock, wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
40: Plantation	Poor: depth to rock, wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
41: Dania	Poor: depth to rock, wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: depth to rock, excess humus, wetness.
42:				
Okeelanta	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness.
Dania	Poor: depth to rock, wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: depth to rock, excess humus, wetness.
43: Sanibel	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.

Table 10.--Water Management

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definition of "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Grassed waterways
2----------------- Hallandale	Severe: depth to rock.	Severe: seepage, piping, wetness.	Severe: depth to rock, cutbanks cave.	Depth to rock, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, droughty, depth to rock.
4----------------- Valkaria	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
5----------------- Smyrna	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
6----------------- Malabar	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
7----------------- Pople	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Percs slowly, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, droughty, rooting depth.
8----------------- Gator	Severe: seepage.	Severe: piping, ponding.	Severe: slow refill, cutbanks cave.	Ponding, percs slowly, subsides.	Ponding, soil blowing, percs slowly.	Wetness, percs slowly.
9----------------- Sanibel	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, subsides, cutbanks cave.	Ponding--------	Wetness.
10---------------- Felda	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
11---------------- Tequesta	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Wetness, subsides, cutbanks cave.	Wetness, droughty, soil blowing.	Wetness, droughty.
12---------------- Chobee	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: slow refill, cutbanks cave.	Ponding, percs slowly.	Ponding, fast intake, soil blowing.	Wetness, percs slowly.
13---------------- Boca	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: depth to rock, cutbanks cave.	Depth to rock, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, droughty, depth to rock.

Table 10.--Water Management--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Grassed waterways
14----------------Basinger	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
15----------------Pineda	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Percs slowly, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, droughty, percs slowly.
16----------------Floridana	Severe: seepage.	Severe: ponding.	Severe: slow refill, cutbanks cave.	Ponding, percs slowly.	Ponding, droughty, fast intake.	Wetness, droughty, percs slowly.
17----------------Okeelanta	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, subsides, cutbanks cave.	Ponding, soil blowing.	Wetness.
19----------------Terra Ceia	Severe: seepage.	Severe: excess humus, wetness.	Severe: cutbanks cave.	Wetness, subsides.	Wetness, soil blowing.	Wetness.
20----------------EauGallie	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
22----------------Astor	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, fast intake, soil blowing.	Wetness.
23----------------Oldsmar	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
24:						
Hallandale--------	Severe: depth to rock.	Severe: seepage, piping, wetness.	Severe: depth to rock, cutbanks cave.	Depth to rock, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, droughty, depth to rock.
Pople------------	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Percs slowly, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, droughty, rooting depth.
26----------------Immokalee	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty.	Wetness, droughty.
27----------------Ft. Drum	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.

Table 10.--Water Management--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Grassed waterways
28: Pomello	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty.	Droughty.
29: Myakka	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty.	Wetness, droughty.
32:						
Floridana	Severe: seepage.	Severe: wetness.	Severe: slow refill, cutbanks cave.	Percs slowly, flooding.	Wetness, droughty, fast intake.	Wetness, droughty, percs slowly.
Astor	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Wetness, fast intake, soil blowing.	Wetness.
Felda	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, droughty.
34: Basinger	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Wetness, droughty.
35: Arents	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Slope, droughty.
36: Malabar	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
37: Lauderhill	Severe: seepage.	Severe: excess humus, wetness.	Severe: depth to rock.	Wetness, depth to rock, subsides.	Wetness, soil blowing, depth to rock.	Wetness, depth to rock.
38: Pahokee	Severe: seepage.	Severe: excess humus, wetness.	Severe: depth to rock.	Wetness, depth to rock, subsides.	Wetness, soil blowing, depth to rock.	Wetness, depth to rock.
40: Plantation	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: depth to rock, cutbanks cave.	Wetness, depth to rock, subsides.	Wetness, droughty, soil blowing.	Wetness, droughty, depth to rock.
41: Dania	Severe: depth to rock.	Severe: excess humus, wetness.	Severe: depth to rock, cutbanks cave.	Wetness, depth to rock, subsides.	Wetness, soil blowing, depth to rock.	Wetness, depth to rock.
42:						
Okeelanta	Severe: seepage.	Severe: piping, ponding.	Severe: slow refill, cutbanks cave.	Ponding, percs slowly, subsides.	Ponding, soil blowing, percs slowly.	Wetness, percs slowly.

Table 10.--Water Management--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Grassed waterways
42:						
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.	Wetness, depth to rock.
43---------------- Sanibel	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Wetness, subsides, cutbanks cave.	Wetness	Wetness, droughty.

Table 11.--Engineering Index Properties

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated.)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
2---------------- Hallandale	0-4	Fine sand--------	SP, SP-SM	A-3	0	100	100	90-100	2-6	---	NP
	4-19	Fine sand, sand	SP, SP-SM	A-3, A-2-4	0	100	100	90-100	2-12	---	NP
	19-23	Weathered bedrock	---	---	---	---	---	---	---	---	---
4---------------- Valkaria	0-4	Fine sand--------	SP, SP-SM	A-3	0	100	75-100	75-100	2-10	---	NP
	4-13	Sand, fine sand	SP, SP-SM	A-3	0	100	75-100	75-100	2-10	---	NP
	13-38	Sand, fine sand	SP, SP-SM	A-3	0	100	75-100	75-100	3-10	---	NP
	38-80	Sand, fine sand	SP, SP-SM	A-3	0	100	75-100	75-100	2-10	---	NP
5---------------- Smyrna	0-15	Fine sand--------	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	15-20	Sand, fine sand, loamy fine sand.	SM, SP-SM	A-3, A-2-4	0	100	100	80-100	5-20	---	NP
	20-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
6---------------- Malabar	0-35	Fine sand--------	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
	35-42	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	3-12	---	NP
	42-60	Sandy clay loam, fine sandy loam, sandy loam.	SC, SC-SM, SM	A-2, A-4, A-6	0	100	100	80-100	20-40	<35	NP-20
	60-80	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	80-100	5-20	---	NP
7---------------- Pople	0-8	Fine sand--------	SP, SP-SM	A-3	0	100	100	80-100	2-5	---	NP
	8-30	Sand, fine sand	SP, SP-SM	A-3	0	90-100	90-100	80-100	2-5	---	NP
	30-38	Loamy sand, fine sandy loam, sandy clay loam.	SC-SM, SC	A-2-4, A-2-6	0	85-100	85-100	80-100	15-35	20-30	4-12
	38-80	Fine sand, loamy sand, loamy fine sand.	SP, SP-SM, SM	A-2-4, A-3	0	100	100	85-100	3-15	<30	NP-12
8---------------- Gator	0-33	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	33-80	Fine sandy loam, sandy clay loam.	SC-SM, SC, SM	A-2-4, A-2-6	0	100	100	80-99	25-35	<40	NP-15
9---------------- Sanibel	0-10	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	10-18	Sand, fine sand, mucky fine sand.	SP, SP-SM	A-3	0	100	100	80-95	1-10	---	NP
	18-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-95	1-10	---	NP
10--------------- Felda	0-35	Fine sand--------	SP, SP-SM	A-3	0	100	100	90-99	2-5	---	NP
	35-43	Sandy loam, fine sandy loam, sandy clay loam.	SM, SC-SM, SC	A-2-4, A-2-6	0	100	100	90-99	15-35	<40	NP-15
	43-80	Sand, fine sand, loamy sand.	SP, SP-SM	A-3, A-2-4	0	85	80	80-99	2-12	---	NP

Table 11.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
11----------------- Tequesta	0-9	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	9-36	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	36-42	Sandy loam, sandy clay loam, fine sandy loam.	SM, SC-SM, SC	A-2-4, A-2-6	0	100	100	80-100	15-35	<40	NP-20
	42-80	Sand, fine sand, loamy sand.	SP, SP-SM, SM	A-3, A-2-4	0	100	100	80-100	3-20	---	NP
12----------------- Chobee	0-9	Loamy fine sand--	SP-SM, SM	A-3, A-2-4	0	100	100	95-100	5-20	<40	NP-10
	9-50	Sandy loam, fine sandy loam, sandy clay loam.	SP-SM, SM, SC, SC-SM	A-2-4, A-2-6, A-6, A-7	0	100	100	85-100	12-45	<45	NP-25
	50-80	Fine sand, loamy sand.	SP-SM, SM	A-2-4	0	100	100	80-100	12-25	<40	NP-10
13----------------- Boca	0-4	Fine sand--------	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	4-21	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	21-34	Sandy loam, sandy clay loam, fine sandy loam.	SC, SC-SM	A-2, A-6, A-4	0	100	100	80-100	17-40	16-37	5-20
	34-38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
14----------------- Basinger	0-6	Fine sand--------	SP	A-3	0	100	100	85-100	1-4	---	NP
	6-32	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
	32-40	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
	40-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
15----------------- Pineda	0-4	Fine sand--------	SP, SP-SM	A-3	0	100	100	80-95	2-8	---	NP
	4-32	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-95	2-10	---	NP
	32-36	Sandy loam, fine sandy loam, sandy clay loam.	SC, SC-SM, SM	A-2-4, A-2-6	0	100	100	65-95	15-35	<35	NP-20
	36-80	Sand, fine sand, loamy fine sand.	SP-SM, SM, SP	A-3, A-2-4	0	50-60	20-30	10-20	4-15	---	NP
16----------------- Floridana	0-19	Fine sand--------	SP-SM, SM	A-3, A-2-4	0	100	100	80-90	5-25	---	NP
	19-25	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-90	2-10	---	NP
	25-80	Sandy loam, fine sandy loam, sandy clay loam.	SC-SM, SC	A-2-4, A-2-6	0	100	100	85-95	20-35	20-40	7-18
17----------------- Okeelanta	0-31	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	31-80	Fine sand, sand, loamy sand.	SP, SP-SM, SM	A-3, A-2-4	0	100	85-100	80-95	2-15	---	NP
19----------------- Terra Ceia	0-80	Muck-------------	PT	A-8	---	---	---	---	---	---	---

Table 11.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
20---------------EauGallie	0-23	Fine sand--------	SP, SP-SM	A-3	0	100	100	80-98	2-5	---	NP
	23-42	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	80-98	5-20	---	NP
	42-55	Sandy loam, fine sandy loam, sandy clay loam.	SM, SC-SM, SC	A-2-4, A-2-6	0	100	100	80-98	20-35	<40	NP-20
	55-80	Sand, loamy sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	80-98	5-25	---	NP
22---------------Astor	0-34	Fine sand--------	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	5-20	---	NP
	34-80	Sand, fine sand, loamy sand.	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	5-20	---	NP
23---------------Oldsmar	0-34	Sand-------------	SP, SP-SM	A-3	0	100	100	50-100	2-10	---	NP
	34-46	Fine sand, sand, loamy fine sand.	SM, SP-SM	A-2-4, A-3	0	100	100	80-100	5-20	---	NP
	46-80	Fine sandy loam, sandy loam, sandy clay loam.	SC-SM, SC	A-2-4, A-2-6	0	100	100	85-100	20-35	20-35	5-15
24:											
Hallandale------	0-4	Fine sand--------	SP, SP-SM	A-3	0	100	100	90-100	2-6	---	NP
	4-19	Fine sand, sand	SP, SP-SM	A-3, A-2-4	0	100	100	90-100	2-12	---	NP
	19-23	Weathered bedrock	---	---	---	---	---	---	---	---	---
Pople-----------	0-8	Fine sand--------	SP, SP-SM	A-3	0	100	100	80-100	2-5	---	NP
	8-30	Sand, fine sand	SP, SP-SM	A-3	0	90-100	90-100	80-100	2-5	---	NP
	30-38	Loamy sand, fine sandy loam, sandy clay loam.	SC-SM, SC	A-2-4, A-2-6	0	85-100	85-100	80-100	15-35	20-30	4-12
	38-80	Fine sand, loamy sand, loamy fine sand.	SP, SP-SM, SM	A-2-4, A-3	0	90-100	90-100	85-100	3-15	<30	NP-12
26---------------Immokalee	0-8	Sand-------------	SP, SP-SM	A-3	0	100	100	70-100	2-10	---	NP
	8-38	Fine sand, sand	SP, SP-SM	A-3	0	100	100	70-100	2-10	---	NP
	38-48	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	100	70-100	5-21	---	NP
	48-80	Fine sand, sand	SP, SP-SM	A-3	0	100	100	70-100	2-10	---	NP
27---------------Ft. Drum	0-10	Fine sand--------	SP, SP-SM	A-3	0	100	100	90-100	2-10	---	NP
	10-22	Sand, fine sand	SP, SP-SM	A-3	0	100	100	90-100	2-10	---	NP
	22-32	Fine sandy loam, loamy fine sand, fine sand.	SM, SC-SM, SC, SP-SM	A-2-4, A-3	0	100	100	90-100	5-30	<30	NP-10
	32-80	Sand, fine sand, loamy fine sand.	SP, SP-SM, SM	A-3, A-2-4	0	95-100	95-100	90-100	2-15	---	NP
28---------------Pomello	0-55	Fine sand--------	SP, SP-SM	A-3	0	100	100	60-100	1-8	---	NP
	55-65	Coarse sand, sand, fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	60-100	6-15	---	NP
	65-80	Coarse sand, sand, fine sand.	SP, SP-SM	A-3	0	100	100	60-100	4-10	---	NP

Table 11.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
29--------------- Myakka	0-3	Fine sand--------	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
	3-27	Sand, fine sand	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
	27-45	Sand, fine sand, loamy fine sand.	SM, SP-SM	A-3, A-2-4	0	100	100	85-100	5-20	---	NP
	45-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	85-100	2-8	---	NP
32:											
Floridana-------	0-19	Fine sand--------	SP-SM, SM	A-3, A-2-4	0	100	100	80-90	5-25	---	NP
	19-25	Fine sand, sand	SP, SP-SM	A-3	0	100	100	85-95	2-10	---	NP
	25-80	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	7-16
Astor-----------	0-34	Fine sand--------	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	5-20	---	NP
	34-80	Sand, fine sand, loamy sand.	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	5-20	---	NP
Felda-----------	0-35	Fine sand--------	SP, SP-SM	A-3	0	100	100	90-99	2-5	---	NP
	35-43	Sandy loam, fine sandy loam, sandy clay loam.	SM, SC-SM, SC	A-2-4, A-2-6	0	100	100	90-99	15-35	<40	NP-15
	43-80	Sand, fine sand, loamy sand.	SP, SP-SM	A-3, A-2-4	0	30	85	10	2-12	---	NP
34--------------- Basinger	0-6	Fine sand--------	SP	A-3	0	100	100	85-100	1-4	---	NP
	6-32	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
	32-40	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
	40-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
35--------------- Arents	0-80	Variable---------	SP, SP-SM, SM	A-3, A-2-4	0	95-100	75-95	60-90	2-25	---	NP
36--------------- Malabar	0-35	Fine sand--------	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
	35-42	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	3-12	---	NP
	42-60	Fine sandy loam, sandy clay loam.	SC, SC-SM, SM	A-2, A-4, A-6	0	100	100	80-100	20-40	<35	NP-20
	60-80	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	80-100	5-20	---	NP
37--------------- Lauderhill	0-25	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	25-29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
38--------------- Pahokee	0-48	Muck-------------	PT	A-8	---	---	---	---	---	---	---
	48-52	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
40--------------- Plantation	0-10	Muck-------------	PT	A-8	---	---	---	---	---	---	---
	10-30	Sand, fine sand	SP	A-3	0	100	100	90-100	1-4	---	NP
	30-34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

Table 11.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
41--------------- Dania	0-16	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	16-20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
42:											
Okeelanta-------	0-31	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	31-80	Fine sand--------	SP-SM	A-3, A-2-4	0	100	100	85-100	5-12	---	NP
Dania-----------	0-16	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	16-20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
43--------------- Sanibel	0-10	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	10-18	Sand, fine sand, mucky fine sand.	SP, SP-SM	A-3	0	100	100	80-95	1-10	---	NP

Table 12.--Physical and Chemical Properties of the Soils

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated.)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	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
2 Hallandale	0-4	0-3	1.20-1.45	6.0-20	0.05-0.10	5.1-6.5	<2	Low	0.10	1	2	1-2
	4-19	0-5	1.45-1.65	6.0-20	0.03-0.10	5.6-8.4	<2	Low	0.10			
	19-23	---	---	2.0-20.0	---	---	---	----------	----			
4 Valkaria	0-4	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
	4-13	0-2	1.45-1.60	6.0-20	0.03-0.08	4.5-7.3	<2	Low	0.10			
	13-38	2-5	1.45-1.60	6.0-20	0.05-0.10	4.5-7.3	<2	Low	0.10			
	38-80	1-5	1.45-1.60	6.0-20	0.03-0.08	5.1-8.4	<2	Low	0.10			
5 Smyrna	0-15	1-6	1.35-1.45	6.0-20	0.03-0.07	3.6-7.3	<2	Low	0.10	5	2	1-5
	15-20	3-8	1.35-1.45	0.6-6.0	0.10-0.20	3.6-7.3	<2	Low	0.15			
	20-80	1-6	1.50-1.65	6.0-20	0.03-0.07	4.5-5.5	<2	Low	0.10			
6 Malabar	0-35	0-4	1.35-1.55	6.0-20	0.03-0.08	5.1-8.4	<2	Low	0.10	5	1	1-4
	35-42	1-5	1.35-1.70	6.0-20	0.05-0.10	5.1-8.4	<2	Low	0.10			
	42-60	12-25	1.55-1.75	<0.2	0.10-0.15	5.1-8.4	<2	Low	0.24			
	60-80	1-8	1.40-1.70	6.0-20	0.03-0.08	5.1-8.4	<2	Low	0.15			
7 Pople	0-8	2-6	1.25-1.45	2.0-20	0.05-0.15	5.6-7.8	<2	Low	0.10	5	1	.5-6
	8-30	4-8	1.30-1.60	2.0-20	0.03-0.08	5.6-8.4	<2	Low	0.10			
	30-38	12-30	1.60-1.75	0.06-0.6	0.10-0.15	7.4-8.4	<2	Low	0.20			
	38-80	2-15	1.45-1.60	2.0-20	0.03-0.10	7.4-8.4	<2	Low	0.15			
8 Gator	0-33	0-1	0.10-0.30	6.0-20	0.30-0.40	3.6-6.0	<2	Low	----	---	2	55-85
	33-80	13-20	1.60-1.70	0.6-2.0	0.10-0.15	6.1-8.4	<2	Low	0.32			
9 Sanibel	0-10	---	0.30-0.55	6.0-20	0.20-0.50	3.6-7.3	<2	Low	0.10	4	2	20-50
	10-18	2-6	1.40-1.60	6.0-20	0.10-0.15	3.6-7.3	<2	Low	0.10			
	18-80	2-6	1.50-1.65	6.0-20	0.03-0.10	3.6-7.3	<2	Low	0.10			
10 Felda	0-35	1-3	1.40-1.55	6.0-20	0.02-0.05	5.1-7.8	<2	Low	0.10	5	2	1-4
	35-43	13-30	1.50-1.65	0.6-6.0	0.10-0.15	6.1-7.8	<2	Low	0.24			
	43-80	1-10	1.50-1.65	6.0-20	0.02-0.05	6.1-8.4	<2	Low	0.10			
11 Tequesta	0-9	---	0.20-0.40	6.0-20	0.20-0.25	5.1-7.3	<2	Low	----	---	2	35-60
	9-36	1-6	1.45-1.65	6.0-20	0.05-0.10	5.1-7.3	<2	Low	0.10			
	36-42	15-25	1.50-1.70	0.2-0.6	0.10-0.15	6.1-8.4	<2	Low	0.24			
	42-80	5-12	1.40-1.65	6.0-20	0.02-0.05	6.1-8.4	<2	Low	0.10			
12 Chobee	0-9	2-8	1.25-1.45	6.0-20	0.15-0.25	5.1-7.3	<2	Low	0.10	5	2	10-20
	9-50	10-30	1.40-1.45	<0.2	0.12-0.17	5.6-8.4	<2	Low	0.15			
	50-80	0-15	1.45-1.50	2.0-6.0	0.10-0.15	5.6-7.8	<2	Low	0.15			
13 Boca	0-4	1-5	1.30-1.55	6.0-20	0.05-0.10	5.1-8.4	<2	Low	0.10	2	1	1-3
	4-21	1-5	1.50-1.60	6.0-20	0.02-0.05	5.1-8.4	<2	Low	0.17			
	21-34	14-30	1.55-1.65	0.6-2.0	0.10-0.15	5.1-8.4	<2	Low	0.20			
	34-38	---	---	2.0-20	---	---	---	----------	----			
14 Basinger	0-6	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
	6-32	0-4	1.40-1.55	6.0-20	0.05-0.10	3.6-7.3	<2	Low	0.10			
	32-40	1-6	1.40-1.65	6.0-20	0.10-0.15	3.6-7.3	<2	Low	0.10			
	40-80	1-3	1.50-1.70	6.0-20	0.05-0.10	3.6-7.3	<2	Low	0.10			

Table 12.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	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
15--------------- Pineda	0-4	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
	4-32	1-8	1.40-1.70	6.0-20	0.02-0.05	4.5-7.3	<2	Low-------	0.10			
	32-36	10-25	1.50-1.70	<0.2	0.10-0.15	5.1-8.4	<2	Low-------	0.24			
	36-80	3-12	1.45-1.60	2.0-6.0	0.02-0.05	5.6-8.4	<2	Low-------	0.10			
16--------------- Floridana	0-19	3-10	1.40-1.50	6.0-20	0.10-0.20	4.5-8.4	<2	Low-------	0.10	5	2	6-15
	19-25	1-7	1.50-1.55	6.0-20	0.05-0.10	4.5-8.4	<2	Low-------	0.10			
	25-80	15-30	1.60-1.70	<0.2	0.10-0.20	4.5-8.4	<2	Low-------	0.24			
17--------------- Okeelanta	0-31	---	0.22-0.38	6.0-20	0.30-0.50	4.5-6.5	<2	Low-------	----	---	2	60-90
	31-80	1-5	1.30-1.55	6.0-20	0.05-0.10	5.1-7.8	<2	Low-------	0.15			
19--------------- Terra Ceia	0-80	---	0.15-0.35	6.0-20	0.30-0.50	4.5-8.4	<2	Low-------	----	---	2	60-90
20--------------- EauGallie	0-23	<5	1.25-1.50	6.0-20	0.02-0.07	4.5-6.0	<2	Low-------	0.10	5	2	2-8
	23-42	1-8	1.45-1.60	0.6-2.0	0.15-0.25	4.5-6.5	<2	Low-------	0.15			
	42-55	13-31	1.55-1.70	0.06-2.0	0.10-0.20	4.5-7.8	<2	Low-------	0.20			
	55-80	1-13	1.45-1.55	0.6-6.0	0.05-0.15	4.5-7.8	<2	Low-------	0.15			
22--------------- Astor	0-34	2-7	1.30-1.60	6.0-20	0.15-0.20	6.1-8.4	<2	Low-------	0.10	5	2	2-9
	34-80	2-7	1.50-1.70	6.0-20	0.05-0.10	6.1-8.4	<2	Low-------	0.10			
23--------------- Oldsmar	0-34	<2	1.48-1.61	6.0-20	0.02-0.05	3.6-7.3	<2	Low-------	0.10	5	2	1-2
	34-46	2-8	1.42-1.59	0.2-6.0	0.10-0.15	3.6-7.3	<2	Low-------	0.15			
	46-80	15-30	1.60-1.69	<0.2	0.10-0.15	6.1-8.4	<2	Low-------	0.24			
24:												
Hallandale------	0-4	0-3	1.20-1.45	6.0-20	0.05-0.10	5.1-6.5	<2	Low-------	0.10	1	2	1-2
	4-19	0-5	1.45-1.65	6.0-20	0.03-0.10	5.6-8.4	<2	Low-------	0.10			
	19-23	---	---	2.0-20.0	---	---	---	----------	----			
Pople-----------	0-8	2-6	1.25-1.45	6.0-20	0.05-0.15	5.6-7.8	<2	Low-------	0.10	5	1	.5-6
	8-30	4-8	1.30-1.60	6.0-20	0.03-0.08	5.6-8.4	<2	Low-------	0.10			
	30-48	12-30	1.60-1.75	0.06-0.6	0.10-0.15	7.4-8.4	<2	Low-------	0.20			
	48-80	2-15	1.45-1.60	2.0-20	0.03-0.10	7.4-8.4	<2	Low-------	0.15			
26--------------- Immokalee	0-8	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
	8-38	1-5	1.45-1.70	6.0-20	0.02-0.05	3.6-6.0	<2	Low-------	0.10			
	38-48	2-7	1.30-1.70	0.6-2.0	0.10-0.25	3.6-6.0	<2	Low-------	0.15			
	48-80	1-5	1.40-1.70	6.0-20	0.02-0.05	3.6-6.0	<2	Low-------	0.10			
27--------------- Ft. Drum	0-10	1-3	1.30-1.55	6.0-20	0.05-0.10	4.5-7.3	<2	Low-------	0.10	5	2	1-2
	10-22	1-3	1.30-1.55	6.0-20	0.05-0.08	5.6-8.4	<2	Low-------	0.10			
	22-32	10-20	1.40-1.65	0.6-2.0	0.10-0.15	7.4-8.4	<2	Low-------	0.24			
	32-80	2-5	1.30-1.60	6.0-20	0.05-0.08	6.1-8.4	<2	Low-------	0.17			
28--------------- Pomello	0-55	<2	1.35-1.65	>20	0.02-0.05	4.5-6.0	<2	Low-------	0.10	5	1	<1
	55-65	<2	1.45-1.60	2.0-6.0	0.10-0.30	4.5-6.0	<2	Low-------	0.15			
	65-80	<2	1.35-1.65	6.0-20	0.02-0.05	4.5-6.0	<2	Low-------	0.10			
29--------------- Myakka	0-3	1-3	1.25-1.45	6.0-20	0.05-0.15	3.6-6.5	<2	Low-------	0.10	5	2	2-5
	3-27	0-2	1.45-1.60	6.0-20	0.02-0.05	3.6-6.5	<2	Low-------	0.10			
	27-45	1-8	1.45-1.60	0.6-2.0	0.10-0.20	3.6-6.5	<2	Low-------	0.15			
	45-80	0-2	1.48-1.70	6.0-20	0.02-0.10	3.6-6.5	<2	Low-------	0.10			
32:												
Floridana-------	0-19	3-10	1.40-1.50	6.0-20	0.10-0.20	4.5-8.4	<2	Low-------	0.10	5	2	6-15
	19-25	1-7	1.50-1.60	6.0-20	0.05-0.10	4.5-8.4	<2	Low-------	0.10			
	25-80	15-30	1.60-1.70	<0.2	0.10-0.20	4.5-8.4	<2	Low-------	0.24			

Table 12.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	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
32:												
Astor-----------	0-34	2-7	1.30-1.60	6.0-20	0.15-0.20	6.1-8.4	<2	Low-------	0.10	5	2	2-9
	34-80	2-7	1.50-1.70	6.0-20	0.05-0.10	6.1-8.4	<2	Low-------	0.10			
Felda-----------	0-35	1-3	1.40-1.55	6.0-20	0.02-0.05	5.1-7.8	<2	Low-------	0.10	5	2	1-4
	35-43	13-30	1.50-1.65	0.6-6.0	0.10-0.15	6.1-7.8	<2	Low-------	0.24			
	43-80	1-10	1.50-1.65	6.0-20	0.02-0.05	6.1-7.8	<2	Low-------	0.10			
34--------------- Basinger	0-6	0-4	1.40-1.55	6.0-20	0.05-0.10	3.6-7.3	<2	Low-------	0.10	5	2	1-8
	6-32	0-4	1.40-1.55	6.0-20	0.05-0.10	3.6-7.3	<2	Low-------	0.10			
	32-40	1-3	1.40-1.65	6.0-20	0.10-0.15	3.6-7.3	<2	Low-------	0.10			
	40-80	1-3	1.50-1.70	6.0-20	0.05-0.10	3.6-7.3	<2	Low-------	0.10			
35--------------- Arents	0-80	1-25	1.25-1.60	6.0-20	0.02-0.10	6.1-8.4	<2	Low-------	0.10	3	2	<1
36--------------- Malabar	0-35	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
	35-42	1-5	1.35-1.70	6.0-20	0.05-0.10	5.1-7.3	<2	Low-------	0.10			
	42-60	12-25	1.55-1.75	<0.2	0.10-0.15	5.1-7.3	<2	Low-------	0.24			
	60-80	1-8	1.40-1.70	6.0-20	0.03-0.08	5.1-7.3	<2	Low-------	0.10			
37--------------- Lauderhill	0-25	---	0.15-0.35	6.0-20	0.30-0.50	5.6-7.8	<2	Low-------	----	---	2	60-90
	25-29	---	---	2.0-20.0	---	---	---	----------	----			
38--------------- Pahokee	0-48	---	0.20-1.00	6.0-20	0.20-0.25	5.6-7.3	<2	Low-------	----	---	2	75-90
	48-52	---	---	2.0-20.0	---	---	---	----------	----			
40--------------- Plantation	0-10	---	0.15-0.35	6.0-20	0.20-0.30	4.5-6.0	<2	Low-------	----	2	2	20-50
	10-30	1-3	1.50-1.60	6.0-20	0.02-0.05	5.1-8.4	<2	Low-------	0.10			
	30-34	---	---	2.0-20.0	---	---	---	----------	----			
41--------------- Dania	0-16	---	0.15-0.35	6.0-20	0.20-0.30	5.6-7.3	<2	Low-------	----	---	2	60-90
	16-20	---	---	2.0-20	---	---	---	----------	----			
42:												
Okeelanta-------	0-31	0-1	0.10-0.30	6.0-20	0.30-0.40	3.6-5.0	<2	Low-------	----	---	2	20-80
	31-80	1-2	1.20-1.55	2.0-6.0	0.03-0.05	5.1-6.5	<2	Low-------	0.17			
Dania-----------	0-16	---	0.15-0.35	6.0-20	0.20-0.30	5.6-7.3	<2	Low-------	----	---	2	60-90
	16-20	---	---	2.0-20	---	---	---	----------	----			
43--------------- Sanibel	0-10	---	0.30-0.55	6.0-20	0.20-0.50	3.6-7.3	<2	Low-------	0.10	4	2	
	10-18	2-6	1.40-1.60	6.0-20	0.10-1.15	3.6-7.3	<2	Low-------	0.10	---		20-80
	18-80	2-6	1.50-1.65	6.0-20	0.03-0.10	3.6-7.3	<2	Low-------	0.10	---		

Table 13.--Soil and Water Features

("Flooding" and "water table" and terms such as "frequent," "brief," 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.)

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock depth	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In		
2-------------- Hallandale	B/D	None--------	---	---	0.5-1.5	Apparent	Jun-Sep	7-20	High------	Low.
4-------------- Valkaria	B/D	None--------	---	---	0-0.5	Apparent	Jun-Sep	>60	High------	Moderate.
5-------------- Smyrna	B/D	None--------	---	---	0.5-1.5	Apparent	Jun-Sep	>60	High------	High.
6-------------- Malabar	B/D	None--------	---	---	0-0.5	Apparent	Jun-Oct	>60	High------	Moderate.
7-------------- Pople	B/D	None--------	---	---	0.5-1.5	Apparent	Jun-Sep	>60	High------	Low.
8-------------- Gator	D	None--------	---	---	+2-0	Apparent	Jun-Apr	>60	High------	High.
9-------------- Sanibel	D	None--------	---	---	+1-1.0	Apparent	Jun-Apr	>60	High------	Low.
10------------- Felda	B/D	None--------	---	---	0-0.5	Apparent	Jul-Mar	>60	High------	Moderate.
11------------- Tequesta	B/D	None--------	---	---	0-1.0	Apparent	Jan-Dec	>60	Moderate	Low.
12------------- Chobee	D	None--------	---	---	+2-0	Apparent	Jun-Mar	>60	High------	High.
13------------- Boca	B/D	None--------	---	---	0.5-1.5	Apparent	Jun-Feb	24-40	High------	Moderate.
14------------- Basinger	B/D	None--------	---	---	0-0.5	Apparent	Jun-Feb	>60	High------	Moderate.
15------------- Pineda	B/D	None--------	---	---	0-0.5	Apparent	Jun-Nov	>60	High------	Low.
16------------- Floridana	D	None--------	---	---	+2-0	Apparent	Jun-Mar	>60	Moderate	Low.
17------------- Okeelanta	B/D	None--------	---	---	+1-0	Apparent	Jun-Jan	>60	High------	Moderate.
19------------- Terra Ceia	B/D	None--------	---	---	0-1	Apparent	Jun-Apr	>60	Moderate	Moderate.
20------------- EauGallie	B/D	None--------	---	---	0.5-1.5	Apparent	Jun-Sep	>60	High------	Moderate.
22------------- Astor	B/D	None--------	---	---	+2-0	Apparent	Jun-Jan	>60	High------	Low.

Table 13.--Soil and Water Features--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	depth	Uncoated steel	Concrete
					Ft			In		
23-------------- Oldsmar	B/D	None--------	---	---	0.5-1.5	Apparent	Jun-Sep	>60	Moderate	High.
24:										
Hallandale-----	B/D	None--------	---	---	0.5-1.5	Apparent	Jun-Sep	7-20	High------	Low.
Pople----------	B/D	None--------	---	---	0.5-1.5	Apparent	Jun-Sep	>60	High------	Low.
26-------------- Immokalee	B/D	None--------	---	---	0.5-1.5	Apparent	Jun-Sep	>60	High------	High.
27-------------- Ft. Drum	C	None--------	---	---	0.5-1.5	Apparent	Jun-Sep	>60	High------	Low.
28-------------- Pomello	C	None--------	---	---	2.0-3.5	Apparent	Jul-Nov	>60	Low-------	High.
29-------------- Myakka	B/D	None--------	---	---	0.5-1.5	Apparent	Jun-Sep	>60	High------	High.
32:										
Floridana------	D	Frequent----	Very long	Jul-Sep	0-0.5	Apparent	Jun-Oct	>60	Moderate	Low.
Astor----------	D	Frequent----	Very long	Jun-Jan	0-0.5	Apparent	Jun-Oct	>60	High------	Low.
Felda----------	B/D	Frequent----	Brief----	Jul-Feb	0-0.5	Apparent	Jul-Mar	>60	High------	Moderate.
34-------------- Basinger	D	None--------	---	---	+2-0	Apparent	Jun-Mar	>60	High------	Moderate.
35-------------- Arents	A	None--------	---	---	>6.0	---	---	>60	Low-------	Low.
36-------------- Malabar	B/D	None--------	---	---	0.5-1.5	Apparent	Jun-Sep	>60	High------	Low.
37-------------- Lauderhill	B/D	None--------	---	---	0-1.0	Apparent	Jun-Apr	20-40	High------	Moderate.
38-------------- Pahokee	B/D	None--------	---	---	0-1.0	Apparent	Jun-Feb	36-51	High------	Moderate.
40-------------- Plantation	B/D	None--------	---	---	0-1.0	Apparent	Jun-Apr	20-40	High------	Moderate.
41-------------- Dania	B/D	None--------	---	---	0-1.0	Apparent	Jun-Apr	8-20	High------	Moderate.
42:										
Okeelanta------	D	None--------	---	---	+2-0	Apparent	Jun-Apr	>60	High------	High.
Dania----------	B/D	None--------	---	---	+2-0	Apparent	Jun-Apr	8-20	High------	Moderate.
43-------------- Sanibel	D	None--------	---	---	0-1.0	Apparent	Jun-Apr	>60	High------	Low.

Table 14.--Classification of the Soils

Soil name	Family or higher taxonomic class
Arents	Arents
Astor	Sandy, siliceous, hyperthermic Cumulic Haplaquolls
Basinger	Siliceous, hyperthermic Spodic Psammaquents
Boca	Loamy, siliceous, hyperthermic Arenic Ochraqualfs
Chobee	Fine-loamy, siliceous, hyperthermic Typic Argiaquolls
Dania	Euic, hyperthermic, shallow Lithic Medisaprists
EauGallie	Sandy, siliceous, hyperthermic Alfic Haplaquods
Felda	Loamy, siliceous, hyperthermic Arenic Ochraqualfs
Floridana	Loamy, siliceous, hyperthermic Arenic Argiaquolls
Ft. Drum	Sandy, siliceous, hyperthermic Aeric Haplaquepts
Gator	Loamy, siliceous, euic, hyperthermic Terric Medisaprists
Hallandale	Siliceous, hyperthermic Lithic Psammaquents
Immokalee	Sandy, siliceous, hyperthermic Arenic Haplaquods
Lauderhill	Euic, hyperthermic Lithic Medisaprists
Malabar	Loamy, siliceous, hyperthermic Grossarenic Ochraqualfs
Myakka	Sandy, siliceous, hyperthermic Aeric Haplaquods
Okeelanta	Sandy or sandy-skeletal, siliceous, euic, hyperthermic Terric Medisaprists
Oldsmar	Sandy, siliceous, hyperthermic Alfic Arenic Haploquods
Pahokee	Euic, hyperthermic Lithic Medisaprists
Pineda	Loamy, siliceous, hyperthermic Arenic Glossaqualfs
Plantation	Sandy, siliceous, hyperthermic Histic Humaquepts
Pomello	Sandy, siliceous, hyperthermic Grossarenic Haplohumods
Pople	Loamy, siliceous, hyperthermic Arenic Ochraqualfs
Sanibel	Sandy, siliceous, hyperthermic Histic Humaquepts
Smyrna	Sandy, siliceous, hyperthermic Aeric Haplaquods
Tequesta	Loamy, siliceous, hyperthermic Arenic Glossaqualfs
Terra Ceia	Euic, hyperthermic Typic Medisaprists
Valkaria	Siliceous, hyperthermic Spodic Psammaquents

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