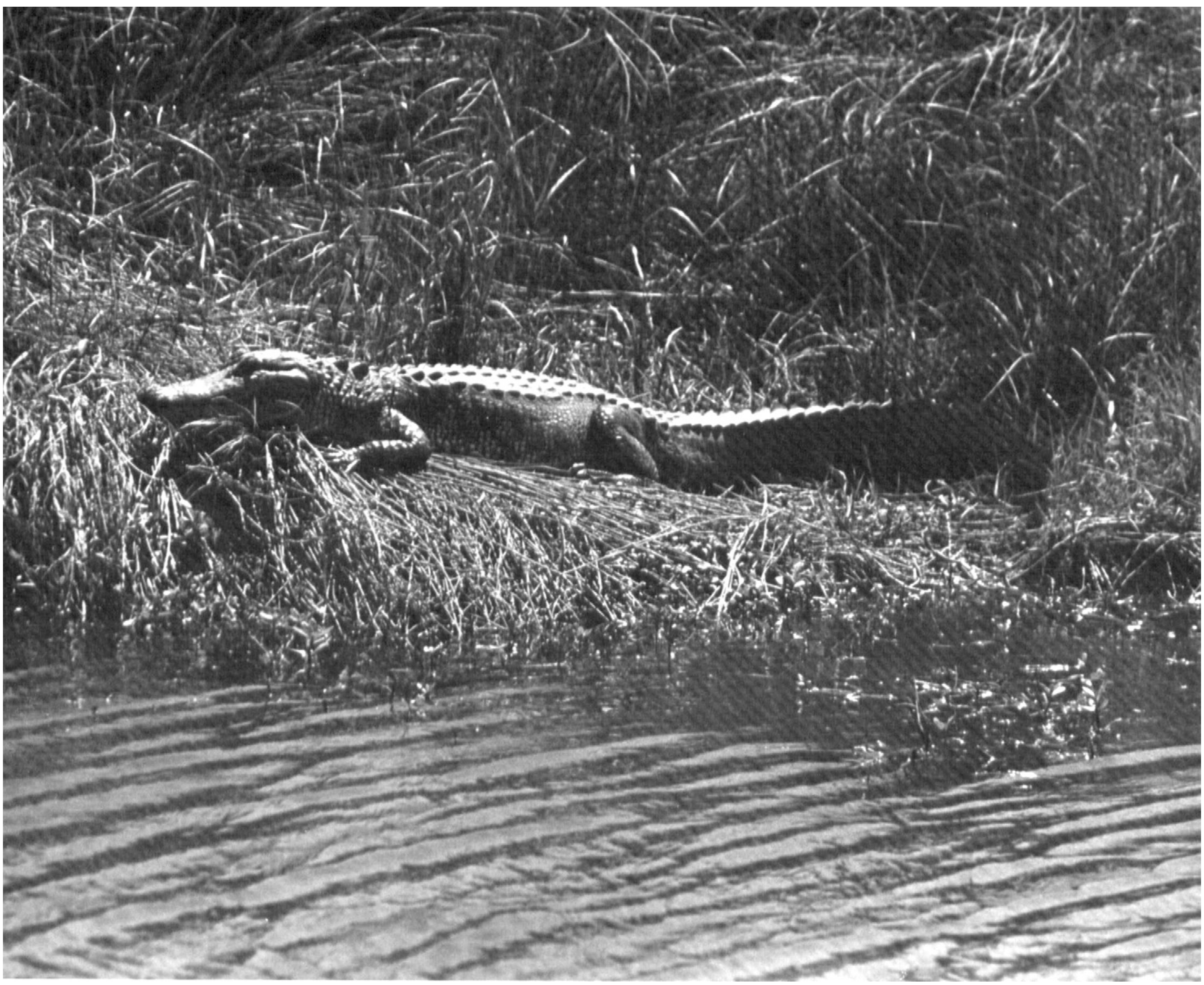
United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
the Louisiana Agricultural
Experiment Station and
the Louisiana Soil and
Water Conservation
Committee

Soil Survey of Cameron Parish, Louisiana



How To Use This Soil Survey

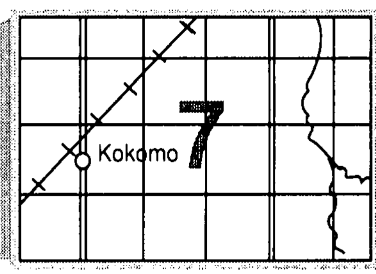
General Soil Map

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

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

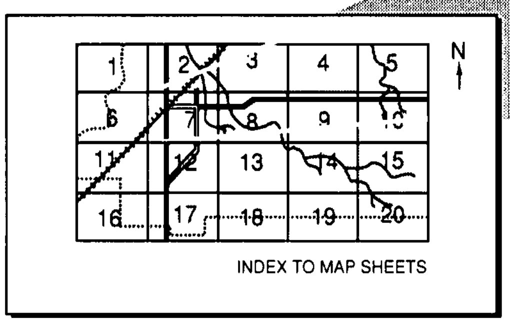
Detailed Soil Maps

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



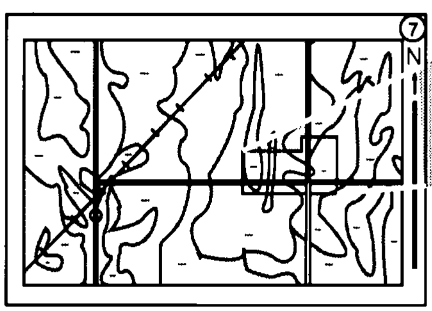
MAP SHEET

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



INDEX TO MAP SHEETS

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



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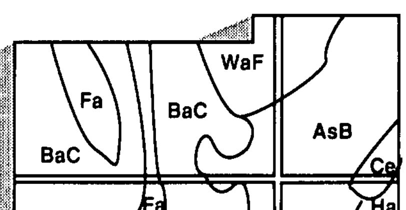

AREA OF INTEREST

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

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

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

Major fieldwork for this soil survey was completed in 1986. Soil names and descriptions were approved in 1986. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1986. This soil survey was made cooperatively by the Soil Conservation Service, the Louisiana Agricultural Experiment Station, and the Louisiana Soil and Water Conservation Committee. It is part of the technical assistance furnished to the Gulf Coast Soil and Water Conservation District.

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

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

Cover: An American alligator sunning on a mat of marshhay cordgrass in an area of Bancker muck. Many alligators inhabit the marshes and swamps in Cameron Parish.

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Issued April 1995

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Summary of Tables

Foreword

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

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

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

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

Donald W. Gohmert
State Conservationist
Soil Conservation Service

Soil Survey of Cameron Parish, Louisiana

By Clay Midkiff and A.J. Roy, Soil Conservation Service, and Rick Nolde, Louisiana Soil and Water Conservation Committee

United States Department of Agriculture, Soil Conservation Service, in cooperation with
the Louisiana Agricultural Experiment Station and the Louisiana Soil and Water Conservation Committee

CAMERON PARISH is in the southwest corner of Louisiana (fig. 1). It has a total area of 1,204,038 acres and is one of the largest parishes in the state. The parish is bordered on the west by Texas, on the south by the Gulf of Mexico, on the north by Calcasieu and Jefferson Davis Parishes, and on the east by Vermilion Parish. Elevation ranges from sea level in the marshes along the coast to about 20 feet above sea level in the uplands in the northern part of the parish. The town of Cameron is the parish seat. The parish is chiefly rural. In 1980, it had a population of 9,336.

Coastal marshes make up about 82 percent of the total acreage in the parish. They are used mainly as habitat for wildlife and for recreational purposes, rangeland, and oil and gas fields. About 20 percent of the land in the parish is rangeland, 13 percent is cropland or pasture, and 4 percent is used for urban development *(23)*. The rest of the land is used as habitat for wildlife and for miscellaneous purposes. Most of the rangeland in the parish is in marshes that are firm enough to support grazing cattle.

The major physiographic areas that make up the parish are the coastal marshes and cheniers in the Gulf Coast Marsh major land resource area and the prairies in the Gulf Coast Prairies major land resource area. The marshes and cheniers border the Gulf of Mexico and the large lakes in the parish. The marshes include soft or very fluid, organic and mineral soils and slightly fluid or firm, mineral soils. The soils are ponded most of the time and are frequently flooded. Most of the acreage is used as habitat for wildlife and for recreational purposes. A small acreage is used as rangeland for cattle. The rangeland in the marshes is entirely in areas of the firm or slightly fluid, mineral soils.

Figure 1.—Location of Cameron Parish in Louisiana.

The cheniers, or low ridges, make up about 6 percent of the land area in the parish. The ridges are broad or are long and narrow. They parallel the coast of the Gulf of Mexico. The soils on the ridges are sandy or loamy and are poorly drained, somewhat poorly drained, or somewhat excessively drained. They are subject to flooding by tidal surges during tropical storms. Most of the acreage is used as rangeland, as habitat for wetland wildlife, or for recreational purposes. A small acreage has been developed for urban uses.

The prairies are in the northern part of the parish. They make up about 12 percent of the land area. The native vegetation was tall prairie grasses. Today, the prairies are used chiefly for crops, mainly rice and soybeans. A small acreage is used for pasture or urban development. The soils generally are level, loamy or clayey, and poorly drained or somewhat poorly drained.

General Nature of the Survey Area

This section gives general information concerning the parish. It describes climate, history, agriculture, industry, transportation facilities, and water resources.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Lake Charles, Louisiana, in the period 1962 to 1977. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 53 degrees F and the average daily minimum temperature is 43 degrees. The lowest temperature on record, which occurred at Lake Charles on January 11, 1962, is 15 degrees. In summer, the average temperature is 81 degrees and the average daily maximum temperature is 90 degrees. The highest recorded temperature, which occurred at Lake Charles on August 8, 1962, is 103 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 52.38 inches. Of this, nearly 29 inches, or about 55 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 23 inches. The heaviest 1-day rainfall during the period of record was 10.22 inches at Lake Charles on August 29, 1962. Thunderstorms occur on about 80 days each year. Every few years a hurricane crosses the parish.

The average seasonal snowfall is less than 1 inch. Snow is seldom on the ground for more than a day. The greatest snow depth at any one time during the period of record was 4 inches.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 90 percent. The sun shines 60 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 10 miles per hour, in spring.

History

Cameron Parish was established as a political unit in 1870, when it was separated from Vermilion and Calcasieu Parishes. The parish was named in honor of Robert Alexander Cameron, who was a soldier in the Confederate Army.

Indians of the Attakapas Tribe lived on the cheniers before the arrival of Europeans. The first Europeans to enter the survey area may have been the Spanish under Cabeza de Vaca, who touched points along the Cameron Coast. Some of DeSoto's survivors may also have landed on the coast during their voyage from the mouth of the Mississippi River to the Spanish colonies in Mexico. The pirates with Jean Lafitte traveled on the rivers and in the bayous and may have gone inland to camp on the cheniers.

During the seventeenth and eighteenth centuries, the land between the Sabine and Calcasieu Rivers was known as the Neutral Strip, which was claimed by both Spain and France but was governed and controlled by neither. In 1762, France ceded all of Louisiana to Spain. In 1803, Spain gave Louisiana back to France, and the French then sold Louisiana to the United States.

The first settlers came to the southern part of the parish during the second quarter of the nineteenth century. They were people of Celtic and Anglo-Saxon origin. The French, from other parts of Louisiana, arrived later and settled primarily in the northern part of the parish. Fishing, fur trading, and livestock raising were important to the early settlers in the southern part of the parish and remain important today. Agriculture has always been the dominant enterprise in the northern part of the parish. Beginning in the early twentieth century, the oil and gas industry became important throughout the parish.

Agriculture

In 1982, Cameron Parish had 446 farms. The farms averaged about 583 acres in size. Since 1978, the number of farms in the parish has increased while the average size has decreased. The acreage of cropland has increased.

In 1982, a total of 67,811 acres was used as cropland, 49,447 acres as pasture, and 171,086 acres as marsh rangeland. The parish has no commercial woodland. Since 1978, the acreage of harvested rice has decreased and the acreage of harvested soybeans has increased *(23)*. In 1985, a total of 15,083 acres was used for soybeans, 11,647 acres for rice, 831 acres for grain sorghum, and 517 acres for wheat.

Rice is the principal cash crop in the parish (fig. 2). Livestock is the second most important source of agricultural income. In 1982, the parish had an estimated 50,500 head of cattle. It probably has more cattle than any other parish in the State.

Industry

The economy of Cameron Parish is based mainly on the extraction, transmission, and processing of oil and natural gas and on trapping, fishing, and agriculture. The exploration for and production of petroleum and natural gas are the major enterprises in the parish. A large part of the employment in the parish is energy related.

The seafood industry plays an important role in the prosperity of the parish. The town of Cameron has excellent port facilities and ranks as the Nation's leading fishing port. Trapping alligators and furbearers and transporting hides and meat are important economic activities.

Despite the limitations of terrain, the parish has potential for additional industrial and commercial growth. A plentiful supply of energy is readily available in the parish. Ample supplies of surface and ground water can be easily obtained, and the parish has good transportation routes.

Transportation Facilities

Cameron Parish is served by several paved State highways and many paved parish roads. Also, there are a number of parish shell roads. No railroads serve the parish.

Water transportation is facilitated by the Gulf Intracoastal Waterway, which crosses the parish from east to west and provides an outlet to the Gulf of Mexico. A deep ship channel extends from the north parish line to the Gulf of Mexico.

The Sabine and Mermentau Rivers are navigable by

Figure 2.—A leveled field of rice in an area of Mowata-Vidrine silt loams.

large ships and barges. Many other smaller waterways in the parish provide transportation routes for smaller craft.

The parish has several landing fields for helicopters and one landing field for small planes, near the town of Cameron. Several smaller emergency landing fields also are in the parish. Several major trucking lines and national bus lines provide passenger and freight service in the parish.

Water Resources

The principal use of water in Cameron Parish is that involved in the irrigation of rice fields. In 1980, about 57 million gallons per day was used in areas where rice is grown. Demand is projected to increase to about 92 million gallons per day by the year 2020 *(35)*. More than 90 percent of the water is drawn from the Mermentau River system. The rest is drawn from ground-water sources.

Public supply systems and industry are important water users in the parish. About 3 million gallons per day is needed for the public supply systems, and 4 million gallons per day is used by industry. The public supply is all drawn from ground-water sources. Industry obtains about 65 percent of its water from ground-water sources and 35 percent from areas of surface water. Ground water for industrial uses is obtained from the Chicot Aquifer and other aquifers of Pleistocene age. By the year 2020, the anticipated demand for the public supply systems will increase by 4 million gallons per day and the industrial demand will increase by nearly 5 million gallons per day. Some supply deficiencies in the Mermentau River system can be expected when the flow of water is low. By the year 2020, users of the Chicot Aquifer can expect a lowering of water levels and some contamination of the aquifer by the intrusion of salt water.

Surface Water

Cameron Parish has 354,924 acres of surface water *(7)*. The Sabine, Calcasieu, and Mermentau Rivers are the largest sources of surface water. Sabine Lake, Calcasieu Lake, and Grand Lake are the largest lakes in the parish. The major streams are at low elevations. They are heavily contaminated with salt water from the Gulf of Mexico. As a result, most of the surface water in the parish is unsuited to agricultural and domestic uses and to some industrial uses.

The Mermentau River, Bayou Lacassine, Grand Lake, and the part of the Gulf Intracoastal Waterway east of the Calcasieu Lock are protected from the influence of tides. They are the primary sources of fresh surface water in the parish. Nearly 590 million gallons per day was drawn from these sources in 1980. Demand from these sources is expected to exceed 1,140 million gallons per day by the year 2020. Intermittent supply problems can be expected by users of these sources unless improvements are made or alternative sources of water are found. Also, this system of streams and lakes, like many coastal systems, is subject to low flows during dry periods and to the intrusion of salt water.

Historical discharge data for the streams in Cameron Parish are not available, primarily because the instrument technology that measures streamflow under the influence of tides was not developed until recently. The future flow of these streams will be measured, and the discharge data will be available to the public.

Ground Water

The ground water used for irrigation and for municipal, industrial, and domestic purposes in Cameron Parish is obtained from wells screened in the Chicot Aquifer. Recent sands overlie this aquifer. Depth to the base of sands that contain fresh water ranges from less than 100 feet below sea level in the southeast and southwest corners of the parish to about 1,025 feet below sea level in the south-central part. The cumulative thickness of these sands is 16 to 600 feet along the coast and is as much as 400 and 800 feet in the northern and eastern parts of the parish, respectively *(7)*.

Recent deposits cover nearly all of the parish, except for small areas along the northern boundary. These deposits consist of clay, silt, sand, and shell beds. The thickness of the deposits generally ranges from less than 1 foot in the northern part of the parish to about 50 feet in the coastal areas. In the Sabine River trench, however, the recent deposits may be as much as 200 feet thick. Only four wells, each 16 feet deep, are in the recently deposited sands. These sands probably contain salt water throughout most of the parish.

The Chicot Aquifer, which consists of sand and gravel, underlies all of southwest Louisiana, including Cameron Parish. Typically, this aquifer grades from fine sand at the top to coarse sand and gravel at the base. The aggregate thickness of the water-bearing sand and gravel in the Chicot Aquifer is 30 feet or less in the extreme southeast coastal area and ranges from 200 to 800 feet in the area between the Mermentau River and the Gulf Intracoastal Waterway. Irrigation wells yielding as much as 2,500 gallons per minute are common in the northern part of the parish, where the sand and gravel are 200 to 400 feet thick.

The specific capacity, or yield per unit of drawdown, of the wells ranges from about 4.7 gallons per minute per foot of drawdown at a yield of 180 gallons per minute to about 95 gallons per minute per foot of drawdown at a yield of 2,000 gallons per minute. Among the principal factors that can cause differences in the capacity are permeability, which is related generally to the texture of the material; the diameter of the well; the length of the screen; and the efficiency of well construction and development.

Water levels in the Chicot Aquifer range from about 6 feet below the surface in selected observation wells along the coast to about 45 feet below the surface in the vicinity of Hackberry, in the northern part of the parish. As a result of pumping for irrigation, seasonal declines in the water level range from about 0.5 foot in wells in the southern part of the parish to as much as 12 feet in wells along the northern edge of the parish. Since 1948, the greatest decline in the water level has occurred in the northern part of the parish, where the average annual decline has been about 2.3 feet.

The content of chloride in the water drawn from the wells in the Chicot Aquifer in Cameron Parish ranges from approximately 30 to 2,000 parts per million. The total iron content ranges from 0.12 to 2.5 parts per million, and the hardness of the water ranges from 65 to 475 parts per million.

Water for the town of Cameron is supplied by two wells. One well is 460 feet deep, and the other is 300 feet deep. Both wells are screened in the Chicot Aquifer. Chemical analyses of the water from these wells show that the content of chloride in the water is more than 400 parts per million. This amount of chloride may make the water unpalatable to some people.

How This Survey Was Made

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

Pickup trucks were used to gain access to most parts of the survey area. In the marshes, where accessibility was limited, helicopters provided transportation to the sample sites.

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

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

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

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

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

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

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils. In the general soil map units, they are called soils of minor extent.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

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

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 map is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in another but in a different pattern.

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

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

The soils in the survey area vary widely in their suitability for major land uses. Table 4 shows the extent of the map units shown on the general soil map. It also shows the suitability of each for major land uses and the soil properties that limit use.

Each map unit is rated for *cultivated crops, pasture,* and *urban uses.* Cultivated crops are those grown extensively in the survey area. Pasture refers to areas of improved perennial grasses and legumes. Urban uses include residential, commercial, and industrial developments.

Soils of the Gulf Coast Prairies

These soils are mainly level and gently sloping and are poorly drained and somewhat poorly drained.

These soils make up about 12 percent of the land area in the parish. Most of the acreage is used for crops. Seasonal wetness, medium fertility, and poor tilth are the main limitations affecting agricultural uses.

1. Mowata-Vidrine-Crowley

Level and gently sloping, poorly drained and somewhat poorly drained soils that have a loamy surface layer and a loamy and clayey or clayey subsoil

The soils in this map unit are on broad flats, on low mounds or smoothed mounds, between mounds, and on broad ridges on the Gulf Coast Prairies. Slope ranges from 0 to 5 percent.

This map unit makes up about 5 percent of the land area in the parish. It is about 30 percent Mowata soils, 29 percent Vidrine soils, 17 percent Crowley soils, and 24 percent soils of minor extent.

The level, poorly drained Mowata soils are on broad flats. These soils typically have a surface layer of gray silt loam and a subsurface layer of gray, mottled silt loam. The subsoil is gray, mottled silty clay and clay loam.

The level and gently sloping, somewhat poorly drained Vidrine soils are on low mounds or smoothed mounds on broad flats and ridges. These soils typically have a surface layer of very dark grayish brown silt loam and a subsurface layer of dark grayish brown silt loam. In sequence downward, the subsoil is light yellowish brown silt loam; grayish brown and red silt loam and pale brown and light yellowish brown silt; grayish brown and light brownish gray, mottled silty clay; and light brownish gray, mottled silty clay loam.

The level, somewhat poorly drained Crowley soils are on broad ridges. These soils typically have a surface layer of dark grayish brown silt loam and a subsurface layer of grayish brown, mottled silt loam. The subsoil is grayish brown and light brownish gray, mottled silty clay.

Of minor extent in this map unit are Judice, Leton, Midland, and Morey soils on broad flats, in slightly depressional areas, and along drainageways and Kaplan soils on broad, slightly convex ridges. Morey soils make up the largest acreage of the minor soils.

Most of the acreage in this map unit is used for crops, mainly rice and soybeans. A small acreage is used for pasture or homesite development.

The major soils are moderately well suited to cultivated crops and well suited to pasture. Wetness and medium fertility are the main limitations. A good surface drainage system and applications of lime and fertilizer are needed in areas used for crops or pasture.

The major soils are poorly suited to most urban uses. The wetness, a high shrink-swell potential, and very slow or slow permeability are the main limitations. Low strength is a limitation on sites for local roads and streets. Also, the Mowata soils are subject to rare flooding during unusually wet periods.

2. Morey-Mowata

Level, poorly drained soils that have a loamy surface layer and a loamy and clayey subsoil

The soils in this map unit are on broad flats and in slightly depressional areas on the Gulf Coast Prairies. Slope is less than 1 percent.

This map unit makes up about 3 percent of the land area in the parish. It is about 70 percent Morey soils, 9 percent Mowata soils, and 21 percent soils of minor extent.

The Morey soils are on broad flats. These soils typically have a surface layer of very dark gray silt loam and a subsurface layer of very dark gray, mottled silt loam. The subsoil is very dark gray and gray, mottled clay loam and silty clay loam and light olive gray, mottled silty clay.

The Mowata soils are on broad flats. These soils typically have a surface layer and subsurface layer of gray silt loam. The subsoil is gray, mottled silty clay and clay loam.

Of minor extent in this map unit are Crowley and Kaplan soils on low ridges; Judice soils in slightly concave areas; Leton and Midland soils on broad flats, in slightly depressional areas, and along drainageways; and Vidrine soils on low mounds and smoothed mounds. Crowley and Vidrine soils make up the largest acreage of the minor soils.

Most of the acreage in this map unit is used for crops, mainly soybeans and rice. A small acreage is used for pasture or homesite development.

The major soils are moderately well suited to cultivated crops and well suited to pasture. Wetness, poor tilth, and medium fertility are the main limitations. A good surface drainage system and applications of lime and fertilizer are needed in the areas used for crops or pasture.

The major soils are poorly suited to most urban uses. The wetness, flooding, slow or very slow permeability, and a moderate or high shrink-swell potential are the main management concerns. Low strength is a limitation on sites for local roads and streets.

3. Morey-Midland

Level, poorly drained soils that have a loamy surface layer and a loamy and clayey subsoil

The soils in this map unit are on broad flats and in slightly depressional areas on the Gulf Coast Prairies. Slope is less than 1 percent.

This map unit makes up about 2 percent of the land area in the parish. It is about 65 percent Morey soils, 29 percent Midland soils, and 6 percent soils of minor extent.

The Morey soils are on broad flats. These soils typically have a surface layer of very dark gray silt loam and a subsurface layer of very dark gray, mottled silt loam. The subsoil is very dark gray and gray, mottled silty clay loam and clay loam and light olive gray, mottled silty clay.

The Midland soils are on broad flats and in slightly depressional areas. These soils typically have a surface layer of dark gray silty clay loam and a subsurface layer of dark grayish brown silty clay loam. The subsoil is dark gray and gray silty clay loam in the upper part; grayish brown and light brownish gray, mottled silty clay in the next part; and gray, mottled clay in the lower part.

Of minor extent in this map unit are Crowley and Kaplan soils on low ridges; Ged soils in marshy areas; Judice, Leton, and Mowata soils in slightly concave areas, on broad flats, and along drainageways; and Vidrine soils on low mounds and smoothed mounds. Ged and Judice soils make up the largest acreage of the minor soils.

Most of the acreage in this map unit is used for crops, mainly rice and soybeans. A small acreage is used for pasture or homesite development.

The major soils are moderately well suited to cultivated crops and well suited to pasture. Wetness, poor tilth, and medium fertility are the main limitations. A good surface drainage system and applications of lime and fertilizer are needed in the areas used for crops or pasture.

The major soils are poorly suited to most urban uses. The wetness, flooding, slow or very slow permeability, and a moderate or high shrink-swell potential are the main management concerns. Low strength is a limitation on sites for local roads and streets.

4. Kaplan-Midland-Morey

Level, somewhat poorly drained and poorly drained soils that have a loamy surface layer and a loamy and clayey subsoil

The soils in this map unit are on low ridges, on broad flats, and in slightly depressional areas on the Gulf Coast Prairies. Slope is less than 1 percent.

This map unit makes up about 2 percent of the land area in the parish. It is about 43 percent Kaplan soils, 32 percent Midland soils, 18 percent Morey soils, and 7 percent soils of minor extent.

The somewhat poorly drained Kaplan soils are on low, broad, slightly convex ridges. These soils typically have a surface layer of dark grayish brown silt loam and a subsurface layer of dark grayish brown, mottled silt loam. The subsoil is dark gray, mottled silty clay loam in the upper part; grayish brown, light yellowish brown, and light brownish gray, mottled silty clay in the next part; and light brownish gray and gray, mottled silty clay loam in the lower part.

The poorly drained Midland soils are on broad flats and in slightly depressional areas. These soils typically have a surface layer of dark gray silty clay loam and a subsurface layer of dark grayish brown silty clay loam. The subsoil is dark gray and gray, mottled silty clay loam in the upper part; grayish brown and light brownish gray, mottled silty clay in the next part; and gray, mottled clay in the lower part.

The poorly drained Morey soils are on broad flats. These soils typically have a surface layer of very dark gray silt loam and a subsurface layer of very dark gray, mottled silt loam. The subsoil is very dark gray and gray, mottled silty clay loam and clay loam and light olive gray, mottled silty clay.

Of minor extent in this map unit are Crowley and Kaplan soils on low ridges and in areas between mounds, Ged soils in marshy areas, Judice soils in slightly concave areas, Mowata soils on broad flats, and Vidrine soils on low mounds and smoothed mounds. Crowley and Ged soils make up the largest acreage of the minor soils.

Most of the acreage in this map unit is used for crops, mainly rice and soybeans. A small acreage is used for pasture or homesite development.

The Kaplan soils are well suited to crops and pasture, and the Midland and Morey soils are moderately well suited to cultivated crops and well suited to pasture. Wetness, poor tilth, and medium fertility are the main limitations. A good surface drainage system and applications of lime and fertilizer are needed in the areas used for crops or pasture.

The major soils are poorly suited to most urban uses. The wetness, flooding, slow or very slow permeability, and a moderate or high shrink-swell potential are the main management concerns. Low strength is a limitation on sites for local roads and streets.

Mineral Soils of the Gulf Coast Marsh

These soils are mainly level and very poorly drained. They are in freshwater, brackish, and saline marshes.

These soils make up about 53 percent of the land area in the parish. Most areas support native vegetation and are used for recreational purposes and as habitat for wetland wildlife. A small acreage is used as rangeland.

5. Ged

Level, very poorly drained soils that have a very fluid, mucky surface layer and a firm, clayey subsoil; in freshwater marshes

The soils in this map unit are in freshwater marshes that are ponded most of the time and are frequently flooded. Slope is less than 1 percent.

This map unit makes up about 4 percent of the land area in the parish. It is about 86 percent Ged soils and 14 percent soils of minor extent.

The Ged soils typically have a surface layer of very dark gray, very fluid mucky clay and a subsurface layer of very dark gray, slightly fluid clay. The subsoil is gray, mottled, firm clay.

Of minor extent in this map unit are Allemands, Gentilly, and Larose soils in freshwater and brackish marshes; Judice, Midland, and Morey soils, which are higher on the landscape than the Ged soils; and a few areas of Aquents and Udifluvents on spoil banks along waterways. Allemands and Larose soils make up the largest acreage of the minor soils.

Most of the acreage in this map unit supports native vegetation and is used for recreational purposes and as habitat for wetland wildlife. A small acreage is used for crops, rangeland, industrial development, or gas and oil fields.

The Ged soils are well suited to habitat for wetland wildlife. They provide habitat for many species of wetland wildlife. They are used as areas for hunting, fishing, and other outdoor activities. The main concerns in managing the soils for wildlife habitat are controlling the level of water and preventing intrusions of salt water.

The Ged soils are moderately well suited to rangeland. The main concerns in managing the soils for rangeland are flooding, insects, and wildfires. Also, small or large areas of very fluid soils are hazardous to grazing cattle.

Unless drained, the Ged soils are generally not suited to crops, pasture, or most urban uses. Flooding, ponding, and low strength are too severe for these uses. If drained and protected from flooding, the soils can be used for some crops.

6. Gentilly-Ged

Level, very poorly drained soils that have a very fluid, mucky surface layer and slightly fluid and firm, clayey underlying material or a firm, clayey subsoil; in brackish and freshwater marshes

The soils in this map unit are in brackish and freshwater marshes that are ponded most of the time and are frequently flooded. Slope is less than 1 percent.

This map unit makes up about 7 percent of the land area in the parish. It is about 62 percent Gentilly soils, 29 percent Ged soils, and 9 percent soils of minor extent.

The Gentilly soils typically have a surface layer of very dark gray, very fluid muck. The next layer is very dark grayish brown, very fluid muck. The underlying material is dark gray and gray clay. It is slightly fluid in the upper part and firm in the lower part.

The Ged soils typically have a surface layer of very dark gray, very fluid mucky clay and a subsurface layer of very dark gray, slightly fluid clay. The subsoil is gray, mottled, firm clay.

Of minor extent in this map unit are Aquents and Udifluvents on spoil banks along waterways; Allemands, Bancker, Clovelly, Larose, and Scatlake soils in marshes; and Midland, Morey, Mowata, and Vidrine soils on small islands of the Gulf Coast Prairies that are in the marshes. Clovelly soils make up the largest acreage of the minor soils.

Most of the acreage in this map unit supports native vegetation and is used for recreational purposes and as habitat for wetland wildlife. A small acreage of the Ged soils is used for rangeland, crops, industrial development, or gas and oil fields.

The major soils are well suited to habitat for many species of wetland wildlife. They are used as areas for hunting, fishing, and other outdoor activities. The Gentilly soils are part of an estuary that supports marine life in the Gulf of Mexico. The main concerns in managing the soils for wildlife habitat are controlling the level of water and preventing wildfires and intrusions of salt water.

The Ged soils are moderately well suited to rangeland, but the Gentilly soils are not suited because of a low load-supporting capacity. The major concerns in managing the soils for rangeland are controlling the level of water, controlling insects, and preventing wildfires and intrusions of salt water.

Unless drained, the major soils are generally not suited to crops, pasture, or most urban uses. Ponding, flooding, salinity, and low strength are too severe for these uses.

7. Creole

Level, very poorly drained soils that have a very fluid, mucky surface layer and slightly fluid and very fluid, clayey, sandy, and loamy underlying material; in brackish marshes

The soils in this map unit are in brackish marshes that are ponded most of the time and are frequently flooded. Slope is less than 1 percent.

This map unit makes up about 12 percent of the land area in the parish. It is about 92 percent Creole soils and 8 percent soils of minor extent.

The Creole soils typically have a surface layer of dark gray, very fluid mucky clay and a subsurface layer of very dark gray, slightly fluid clay. The underlying material is gray, mottled, slightly fluid clay in the upper part; gray, mottled, very fluid clay in the next part; and gray, very fluid loamy very fine sand, clay loam, and clay in the lower part.

Of minor extent in this map unit are Aquents and Udifluvents on spoil banks along waterways; Bancker, Larose, and Scatlake soils in brackish, freshwater, and saline marshes; and Hackberry soils on low ridges.

Most of the acreage in this map unit supports native vegetation and is used for recreational purposes and as habitat for wetland wildlife. A small acreage is used for rangeland or gas and oil fields.

The Creole soils are well suited to habitat for many species of wetland wildlife. They are used as areas for hunting and other outdoor activities. They are part of an estuary that supports marine life in the Gulf of Mexico. Controlling the level of water and preventing wildfires and intrusions of salt water are concerns in managing the soils for wildlife habitat.

The Creole soils are moderately well suited to rangeland. The main concerns in managing the soils for rangeland are flooding, insects, and wildfires. Also, some minor soils in the map unit, such as Bancker, Larose, and Scatlake soils, are hazardous to grazing livestock because of a low load-supporting capacity.

The Creole soils are not suited to crops, pasture, or most urban uses. Wetness, flooding, salinity, and low strength are too severe for these uses.

8. Larose

Level, very poorly drained soils that have a very fluid, mucky surface layer and very fluid, mucky and clayey underlying material; in freshwater marshes

The soils in this map unit are in freshwater marshes that are ponded most of the time and are frequently flooded. Slope is less than 1 percent.

This map unit makes up about 5 percent of the land area in the parish. It is about 93 percent Larose soils and 7 percent soils of minor extent.

The Larose soils typically have a surface layer of very dark grayish brown, very fluid muck. The next layer is very dark gray, very fluid mucky clay. The underlying material is very dark gray and gray, very fluid mucky clay and clay.

Of minor extent in this map unit are Aquents and Udifluvents on spoil banks along waterways and

Allemands, Bancker, Clovelly, Ged, and Scatlake soils in freshwater, brackish, and saline marshes.

Most of the acreage in this map unit supports native vegetation and is used for recreational purposes and as habitat for wetland wildlife.

The Larose soils are well suited to habitat for wetland wildlife. They are used as areas for hunting, fishing, and other outdoor activities. Controlling the level of water and preventing wildfires and intrusions of salt water are the main concerns in managing the soils for wildlife habitat.

The Larose soils are not suited to crops, pasture, or most urban uses. Flooding, ponding, and low strength are too severe for these uses. Water-control structures cannot be easily installed and maintained because of the instability and very fluid nature of the soil material.

9. Bancker

Level, very poorly drained soils that have a very fluid, mucky surface layer and very fluid, clayey underlying material; in brackish marshes

The soils in this map unit are in brackish marshes that are ponded most of the time and are frequently flooded. Slope is less than 1 percent.

This map unit makes up about 17 percent of the land area in the parish. It is about 91 percent Bancker soils and 9 percent soils of minor extent.

The Bancker soils typically have a surface layer of very dark grayish brown, very fluid muck. The next layer is very dark gray, very fluid mucky clay. The underlying material is dark gray and gray, very fluid clay.

Of minor extent in this map unit are Aquents and Udifluvents on spoil banks along waterways and Clovelly, Creole, Gentilly, and Scatlake soils in brackish and saline marshes. Clovelly and Creole soils make up the largest acreage of the minor soils.

Most of the acreage in this map unit supports native vegetation and is used for recreational purposes and as habitat for wetland wildlife. The Bancker soils are well suited to habitat for many species of wetland wildlife. They are used as areas for hunting, fishing, and other outdoor activities. They are part of an estuary that supports marine life in the Gulf of Mexico. Controlling the level of water and preventing wildfires and intrusions of salt water are the main concerns in managing the soils for wildlife habitat.

The Bancker soils are not suited to crops, pasture, or most urban uses. Ponding, flooding, salinity, and low strength are too severe for these uses. Water-control structures cannot be easily installed and maintained because of the instability and very fluid nature of the soil material.

10. Scatlake

Level, very poorly drained soils that have a very fluid, mucky surface layer and very fluid, clayey underlying material; in saline marshes

The soils in this map unit are in saline marshes that are ponded most of the time and are frequently flooded. Slope is less than 1 percent.

This map unit makes up about 8 percent of the land area in the parish. It is about 93 percent Scatlake soils and 7 percent soils of minor extent.

The Scatlake soils typically have a surface layer of dark gray, very fluid mucky clay. The underlying material is gray, very fluid clay.

Of minor extent in this map unit are Aquents and Udifluvents on spoil banks along waterways; beaches along the Gulf of Mexico; and Bancker, Clovelly, and Creole soils in brackish marshes. Bancker soils make up the largest acreage of the minor soils.

Most of the acreage in this map unit supports native vegetation and is used for recreational purposes and as habitat for wetland wildlife. The Scatlake soils are well suited to habitat for many species of wetland wildlife. They are used as areas for hunting, fishing, and other outdoor activities. They are part of an estuary that supports marine life in the Gulf of Mexico. Controlling the level of water and preventing wildfires are the main concerns in managing the soils for wildlife habitat.

The Scatlake soils are not suited to crops, pasture, or most urban uses. Ponding, flooding, salinity, and low strength are too severe for these uses. Water-control structures cannot be easily installed and maintained because of the instability and very fluid nature of the soil material.

Organic Soils of the Gulf Coast Marsh

These soils are level and very poorly drained. They are in freshwater and brackish marshes near the Gulf of Mexico. They are ponded most of the time and are frequently flooded.

These soils make up about 27 percent of the land area in the parish. Most of the acreage supports native vegetation and is used for recreational purposes and as habitat for wetland wildlife.

11. Allemands

Level, very poorly drained soils that have a very fluid, mucky surface layer and very fluid, mucky, clayey, and loamy underlying material; in freshwater marshes

This map unit consists of very fluid, organic soils in freshwater marshes that are ponded most of the time and are frequently flooded. Slope is less than 1 percent.

This map unit makes up about 18 percent of the land area in the parish. It is about 94 percent Allemands soils and 6 percent soils of minor extent.

The Allemands soils typically have a moderately thick surface layer of very dark grayish brown, very fluid muck. The next layer is black, very fluid mucky clay. The underlying material is greenish gray and very fluid. It is clay in the upper part and silty clay loam in the lower part.

Of minor extent in this map unit are Aquents and Udifluvents on spoil banks along waterways and Ged and Larose soils in freshwater marshes.

Most of the acreage in this map unit supports native vegetation and is used for recreational purposes and as habitat for wetland wildlife. The Allemands soils are well suited to habitat for many species of wetland wildlife. They are used as areas for hunting, fishing, and other outdoor activities. The many small ponds and perennial waterways provide excellent opportunities for freshwater sport fishing. Controlling the level of water and preventing wildfires and intrusions of salt water are the main concerns in managing the soils for wildlife habitat.

The Allemands soils are not suited to crops, pasture, or most urban uses. Ponding, flooding, and low strength are too severe for these uses. Levees cannot be easily installed and maintained because of the very fluid nature of the organic and mineral soil material.

12. Clovelly

Level, very poorly drained soils that have a very fluid, mucky surface layer and very fluid, mucky and clayey underlying material; in brackish marshes

This map unit consists of very fluid, organic soils in brackish marshes that are ponded most of the time and are frequently flooded. Slope is less than 1 percent.

This map unit makes up about 9 percent of the land area in the parish. It is about 94 percent Clovelly soils and 6 percent soils of minor extent.

The Clovelly soils typically have a moderately thick surface layer of very dark grayish brown and black, very fluid muck. The next layer is black, very fluid mucky clay. The underlying material is gray and light gray, very fluid clay.

Of minor extent in this map unit are Aquents and Udifluvents on spoil banks along waterways and Allemands, Bancker, and Scatlake soils in freshwater, brackish, and saline marshes. Bancker and Scatlake soils make up the largest acreage of the minor soils.

Most of the acreage in this map unit supports native vegetation and is used for recreational purposes and as habitat for wetland wildlife. The Clovelly soils are well suited to habitat for many species of wetland wildlife. They are used as areas for hunting, fishing, and other outdoor activities. They are part of an estuary that supports marine life in the Gulf of Mexico. Controlling the level of water and preventing wildfires and intrusions of salt water are the main concerns in managing the soils for wildlife habitat.

The Clovelly soils are not suited to crops, pasture, or most urban uses. Ponding, flooding, salinity, and low strength are too severe for these uses. Water-control structures cannot be easily installed and maintained because of the very fluid nature of the organic and mineral soil material.

Soils on Low Ridges and in Depressional Areas Between Ridges

These soils are poorly drained and somewhat poorly drained. They are on low ridges and in depressions between the ridges in the Gulf Coast Marsh. The ridges and depressional areas are long and narrow and are parallel to the coast of the Gulf of Mexico.

These soils make up about 6 percent of the land area in the parish. Most areas support native vegetation and are used for pasture. Seasonal wetness and the hazard of flooding are the main concerns in managing pasture.

13. Mermentau-Hackberry

Level and gently undulating, poorly drained and somewhat poorly drained soils that have a clayey, loamy, or sandy surface layer and a clayey and loamy or loamy, sandy, and clayey subsoil and underlying material

The soils in this map unit are on toe slopes and in other areas on low ridges and in depressions between the ridges. Slope ranges from 0 to 3 percent.

This map unit makes up about 6 percent of the land area in the parish. It is about 61 percent Mermentau soils, 35 percent Hackberry soils, and 4 percent soils of minor extent.

The level, poorly drained Mermentau soils are on low ridges and in depressions between the ridges. These soils typically have a surface layer of black clay and a subsoil of gray clay. The underlying material is grayish brown and gray, mottled very fine sandy loam in the upper part and greenish gray, mottled, very fluid sandy clay in the lower part.

The level and gently undulating, somewhat poorly drained Hackberry soils are on toe slopes and in other areas on low ridges. These soils typically have a surface layer of dark brown loamy fine sand or fine sandy loam. The subsoil is brown and grayish brown, mottled very fine sandy loam and brown, mottled loamy fine sand. The underlying material is pale brown and brown, mottled fine sand and gray, mottled fine sandy loam.

Of minor extent in this map unit are Bancker, Creole, Larose, and Scatlake soils in brackish, freshwater, and saline marshes and Peveto soils on ridges. Creole and Peveto soils make up the largest acreage of the minor soils.

Most of the acreage in this map unit supports native vegetation and is used as rangeland or as habitat for wetland and upland wildlife. A small acreage is used for pasture, homesite development, gardens, or industrial development.

The major soils are moderately well suited to rangeland. Wetness, insects, wildfires, and the hazard of flooding are the main management concerns. Also, some areas of minor soils, such as Bancker, Creole, Larose, and Scatlake soils, are hazardous to grazing livestock because of a low load-supporting capacity.

The Mermentau soils are generally not suited to crops or pasture because of the frequent flooding. The Hackberry soils are moderately well suited to crops and pasture. Wetness and medium fertility are the main limitations in areas of the Hackberry soils.

The Mermentau soils are generally not suited to most urban uses, and the Hackberry soils are poorly suited. The wetness, moderate or very slow permeability, and the hazard of flooding are the main management concerns.

Soils on Spoil Banks

These soils consist of sandy, loamy, and clayey material that was excavated from marshes during the construction and maintenance of waterways. The soil material was deposited as spoil.

These soils make up about 2 percent of the land area in the parish. Most of the acreage supports native vegetation and is used for recreational purposes and as habitat for wetland wildlife. A small acreage is used for pasture or urban development. Wetness, flooding, salinity, low strength, the slope, and restricted accessibility are limitations affecting most uses.

14. Udifluvents-Aquents

Level to moderately steep soils that are stratified and sandy to clayey throughout

The soils in this map unit are stratified and are sandy, loamy, and clayey. They are on spoil banks in areas of freshwater, brackish, and saline marshes. Slope ranges from 0 to 20 percent.

This map unit makes up about 2 percent of the land area in the parish. It is about 47 percent Udifluvents, 41 percent Aquents, and 12 percent soils of minor extent.

The Udifluvents consist of stratified, sandy, loamy, and clayey material that was excavated from marshes during the construction and maintenance of navigable waterways. The texture and internal drainage vary. The soils are firm or friable throughout. They have an uneven surface. Slope ranges from 1 to 20 percent. The soils are very slightly saline or slightly saline.

The Aquents consist of stratified, loamy and clayey material that was excavated from marshes during the construction and maintenance of navigable waterways. The soils are frequently flooded. They are gray silty clay loam, silty clay, and clay. They are very fluid, slightly fluid, or firm. Slope is less than 1 percent. The soils are slightly saline or moderately saline.

Of minor extent in this map unit are Allemands, Bancker, Clovelly, Larose, and Scatlake soils in freshwater, brackish, and saline marshes. Bancker and Scatlake soils make up the largest acreage of the minor soils.

Most of the acreage in this map unit supports native vegetation and is used for recreational purposes and as habitat for wetland wildlife. A small acreage of the Udifluvents is used for pasture or urban development.

The Udifluvents are poorly suited to pasture, and the Aquents are generally not suited because they are frequently flooded and are too soft and boggy for grazing livestock. The major management concerns are the uneven surface, the slope, the variability of the soil material, and restricted accessibility.

The major soils are moderately well suited to habitat for wetland and openland wildlife. They provide habitat for many species of wetland wildlife. They are used as areas for hunting and other outdoor activities. The habitat can be improved by planting or promoting the natural establishment of desirable plants.

The major soils are generally not suited to crops.The main management concerns are wetness, low strength, salinity, the slope, the uneven surface, restricted accessibility, and the hazard of flooding.

The Udifluvents are poorly suited to most urban uses, and the Aquents are not suited because of the frequent flooding. The main limitations are the uneven surface, the slope, the wetness, a very high shrink-swell potential, salinity, low strength, the variability of the soil material, and restricted accessibility.

Detailed Soil Map Units

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

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

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

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

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Morey silt loam is a phase of the Morey series.

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

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

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Beaches, coastal, is an example. Miscellaneous areas are shown on the soil maps.

Most of the soils in Cameron Parish were mapped at the same level of detail, except for those in marshes and on spoil banks along waterways. Poor accessibility limited the number of observations that could be made in the marshes and on the spoil banks. Also, ponding, flooding, the slope, an uneven surface, and the variability of the soil material so limit use and management that mapping all of the soils in these areas separately would be of little value to the land user.

Table 5 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The "Glossary" defines many of the terms used in describing the soils.

AE—Allemands muck. This level, very poorly drained, organic soil is in freshwater marshes. It is ponded most of the time and is frequently flooded. Most areas of this soil are several hundred acres in size. Because of the limited accessibility, the number of observations made in these areas was fewer than in areas that were mapped at a more detailed level. The detail of mapping, however, is adequate for the expected use of the soil. Slope is less than 1 percent.

Typically, the organic material is very dark grayish brown, very fluid muck about 30 inches thick. The next layer, to a depth of about 37 inches, is black, very fluid mucky clay. The underlying material to a depth of about 66 inches is greenish gray and very fluid. It is clay in the upper part and silty clay loam in the lower part.

Included with this soil in mapping are a few small areas of Ged soils, Larose soils, and soils that are similar to the Allemands soil but have more than 51 inches of organic material over the mineral material. Ged soils are in landscape positions similar to those of the Allemands soil. They are mineral soils. Larose soils also are in landscape positions similar to those of the Allemands soil. Their organic surface layer is thinner than that of the Allemands soil. Also included are a few small ponds and perennial streams. Included areas make up about 15 percent of the map unit.

The Allemands soil is flooded with several inches of fresh water most of the time. During storms, the floodwater is as much as 2 feet deep. During periods when the soil is not flooded, the water table is 1.0 foot above to 0.5 foot below the surface. The load-supporting capability of the soil is low. Permeability is rapid in the organic surface layer and very slow in the clayey underlying material. The total subsidence potential is high. The shrink-swell potential is low because the soil is saturated and very fluid throughout. If the soil is drained, however, the shrink-swell potential of the underlying material is very high.

The natural vegetation is mainly bulltongue and maidencane. Other common plants are alligatorweed, cattail, common rush, and pickerelweed.

Most of the acreage of this soil is used for wetland wildlife habitat and extensive recreational purposes.

This soil is well suited to habitat for wetland wildlife. It provides roosting and feeding areas for ducks and many other types of waterfowl. It also provides habitat for American alligators and furbearers, such as nutria, mink, muskrats, and raccoons. Water-control structures for intensive wildlife management cannot be easily constructed and maintained because of the instability of the organic material.

The trapping of alligators and furbearers is a major enterprise in areas of this soil. Hunting of waterfowl is a popular sport. The open water areas, such as canals, ponds, and streams, support large numbers of freshwater fish. Commercial fishing is an important enterprise. Sport fishing also is popular.

This soil is not suited to cultivated crops, pasture, or woodland. The ponding, the flooding, low strength, and the restricted accessibility are severe limitations. The soil generally is too soft and boggy for grazing by livestock. Trees suitable for timber production generally do not grow on this soil. The soil can be drained and protected from flooding, but extensive water-control measures, such as levees and water pumps, are required. Extreme acidity, subsidence, and low strength are continuing limitations after a drainage system is installed.

This soil is not suited to urban uses because the ponding, the flooding, low strength, and the restricted accessibility are severe limitations. The soil can be drained only by an extensive system of levees and water pumps. The suitability of the soil for use as material in the construction of levees is poor. The soil shrinks and cracks as it dries. As a result, the levees fail.

The capability subclass is VIIIw.

AN—Aquents, frequently flooded. This map unit consists of loamy and clayey material that was hydraulically excavated from soils in the marshes during the construction and maintenance of navigable waterways. In most places, levees are constructed around a large area and then the soil material and water are pumped into the area. The result is a level area that is slightly higher than the surrounding marsh. Areas are irregular in shape and range from 10 to about 250 acres in size. Because of limited accessibility, the number of observations made in these areas was fewer than in areas that were mapped at a more detailed level. The detail of mapping, however, is adequate for the expected use of the soils. Slope is dominantly less than 1 percent.

The soil material is gray, stratified silty clay loam, silty clay, and clay. It is firm, slightly fluid, or very fluid.

Included with these soils in mapping are a few large areas of Allemands, Bancker, Larose, and Scatlake soils and Udifluvents. Allemands, Bancker, Larose, and Scatlake soils are in the lower landscape positions. Allemands soils are organic. Bancker, Larose, and Scatlake soils are very fluid throughout. Udifluvents are in the higher landscape positions. They are browner than the Aquents. Included soils make up about 10 percent of the map unit.

The Aquents are poorly drained and frequently flooded. They are slightly saline or moderately saline. Permeability is very slow. Water runs off the surface at a very slow rate. The total subsidence potential is low or medium.

The natural vegetation consists mainly of marshhay cordgrass and seashore saltgrass.

Most of the acreage is used as habitat for wetland wildlife. The use of these soils is limited because of the continuing additions of spoil material.

These soils are moderately well suited to habitat for wetland wildlife. They provide suitable habitat for ducks and many other types of waterfowl. They also provide habitat for American alligators and furbearers, such as nutria, mink, muskrats, and raccoons. Controlling the level of water, controlling wildfires, and preventing intrusions of salt water are the main concerns in managing the soils for wildlife habitat.

These soils are generally not suited to cultivated crops, pasture, or woodland. The wetness, the flooding, the salinity, low strength, and the restricted accessibility are too severe for these uses. Also, the soils are too soft and boggy for grazing by livestock.

These soils are not suited to urban or intensive recreational uses. The flooding, the wetness, a very high shrink-swell potential, the salinity, and the restricted accessibility are the main management concerns. Low strength is a limitation on sites for local roads. If the soils are drained, the low or medium potential for subsidence is a limitation.

The capability subclass is VIIw.

BA—Bancker muck. This level, very poorly drained, very fluid, mineral soil is in brackish marshes. It is ponded most of the time and is frequently flooded. Areas are irregular in shape and are several hundred acres in size. Because of limited accessibility, the number of observations made in these areas was fewer than in areas that were mapped at a more detailed level. The detail of mapping, however, is adequate for the expected use of the soil. Slope is less than 1 percent.

Typically, the surface layer is very dark grayish brown, very fluid muck about 6 inches thick. The next layer, to a depth of about 18 inches, is very dark gray, very fluid mucky clay. The underlying material to a depth of about 88 inches is dark gray and gray, very fluid clay.

Included with this soil in mapping are a few small areas of Clovelly, Creole, and Scatlake soils. Also included are numerous small ponds and tidal channels. Clovelly and Scatlake soils are in landscape positions similar to those of the Bancker soil. Clovelly soils have moderately thick layers of organic material in the upper part and mineral material in the lower part. Creole soils are slightly higher on the landscape than the Bancker soil. They have a slightly fluid surface layer and subsurface layer. Scatlake soils are more saline than the Bancker soil. Included areas make up about 15 percent of the map unit.

The Bancker soil is flooded with several inches of water most of the time. During storms, tides from the Gulf of Mexico cover this soil with as much as 10 feet of water. During periods when the soil is not flooded, the water table is 1.0 foot above to 0.5 foot below the surface. The soil is slightly saline. The load-supporting capability of the soil is low. The shrink-swell potential is low because the soil material is very fluid. If the soil is drained, however, the shrink-swell potential is very high. Permeability is very slow. The total subsidence potential is medium.

The natural vegetation consists mainly of marshhay cordgrass, Olney bulrush, dwarf spikerush, coastal waterhyssop, and saltmarsh morningglory. Other common plants include seashore saltgrass, smooth cordgrass, common reed, saltmarsh bulrush, seashore paspalum, and needlegrass rush.

Most of the acreage of this soil is used for wetland wildlife habitat and extensive recreational purposes. A small acreage is used for oil and gas fields.

This soil is well suited to habitat for wetland wildlife. When flooded, it provides roosting areas and a fair food supply for ducks, geese, and many other types of waterfowl. It also provides good habitat for muskrats. It is part of an estuarine complex that supports marine life in the Gulf of Mexico. It is an important nursery for estuarine-dependent fish and crustaceans, such as menhadens, croaker, bay anchovy, shrimp, and blue crab. These fish and estuarine larval forms are the basis for a large fishing industry. Many natural and manmade ponds and waterways provide access for fishing, shrimping, hunting, and other outdoor activities.

This soil is not suited to cultivated crops, pasture, or woodland. The ponding, the flooding, the salinity, low strength, and the restricted accessibility are severe limitations. The soil is too soft and boggy to support the weight of farm machinery or of grazing cattle. It can be drained and protected from flooding, but extreme acidity and subsidence are continuing limitations. Trees suitable for timber production generally do not grow on this soil.

This soil is not suited to urban or intensive recreational uses. The flooding, the ponding, the salinity, the restricted accessibility, and low strength are severe limitations. Also, hurricanes are common in areas of this soil. If the soil is drained and protected from flooding, it shrinks and subsides to elevations below sea level.

The capability subclass is VIIIw.

Be—Beaches, coastal. This map unit occurs as unvegetated strips of mixed sand, clay, and shell fragments along the shoreline of the Gulf of Mexico. It is continually washed by waves. It is typically covered with water at high tide and is exposed during low tide. The higher parts of the Beaches are generally covered with debris that has washed in during high tides or stormy periods. Areas are long and narrow and range from 40 to about 250 acres in size. Slope is less than 1 percent.

Included with the Beaches in mapping are a few small areas of Peveto and Scatlake soils. Peveto soils are in the higher landscape positions. They have a distinct surface layer. Scatlake soils are in the landward marshes. They are clayey throughout. Included soils make up about 5 percent of the map unit.

In most areas this map unit is used for extensive recreational purposes. It is not suited to agricultural, forestry, or urban uses because the flooding by tidal waves is too severe.

The capability subclass is VIIw.

CO—Clovelly muck. This level, very poorly drained, very fluid, organic soil is in brackish marshes. It is ponded most of the time and is frequently flooded. Most areas are intermittently submerged and occur as small to large lakes. Areas are irregular in shape and range from about 60 to several thousand acres in size. Because of limited accessibility, the number of observations made in these areas was fewer than in areas that were mapped at a more detailed level. The detail of mapping, however, is adequate for the expected use of the soil. Slope is less than 1 percent.

Typically, the organic material is very dark grayish brown and black, very fluid muck about 24 inches thick. The next layer, to a depth of about 36 inches is black, very fluid mucky clay. The underlying material to a depth of about 82 inches is gray and light gray, very fluid clay.

Included with this soil in mapping are a few large areas of Allemands, Bancker, and Scatlake soils. These soils are in landscape positions similar to those of the Clovelly soil. Allemands soils are less saline than the Clovelly soil. Bancker and Scatlake are mineral soils. Also included are a few small areas of Clovelly soils that are covered by as much as 20 inches of slightly fluid, mineral fill material. Included soils make up about 20 percent of the map unit.

The Clovelly soil is ponded most of the time and is frequently flooded with several inches of moderately saline water. During storms, the floodwater is as much as 3 feet deep. During periods when the soil is not flooded, the water table is about 1.0 foot above to 0.5 foot below the surface. The soil is saturated and very fluid throughout. It is slightly saline. The load-supporting capacity of the soil is low. The clayey underlying material has a low shrink-swell potential because it is saturated and very fluid. Permeability is rapid in the organic layers and very slow in the clayey layers. The total subsidence potential is high.

The natural vegetation consists mainly of marshhay cordgrass. Other common plants are Olney bulrush, pigweed, saltmarsh morningglory, needlegrass rush, saltmarsh bulrush, dwarf spikerush, coastal waterhyssop, and seashore saltgrass. Large areas are intermittently submerged and support mainly aquatic vegetation, such as widgeongrass and dwarf spikesedge.

Most of the acreage of this soil is used for wetland wildlife habitat and extensive recreational purposes. A small acreage is used for oil and gas fields.

This soil is well suited to habitat for wetland wildlife. It provides habitat for waterfowl, American alligators, and furbearers, such as mink, muskrats, and nutria. Intensive management of wildlife habitat generally is not practical. Water-control structures cannot be easily constructed and maintained because of the instability and very fluid nature of the soil material. The intrusion of salt water is a problem in managing the vegetation for wildlife habitat. The small ponds and waterways produce large numbers of fish for sport and commercial fishing. Hunting of waterfowl is popular in areas of this soil.

This soil is not suited to cultivated crops, pasture, or woodland. The ponding, the flooding, the salinity, low strength, and the restricted accessibility are severe limitations. The soil cannot support the weight of grazing livestock. It can be protected from flooding and drained by pumps, but extreme acidity, the intrusion of salt water during storms, subsidence, and low strength are continuing limitations. Trees suitable for commercial timber production generally do not grow on this soil.

This soil is not suited to urban or intensive recreational uses because the flooding, the ponding, the salinity, and low strength are severe limitations. If the soil is drained and protected from flooding, it subsides several feet below sea level. After the soil is drained, the clayey underlying material has a very high shrink-swell potential.

The capability subclass is VIIIw.

CR—Creole mucky clay. This level, very poorly drained, very fluid, mineral soil is in brackish marshes. It is ponded for long periods and is frequently flooded. Areas are elliptical and range from 40 to several thousand acres in size. Because of limited accessibility, the number of observations made in these areas was fewer than in areas that were mapped at a more detailed level. The detail of mapping, however, is adequate for the expected use of the soil. Slope is less than 1 percent.

Typically, the surface layer is dark gray, very fluid mucky clay about 3 inches thick. The subsurface layer is very dark gray, slightly fluid clay about 14 inches thick. The underlying material between depths of 17 and 48 inches is gray, mottled clay. It is slightly fluid in the upper part and very fluid in the lower part. The underlying material between depths of 48 and 96 inches is gray and very fluid. It is loamy very fine sand in the upper part, clay loam in the next part, and clay in the lower part.

Included with this soil in mapping are a few large areas of Bancker, Larose, Mermentau, and Scatlake soils and a few small areas of Hackberry soils. Bancker, Larose, and Scatlake soils are slightly lower on the landscape than the Creole soil. They are very fluid throughout. Hackberry and Mermentau soils are in the higher landscape positions. Hackberry soils contain more sand than the Creole soil. Mermentau soils are firm and friable throughout. Also included are a few small areas of soils that are similar to the Creole soil but are underlain by sandy layers. Included soils make up about 15 percent of the map unit.

The Creole soil is ponded for long periods. It is frequently inundated by shallow floodwater during the highest of the normal tides and is occasionally inundated by deep floodwater during periods when tides are as much as 10 feet above normal because of hurricanes or tropical storms in or near the parish. During periods when the soil is not flooded, the water table is 1 foot above to 1 foot below the surface. The soil is slightly saline or strongly saline. The load-supporting capability of the soil is moderately low. The soil has a low shrink-swell potential because it never dries enough to shrink. Permeability is very slow. The total subsidence potential is medium.

The natural vegetation is mainly marshhay cordgrass, big cordgrass, gulf cordgrass, common reed, Olney bulrush, seashore paspalum, longtom, and seashore saltgrass.

Most of the acreage of this soil supports native vegetation and is used for recreational purposes and as habitat for wetland wildlife. A few small areas are used as rangeland. A small acreage is used for oil and gas fields.

This soil is moderately well suited to rangeland. The main concerns in managing the soil as rangeland are the flooding, wildfires, and insects. Also, the included areas of Bancker, Larose, and Scatlake soils are hazardous to grazing cattle because of a low load-supporting capacity. Management that maintains or improves the stands of seashore paspalum, seashore saltgrass, gulf cordgrass, big cordgrass, and marshhay cordgrass is needed. Brush control, protection from wildfire, and properly located stock water, walkways, and fences help to maintain the quality of the forage. Installing cattle walkways and fences improves the distribution of grazing.

This soil is well suited to habitat for wetland wildlife and moderately well suited to habitat for rangeland wildlife. The habitat for wetland wildlife can be improved by constructing shallow ponds, which can provide open water areas for waterfowl and furbearers, such as muskrats, nutria, and otters. Improving the condition of the range also improves the habitat for white-tailed deer. This soil is part of an estuarine complex that supports marine life in the Gulf of Mexico.

This soil is not suited to cultivated crops, pasture, or woodland. The ponding, the flooding, the salinity, low strength, and the restricted accessibility are severe limitations. The soil cannot support the weight of farm machinery. It can be drained and protected from flooding, but extreme acidity and subsidence are continuing limitations. Trees suitable for commercial timber production generally do not grow on this soil.

This soil is not suited to urban or intensive recreational uses. The flooding, the ponding, the salinity, and low strength are severe limitations. Also, hurricanes are common in areas of this soil. If the soil is drained and protected from flooding, it subsides to elevations below sea level. After the soil is drained, the clayey and loamy underlying material has a moderate to very high shrink-swell potential.

The capability subclass is VIIw. The range site is Brackish Firm Mineral Marsh.

Cw—Crowley-Vidrine silt loams. These level and gently sloping, somewhat poorly drained soils are on broad ridges on the Gulf Coast Prairies. The landscape consists of broad ridges that have many small mounds. In places the mounds have been smoothed by construction equipment. The level Crowley soil is in areas between the mounds, and the gently sloping Vidrine soil is in smoothed or unsmoothed areas on the mounds. The mounds are circular and range from 50 to 120 feet in diameter and from 1 to 4 feet in height before they are leveled. The Crowley soil makes up about 55 percent of the map unit and the Vidrine soil about 35 percent. The two soils occur as areas so closely intermingled that they cannot be mapped separately at the scale selected for mapping. Areas are irregular in shape and range from 20 to 1,000 acres in size. Slope is less than 1 percent in the areas between mounds and ranges from 1 to 5 percent on the mounds.

Typically, the Crowley soil has a surface layer of dark grayish brown silt loam about 16 inches thick. The subsurface layer is grayish brown silt loam about 6 inches thick. The subsoil to a depth of about 62 inches is mottled silty clay. It is grayish brown in the upper part and light brownish gray in the lower part.

Fertility is medium in the Crowley soil. Permeability is very slow. Water runs off the surface at a very slow rate. The surface layer remains wet for long periods after heavy rains. The seasonal high water table is 0.5 foot to 1.5 feet below the surface during the period December through April. The shrink-swell potential is high.

Typically, the Vidrine soil has a surface layer of very dark grayish brown silt loam about 6 inches thick. The subsurface layer is dark grayish brown silt loam about 6 inches thick. The subsoil is light yellowish brown silt loam to a depth of about 19 inches; grayish brown and red silt loam and pale brown and light yellowish brown silt between depths of 19 and 22 inches; grayish brown and light brownish gray, mottled silty clay between depths of 22 and 60 inches; and light brownish gray, mottled silty clay loam between depths of 60 and 80 inches.

Fertility is medium in the Vidrine soil. Permeability is slow. Water runs off the surface at a medium rate. The seasonal high water table is at a depth of 1 to 2 feet during the period December through April. The shrink-swell potential is high.

Included with these soils in mapping are a few small areas of Kaplan, Leton, Morey, and Mowata soils. All of the included soils are lower on the landscape than the Crowley and Vidrine soils. Kaplan soils are similar to the Crowley soil but are not characterized by an abrupt textural change between the subsurface layer and the subsoil. Leton soils are loamy throughout. Morey soils have a surface layer that is darker than that of the Crowley and Vidrine soils. Mowata soils have a subsurface layer that tongues into the subsoil. Included soils make up about 10 percent of the map unit.

Most areas of this map unit are used for cultivated crops. A few areas are used as pasture or homesites.

These soils are moderately well suited to cultivated crops. The main limitations are the wetness and the medium fertility. Rice and soybeans are the main crops. Most climatically adapted crops can be grown if a drainage system is installed. Land grading and smoothing can improve surface drainage and facilitate the use of farm equipment. The organic matter content can be maintained by returning all crop residue to the soils, plowing under cover crops, and using a suitable cropping system. Most crops respond well to additions of lime and fertilizer.

These soils are well suited to pasture. The main limitations are the wetness and the medium fertility. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, ryegrass, winterpea, and white clover. Grazing when the soils are wet results in compaction of the surface layer, poor tilth, and excessive runoff. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Fertilizer and lime are needed for the optimum growth of grasses and legumes.

These soils are moderately well suited to woodland; however, few areas are expected to be used for commercial timber production. The native vegetation is tall prairie grasses. If the soils are used as woodland, the main management concerns are severe equipment use limitations, surface compaction, and moderate seedling mortality caused by the wetness. Using standard-wheeled and tracked equipment when the soils are moist causes compaction and the formation of ruts. Using low-pressure ground equipment or harvesting trees only during the drier periods minimizes damage to the soils and helps to maintain productivity. The main species of trees that are suitable for planting are loblolly pine and slash pine. The site index for loblolly pine ranges from 80 to 85.

These soils are poorly suited to intensive recreational uses. The main limitations are the wetness and the very slow or slow permeability. A drainage system can improve the suitability for most recreational uses. Seeding or mulching areas that have been cut and filled helps to control erosion. The plant cover can be maintained by controlling traffic.

These soils are poorly suited to urban development. The main limitations are the wetness, the high shrink-swell potential, and the slow or very slow permeability. Low strength is an additional limitation on sites for local roads and streets. A drainage system can improve the suitability for most lawn grasses, shade trees, ornamental trees, shrubs, vines, and vegetable gardens. Properly designing buildings and roads helps to offset the limited ability of the soils to support a load. The slow or very slow permeability and the high water table increase the possibility that septic tank absorption fields will fail. Sewage lagoons or self-contained sewage disposal units can be used. The adverse effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

The capability subclass is IIIw.

GB—Ged mucky clay. This level, very poorly drained, mineral soil is in freshwater marshes. It is ponded most of the time and is frequently flooded. Areas are irregular in shape and range from 40 to several hundred acres in size. Because of limited accessibility, the number of observations made in these areas was fewer than in areas that were mapped at a more detailed level. The detail of mapping, however, is adequate for the expected use of the soil. Slope is less than 1 percent.

Typically, the surface layer is very dark gray, very fluid mucky clay about 4 inches thick. The subsurface layer is very dark gray, slightly fluid clay about 10 inches thick. The subsoil to a depth of 60 inches is gray, mottled, firm clay.

Included with this soil in mapping are a few large areas of Allemands, Gentilly, and Larose soils. These soils are in landscape positions similar to those of the Ged soil. Allemands soils are organic. Gentilly soils are more saline than the Ged soil. Larose soils are very fluid throughout. Also included are a few large areas of Ged soils that are protected from flooding by levees and are drained by pumps. Included soils make up about 20 percent of the map unit.

The Ged soil is ponded with several inches of water most of the time. During storms, floodwater is as much as 3 feet deep. During periods when the soil is not flooded, the water table fluctuates between the surface and 1 foot above the surface. Permeability is very slow. The shrink-swell potential is high.

The natural vegetation consists mainly of maidencane, bulltongue, and alligatorweed. Other common plants are cattail, squarestem spikesedge, smartweed, paspalum, California bulrush, common rush, Jamaica sawgrass, and giant cutgrass.

Most of the acreage of this soil supports native vegetation and is used for recreational purposes and as habitat for wetland and openland wildlife. A small acreage is used as rangeland. A very small acreage is protected from flooding and is used for crops or for industrial development. A few small areas are used for oil and gas fields.

This soil is well suited to habitat for wetland and rangeland wildlife. When flooded, it provides roosting and feeding areas for ducks, geese, and many other types of waterfowl. It also provides habitat for white-tailed deer, American alligators, and furbearers, such as nutria, muskrats, mink, and raccoons. Hunting of waterfowl and deer is a popular sport in areas of this soil. The main concerns in managing the soil for wildlife habitat are maintaining the range forage, controlling the level of water, and preventing intrusions of salt water.

This soil is moderately well suited to rangeland. It generally is firm enough to support grazing livestock. The major concerns in managing the soil for marsh rangeland are controlling the level of water, insects, and wildfires and preventing intrusions of salt water. Also, the included areas of Allemands, Gentilly, and Larose soils are hazardous to grazing cattle because of a low load-supporting capacity. Installing cattle walkways improves the distribution of grazing. During periods of flooding, cattle can be moved to adjacent pastures at the higher elevations.

Unless drained and protected from flooding, this soil is not suited to cultivated crops, pasture, or woodland. It can be used for rice, however, if a good system of dikes, ditches, and pumps is maintained.

This soil is not suited to urban or intensive recreational uses. The flooding, the ponding, the very slow permeability, and the high shrink-swell potential are the main management concerns. Low strength is an additional limitation on sites for local roads and streets.

The capability subclass is VIIw. The range site is Fresh Firm Mineral Marsh.

GC—Gentilly muck. This level, very poorly drained, very fluid, mineral soil is in brackish marshes. It is ponded and flooded most of the time. Some areas are intermittently submerged and occur as small to large, shallow lakes. Areas are irregular in shape and range from 15 to several hundred acres in size. Because of limited accessibility, the number of observations made in these areas was fewer than in areas that were mapped at a more detailed level. The detail of mapping, however, is adequate for the expected use of the soil. Slope is less than 1 percent.

Typically, the surface layer is very dark gray, very fluid muck about 5 inches thick. The next layer is very dark grayish brown, very fluid muck about 3 inches thick. The underlying material is dark gray and gray, slightly fluid clay between depths of 8 and 43 inches and gray, mottled, firm clay between depths of 43 and 82 inches.

Included with this soil in mapping are a few large areas of Bancker, Clovelly, Ged, and Scatlake soils. These soils are in landscape positions similar to those of the Gentilly soil. Bancker and Scatlake soils are very fluid throughout. Clovelly soils have an organic surface layer that is thicker than that of the Gentilly soil. Ged soils are not so saline as the Gentilly soil. Also included are a few large areas of soils that are similar to the Gentilly soil but have a firmer surface layer and subsoil. Included soils make up about 25 percent of the map unit.

The Gentilly soil is ponded with several inches of water most of the time. During storms, floodwater is as much as 3 feet deep. During periods when the soil is not flooded, the water table is 1.0 foot above to 0.5 foot below the surface. The soil is slightly saline. The load-supporting capacity of the soil is low. Permeability is very slow. The total subsidence potential is medium. The shrink-swell potential is low because the soil never dries enough to shrink.

The natural vegetation consists mainly of marshhay cordgrass. Other common plants include needlegrass rush, coastal waterhyssop, saltmarsh morningglory, California bulrush, and seashore saltgrass. Large areas are intermittently submerged and support mainly aquatic vegetation, such as widgeongrass and dwarf spikesedge.

Most of the acreage of this soil is used for wetland wildlife habitat and extensive recreational purposes. A few small areas are used as rangeland. The rangeland occurs as areas of the included soils that are similar to the Gentilly soil but have a firmer surface layer and subsoil.

This soil is well suited to habitat for wetland wildlife. When flooded, it provides roosting and feeding areas for ducks, geese, and many other types of waterfowl. It also provides habitat for American alligators and furbearers, such as nutria, mink, and muskrats. Levees and other structures for intensive wildlife management cannot be easily constructed and maintained because of the very fluid or slightly fluid mineral layers in the upper part of the soil. Hunting of waterfowl is a popular sport in areas of this soil. The soil is part of an estuarine complex that supports marine life in the Gulf of Mexico.

This soil is not suited to cultivated crops, pasture, or woodland. The ponding, the flooding, the salinity, low strength, and the restricted accessibility are severe limitations. The soil generally cannot support the weight of farm machinery or of grazing cattle. Trees suitable for commercial timber production generally do not grow on this soil. The soil can be drained and protected from flooding, but extreme acidity and subsidence are continuing limitations.

This soil is not suited to urban or intensive recreational uses. The flooding, the ponding, the salinity, and low strength are severe limitations. If the soil is drained and protected from flooding, it subsides to elevations below sea level. After the soil is drained, the clayey underlying material has a very high shrink-swell potential.

The capability subclass is VIIw.

Hb—Hackberry loamy fine sand. This somewhat poorly drained soil is on toe slopes and in other areas on low ridges. The ridges are generally parallel to the coast of the Gulf of Mexico. The soil is subject to rare flooding when hurricanes and tropical storms pass over or near the parish. Areas are elliptical and range from 10 to 1,500 acres in size. Slope is less than 1 percent.

Typically, the surface layer is dark brown loamy fine sand about 6 inches thick. The subsoil extends to a depth of about 28 inches. It is brown, mottled very fine sandy loam in the upper part; grayish brown, mottled very fine sandy loam in the next part; and brown, mottled loamy fine sand in the lower part. The upper part of the underlying material is pale brown, mottled fine sand. The next part is gray, mottled fine sandy loam. The lower part to a depth of 61 inches is brown, mottled fine sand.

Included with this soil in mapping are a few small areas of Bancker, Creole, Mermentau, and Peveto soils. Bancker, Creole, and Mermentau soils are lower on the landscape than the Hackberry soil. Bancker and Creole soils have a clayey subsoil. Mermentau soils are slightly saline to strongly saline. Peveto soils are in the higher landscape positions. They do not have a distinct subsoil. Included soils make up about 10 percent of the map unit.

Fertility is medium in the Hackberry soil. The soil is very slightly saline. Permeability is rapid. Water runs off the surface at a slow rate. The available water capacity is low or moderate; however, an adequate amount of water is available to plants in most years because of a high water table. The effective rooting depth is limited by the seasonal high water table, which is at a depth of about 1 to 4 feet throughout the year. The shrink-swell potential is low.

Most of the acreage of this soil is used for pasture or homesite development. Some areas are used for industrial development or for gardens or orchards.

This soil is moderately well suited to pasture. The main limitations are the wetness and the medium fertility. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, and ryegrass. During periods of flooding, cattle can be moved to pastures that are protected from flooding or are at the higher elevations. Proper grazing management, weed control, and applications of fertilizer can improve the quality of the forage.

This soil is moderately well suited to cultivated crops. It is limited mainly by the wetness and the medium fertility. Suitable crops are soybeans and vegetables. The high water table generally limits the suitability for shallow-rooted crops. Crops are damaged by flooding in some years. The soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. The content of organic matter can be maintained by returning all crop residue to the soil, plowing under cover crops, and using a suitable cropping system. Most crops respond well to additions of fertilizer.

This soil is poorly suited to woodland. The potential production of hardwoods and pine generally is low. The native vegetation is tall prairie grasses, forbs, and shrubs. A few sugarberry and live oak trees grow in most areas. The main concern in producing and harvesting timber is the wetness, which limits the use of equipment and causes some seedling mortality. The hazard of windthrow is severe because of the limited rooting depth. The trees that are selected for planting should be those that can withstand seasonal wetness. Examples are sugarberry and live oak.

This soil is poorly suited to urban development. Population growth, however, has increased the extent of homesite development on this soil. The main management concerns are the wetness and the hazard of flooding during tropical storms. Additions of loamy fill material and a drainage system can improve the suitability for most urban uses. Pilings or mounds can elevate buildings above the expected level of flooding. Mulching and applying fertilizer help to establish plants in areas that have been cut. The plants that can tolerate a high water table should be selected unless a drainage system is installed. Cutbanks are not stable and are subject to slumping. The high water table increases the possibility that septic tank absorption fields will fail. Protecting the soil from flooding by tides during severe storms generally is not feasible.

This soil is poorly suited to recreational development. It is limited mainly by the wetness. The flooding is a hazard in camp areas. A drainage system can improve the suitability for intensive recreational uses, such as playgrounds and camp areas. The plant cover can be maintained by applying fertilizer and controlling traffic. Controlling flooding by tides during severe storms generally is not feasible.

This soil is moderately well suited to habitat for openland wildlife. The habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

The capability subclass is IIIw.

Hm—Hackberry-Mermentau complex, gently undulating. These level and gently undulating, somewhat poorly drained and poorly drained soils are near the coast of the Gulf of Mexico. The Hackberry soil is on low ridges, and the Mermentau soil is in depressions between the ridges. The ridges are 1 to 3 feet high and 50 to 300 feet wide. The depressions are about 50 to 300 feet wide. The soils are subject to flooding during hurricanes and tropical storms. Elevation is about 5 feet above sea level. Most areas are about 60 percent Hackberry and similar soils and 30 percent Mermentau soil. The two soils occur as areas so closely intermingled that they cannot be mapped separately at the scale selected for mapping. Areas are long and narrow and range from 50 to 1,000 acres in size. Slope is 0 to 1 percent in the depressions and 1 to 3 percent on the ridges.

Typically, the Hackberry soil has a surface layer of dark brown fine sandy loam about 5 inches thick. The subsoil extends to a depth of about 27 inches. It is dark grayish brown, mottled very fine sandy loam in the upper part and brown very fine sandy loam in the lower part. The underlying material to a depth of about 60 inches is brown and grayish brown loamy fine sand and fine sand.

Fertility is medium in the Hackberry soil. Permeability is rapid. Water runs off the surface at a slow rate. The effective rooting depth is limited by a high water table, which is at a depth of about 1 to 4 feet throughout the year. This soil is subject to rare flooding by tidal waves during tropical storms. An adequate amount of water is available to plants in most years. The shrink-swell potential is low.

Typically, the Mermentau soil has a surface layer of black clay about 15 inches thick. The subsoil extends to a depth of about 29 inches. It is dark gray, mottled silty clay. The underlying material to a depth of about 60 inches is grayish brown and gray, mottled very fine sandy loam.

Fertility is high in the Mermentau soil. Permeability is very slow. Water runs off the surface at a very slow rate. It stands in low areas for long periods after heavy rains. The water table is at the surface to 3.5 feet below the surface throughout the year. This soil is frequently inundated by shallow floodwater during heavy rains. The surface layer is very sticky when wet and hard when dry. The soil is slightly saline to strongly saline throughout. The shrink-swell potential is high.

The natural vegetation on the Hackberry soil is mainly common bermudagrass, common carpetgrass, rattail smutgrass, eastern baccharis, cabbage-palm, and pricklypear. Also, a few sugarberry and live oak trees grow in most areas. The natural vegetation on the Mermentau soil is mainly coastal waterhyssop, saltmarsh morningglory, longtom, marshhay cordgrass, big cordgrass, gulf cordgrass, common reed, seashore saltgrass, seashore paspalum, Olney bulrush, and dwarf spikerush.

Included with these soils in mapping are many small areas of Bancker, Creole, Larose, Peveto, and Scatlake soils. Bancker, Creole, Larose, and Scatlake soils are lower on the landscape than the Mermentau soil. They are very fluid or slightly fluid throughout. Peveto soils are higher on the landscape than the Hackberry soil. They do not have a distinct subsoil. Also included are many small areas of soils that are similar to the Hackberry soil but are slightly more saline, have more numerous thin strata of fine textured material, or have a thicker and darker surface layer. In some areas these similar soils make up a larger acreage than the Hackberry soil. The contrasting included soils make up about 10 percent of the map unit.

The Hackberry and Mermentau soils are used mainly as pasture. A small acreage is used for rangeland, homesite development, gardens, or industrial development.

The Hackberry soil is moderately well suited to pasture, but the Mermentau soil is generally not suited because of the frequent flooding. Other management concerns are the wetness and the salinity. The main suitable pasture plants are common bermudagrass and improved bermudagrass. During periods of flooding, cattle can be moved to pastures that are protected from flooding or are at the higher elevations. Proper grazing management, weed control, and applications of fertilizer can improve the quality of the forage.

These soils are moderately well suited to rangeland. The wetness and the frequent flooding are the main concerns in managing the soils as rangeland. Also, the included areas of unstable soils, such as Bancker, Larose, and Scatlake soils, are hazardous to grazing cattle because of a low load-supporting capacity. Applying proper grazing management, fencing, controlling insects and wildfires, and preventing intrusions of salt water help to maintain the condition of the range.

The Hackberry soil is poorly suited to urban development, and the Mermentau soil is generally not suited. Population growth, however, has increased the extent of homesite development on both soils. The major management concerns are the wetness, the flooding, the salinity and high shrink-swell potential of the Mermentau soil, and the rapid or very slow permeability. Installing a drainage system and adding loamy fill material can improve the suitability for most urban uses. Pilings or mounds can elevate buildings above the expected level of flooding. Mulching and applying fertilizer help to establish plants in areas that have been cut. Unless an adequate drainage system is installed, the plants that can tolerate salinity and a high water table should be selected. Cutbanks are not stable and are subject to slumping. The very slow permeability and the high water table increase the possibility that septic tank absorption fields will fail. If buildings are constructed on the Mermentau soil, properly designing foundations and footings helps to prevent the structural damage caused by shrinking and swelling. Protecting the soils from flooding by tides during severe storms generally is not feasible.

The Hackberry soil is moderately well suited to cultivated crops, but the Mermentau soil is generally not suited because of the wetness, the frequent flooding, and the salinity. Vegetables are the main crops grown on the Hackberry soil. The high water table generally limits the suitability of this soil for shallow-rooted crops, such as vegetables and small grain. Tilth and fertility can be improved by returning crop residue to the soils. Most crops respond well to additions of fertilizer.

The Hackberry soil is poorly suited to woodland, and the Mermentau soil is not suited. Few areas are expected to be used for commercial timber production. A few trees, such as sugarberry and live oak, grow in some areas. The potential production of pine and hardwoods is low. The main concerns in producing and harvesting timber are severe equipment use limitations and moderate seedling mortality caused by the wetness. Trees are subject to windthrow because of the shallow rooting depth caused by the high water table.

The Hackberry soil is poorly suited to recreational development, and the Mermentau soil is generally not suited because of the wetness, the frequent flooding, and the very slow permeability. Installing a drainage system can improve the suitability for intensive recreational uses, such as playgrounds and camp areas. The plant cover can be maintained by applying fertilizer and controlling traffic. Protecting the soils from flooding by tides during severe storms generally is not feasible.

These soils are moderately well suited to habitat for rangeland wildlife. Also, the Hackberry soil is well suited to habitat for openland wildlife, and the Mermentau soil is moderately well suited to habitat for wetland wildlife. The habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

The Hackberry soil is in capability subclass IIw and in the Fresh Sandy Cheniers range site. The Mermentau soil is in capability subclass VIIw and in the Brackish Firm Mineral Marsh range site.

Ju—Judice silty clay. This level, poorly drained soil is in slightly concave areas on the Gulf Coast Prairies. Areas are irregular in shape and range from 100 to 2,000 acres in size. Slope is less than 1 percent.

Typically, the surface layer is black silty clay about 10 inches thick. The subsoil is dark gray and gray, mottled silty clay to a depth of about 26 inches; gray, mottled clay loam between depths of 26 and 42 inches; and gray, light olive gray, and greenish gray, mottled silty clay between depths of 42 and 80 inches.

Included with this soil in mapping are a few small areas of Midland, Morey, and Mowata soils. These soils are in landscape positions similar to those of the Judice soil. Midland soils have a surface layer that is lighter colored than that of the Judice soil. Morey soils contain less clay in the subsoil than the Judice soil. Mowata soils have less clay than the Judice soil and have a lighter colored surface layer. Included soils make up about 10 percent of the map unit.

Fertility is high in the Judice soil. Permeability is very slow. Water runs off the surface at a very slow rate. The water table is at the surface to 1.5 feet below the surface during the period December through April. The soil is subject to rare flooding during unusually wet periods. The surface layer is very sticky when wet and very hard when dry. It remains wet for long periods after heavy rains. The shrink-swell potential is high. An adequate amount of water is available to plants in most years.

Most areas are used for cultivated crops. A few areas are used as pasture or homesites.

This soil is moderately well suited to cultivated crops. Rice and soybeans are the main crops. The main limitations are the wetness and poor tilth. Maintaining good tilth is difficult. The soil can be worked only within a narrow range in moisture content. The plow layer becomes cloddy if it is tilled when too wet or too dry. Installing a drainage system can improve the suitability for most cultivated crops. Keeping crop residue on or near the surface helps to maintain tilth and the organic matter content. Most crops respond well to additions of fertilizer. Lime generally is needed.

This soil is well suited to pasture. The main limitations are the wetness and the poor tilth. The main suitable pasture plants are common bermudagrass, Dallisgrass, tall fescue, white clover, ryegrass, and winterpea. Wetness can limit the period of grazing. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Fertilizer and lime are needed for the optimum growth of grasses and legumes.

This soil is moderately well suited to woodland; however, it is not likely be used for commercial timber production. The native vegetation is tall prairie grasses. The main concerns in managing the soil for timber production are severe equipment use limitations, a severe windthrow hazard, and severe seedling mortality caused by the wetness. Harvesting when the soil is moist causes compaction and reduces the productivity of the soil. The main species of trees that are suitable for planting are eastern cottonwood and American sycamore. On the basis of a 35-year site curve, the mean site index for eastern cottonwood is 100.

This soil is poorly suited to recreational development. The main limitations are the wetness, the very slow permeability, and the clayey surface layer. The flooding is a hazard in camp areas. A drainage system can improve the suitability for most recreational uses. Flooding can be controlled only by major structures, such as levees and diversions. The plant cover can be maintained by controlling traffic.

This soil is poorly suited to urban development. The main management concerns are the wetness, the flooding, the very slow permeability, and the high shrink-swell potential. Low strength is an additional limitation on sites for local roads and streets. A drainage system can improve the suitability for buildings. Mounds can raise buildings above the expected level of flooding. The very slow permeability and the high water table increase the possibility that septic tank absorption fields will fail. If flooding is controlled, sewage lagoons or self-contained sewage disposal units can be used. The adverse effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

The capability subclass is IIIw.

Kd—Kaplan silt loam. This level, somewhat poorly drained soil is on broad, slightly convex ridges on the Gulf Coast Prairies. Slope is less than 1 percent.

Typically, the surface layer is dark grayish brown silt loam about 4 inches thick. The subsurface layer is dark grayish brown, mottled silt loam about 6 inches thick. The subsoil extends to a depth of about 65 inches. It is dark gray, mottled silty clay loam in the upper part; grayish brown, light yellowish brown, and light brownish gray, mottled silty clay in the next part; and light brownish gray and gray, mottled silty clay loam in the lower part.

Included with this soil in mapping are a few small areas of Crowley, Midland, Morey, and Mowata soils. Crowley soils are slightly higher on the landscape than the Kaplan soil. They are characterized by an abrupt textural change between the subsurface layer and the subsoil. Midland, Morey, and Mowata soils are lower on the landscape than the Kaplan soil. Midland soils contain more clay in the upper part of the subsoil than the Kaplan soil. Morey soils have a surface layer that is darker than that of the Kaplan soil. Mowata soils have a subsurface layer that tongues into the subsoil. Included soils make up about 15 percent of the map unit.

Fertility is medium in the Kaplan soil. Water runs off the surface at a slow rate. It stands in low areas for short periods after heavy rains. Permeability is slow. The water table is 1.5 to 2.5 feet below the surface during the period December through April. The shrink-swell potential is moderate.

Most of the acreage of this soil is used for cultivated crops or for building site development. A small acreage is used as pasture.

This soil is well suited to cultivated crops. It is limited mainly by the wetness and the medium fertility. Rice and soybeans are the main crops, but corn and small grain also are suitable. Proper row arrangement, field ditches, and vegetated outlets help to remove excess water. Land grading and smoothing can improve surface drainage, allow for a more uniform application of irrigation water, and facilitate the use of farm equipment. Proper irrigation systems are needed in the areas used for rice. Pipe or other drop structures can be installed in drainage ditches to control the level of water in rice fields and to prevent excessive erosion in the ditches. The soil is friable and can be easily kept in good tilth. Traffic pans form easily, but they can be broken up by deep plowing or chiseling. Returning all crop residue to the soil and including grasses, legumes, or grass-legume mixtures in the cropping system help to maintain fertility and tilth. Crops respond well to additions of fertilizer.

This soil is well suited to pasture. The main limitations are the wetness and the medium fertility. The main suitable pasture plants are common bermudagrass, improved bermudagrass, Dallisgrass, ryegrass, and white clover. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and excessive runoff. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Fertilizer and lime are needed for the optimum growth of grasses and legumes.

This soil is moderately well suited to woodland; however, it is not likely to be used for commercial timber production. The native vegetation is tall prairie grasses. If the soil is used as woodland, the potential productivity is high. The main management concern is a moderate equipment use limitation caused by the wetness. The hazard of windthrow is moderate because of a limited effective rooting depth. Using heavy equipment when the soil is moist can result in compaction and reduced productivity. Eastern cottonwood is suitable for planting.

This soil is moderately well suited to recreational development. The main limitations are the wetness and the slow permeability. Installing a drainage system can improve the suitability for most recreational uses. Areas that have been cut and filled should be seeded or mulched. The plant cover can be maintained by controlling traffic.

This soil is poorly suited to urban development. The main limitations are the wetness, the slow permeability, and the moderate shrink-swell potential. Low strength is an additional limitation on sites for local roads. Installing a drainage system can improve the suitability for most lawn grasses, shade trees, ornamental trees, shrubs, vines, and vegetable gardens. Properly designing buildings and roads helps to offset the limited ability of the soil to support a load. The slow permeability and the high water table increase the possibility that septic tank absorption fields will fail. Sewage lagoons or self-contained sewage disposal units can be used. The adverse effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

The capability subclass is IIIw.

LE—Larose muck. This level, very poorly drained soil is in freshwater marshes. It is ponded most of the time and is frequently flooded. Many areas are intermittently submerged and occur as small to large, shallow lakes. Areas are irregular in shape and are several hundred acres in size. Because of limited accessibility, the number of observations made in these areas was fewer than in areas that were mapped at a more detailed level. The detail of mapping, however, is adequate for the expected use of the soil. Slope is less than 1 percent.

Typically, the surface layer is very dark grayish brown, very fluid muck about 6 inches thick. The next layer is very dark gray, very fluid mucky clay about 12 inches thick. Below this to a depth of about 82 inches are layers of very dark gray and gray, very fluid mucky clay and clay.

Included with this soil in mapping are a few large areas of Allemands soils and a few small areas of Bancker, Clovelly, Ged, and Scatlake soils. All of the included soils are in landscape positions similar to those of the Larose soil. Allemands and Clovelly soils are organic. Ged soils have a firm, mineral subsoil. Bancker and Scatlake soils are more saline than the Larose soil. Also included are a few small areas of soils that are similar to the Larose soil but are more firm in the lower part of the subsoil. Included soils make up about 20 percent of the map unit.

The Larose soil is ponded with several inches of fresh water most of the time. During storms, floodwater is as much as 2 feet deep. During periods when the soil is not flooded, the water table is 2.0 feet above to 0.5 foot below the surface. The load-supporting capacity of the soil is low. This soil is saturated and very fluid throughout. It has a low shrink-swell potential because it never dries enough to shrink. Permeability is very slow. The total subsidence potential is medium.

The natural vegetation consists mainly of bulltongue, cattail, and marshhay cordgrass. Other common species are giant cutgrass, rattlebox, California bulrush, maidencane, smartweed, and alligatorweed. Large areas are intermittently submerged and support mainly aquatic and floating vegetation, such as duckweed, milfoil, pennywort, water hyacinth, waterlily, and coontail.

Most of the acreage of this soil is used for wetland wildlife habitat and extensive recreational purposes.

This soil is well suited to habitat for wetland wildlife and to recreational uses. It provides roosting and feeding areas for ducks, geese, and many other types of waterfowl. It also provides habitat for American alligators and for furbearers, such as nutria, mink, muskrats, and raccoons. Water-control structures for intensive wildlife management cannot be easily constructed because of the instability and very fluid nature of the soil material. Small ponds in areas of this soil are inhabited by many freshwater fish, which provide opportunities for sport and commercial fishing. Hunting of waterfowl is a popular sport in these areas.

This soil is not suited to cultivated crops, pasture, or woodland because of the ponding, the flooding, and the restricted accessibility. The soil cannot support the weight of grazing cattle or of farm machinery. Trees suitable for commercial timber production generally do not grow on this soil. The soil can be drained and protected from flooding only by an extensive system of levees and pumps.

This soil is generally not suited to urban uses because the flooding, the ponding, and low strength are severe limitations. If the soil is protected from flooding and is drained, subsidence and low strength are continuing limitations on sites for local roads and streets. Also, after the soil is drained, the clayey underlying material has a very high shrink-swell potential. The suitability of the soil for use as material in the construction of levees is poor because the soil shrinks and cracks considerably as it dries.

The capability subclass is VIIw.

Lt—Leton silt loam. This level, poorly drained soil is on broad flats and along drainageways on the Gulf Coast Prairies. Areas are irregular in shape and range from 20 to 200 acres in size. Slope is less than 1 percent.

Typically, the surface layer is grayish brown silt loam about 6 inches thick. The subsurface layer is grayish brown and gray, mottled silt loam about 13 inches thick. The subsoil extends to a depth of 60 inches. It is grayish brown and gray, mottled, neutral silty clay loam and silt loam in the upper part; grayish brown, mottled silty clay loam in the next part; and grayish brown, mottled clay loam in the lower part.

Included with this soil in mapping are a few small areas of Midland, Morey, Mowata, and Vidrine soils. Midland, Morey, and Mowata soils are in landscape positions similar to those of the Leton soil. Midland and Mowata soils contain more clay in the upper part of the subsoil than the Leton soil. The surface layer of Morey soils is darker than that of the Leton soil. Vidrine soils are in smoothed or unsmoothed areas on mounds. The upper part of their subsoil is browner than that of the Leton soil. Included soils make up about 15 percent of the map unit.

Fertility is medium in the Leton soil. Permeability is slow. Water runs off the surface at a very slow rate. It stands in low areas for short periods after heavy rains. The high water table is at the surface to 1.5 feet below the surface during the period December through April. The soil is subject to rare flooding during unusually wet periods. Wetness causes poor soil aeration and restricts root development. The surface layer remains wet for long periods after heavy rains. The soil dries out more slowly than most of the adjoining soils at the higher elevations. The shrink-swell potential is moderate.

Most areas are used as cropland. A few areas are used as pasture.

This soil is moderately well suited to cultivated crops. The main limitations are the wetness and the medium fertility. Rice and soybeans are the main crops. A tillage pan forms easily if the soil is tilled when wet. The soil is friable, but maintaining good tilth is somewhat difficult because of surface crusting. Most climatically adapted crops can be grown if a drainage system is installed. Pipe or other drop structures can be installed in drainage ditches to control the level of water in rice fields and to prevent excessive erosion in the ditches. The organic matter content can be maintained by returning all crop residue to the soil, plowing under cover crops, and using a suitable cropping system. Land grading and smoothing can improve surface drainage and facilitate the use of farm equipment. Crops respond well to additions of lime and fertilizer.

This soil is well suited to pasture. The main limitations are the wetness and the medium fertility. The main suitable pasture plants are common bermudagrass, bahiagrass, ryegrass, winterpea, and white clover. Grazing when the soil is wet results in compaction of the surface layer and reduces forage production. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Fertilizer and lime are needed for the optimum growth of grasses and legumes.

This soil is moderately well suited to woodland; however, few areas are likely to be used for commercial timber production. The native vegetation is tall prairie grasses. If the soil is used as woodland, the potential productivity is high. The wetness severely limits the use of equipment and results in severe seedling mortality and a severe windthrow hazard. If trees are harvested when the soil is moist, compaction can be a problem. It reduces the productivity of the soil. The main species of trees that are suitable for planting are eastern cottonwood, American sycamore, and slash pine.

This soil is poorly suited to recreational development. The main limitations are the wetness and the slow permeability. The flooding is a hazard in camp areas. Installing a drainage system can improve the suitability for most recreational uses. The plant cover can be maintained by controlling traffic.

This soil is poorly suited to urban development. The main limitations are the wetness, the flooding, the slow permeability, and the moderate shrink-swell potential. Low strength is an additional limitation on sites for local roads and streets. A drainage system can improve the suitability for most lawn grasses, shade trees, ornamental trees, shrubs, vines, and vegetable gardens. Mounds can elevate buildings above the expected level of flooding. Properly designing roads can offset the limited ability of the soil to support a load. The slow permeability and the high water table increase the possibility that septic tank absorption fields will fail. If flooding is controlled, sewage lagoons or self-contained sewage disposal units can be used.

The capability subclass is IIIw.

ME—Mermentau clay. This level, poorly drained soil is on low ridges near the coast of the Gulf of Mexico and in broad areas of brackish marsh. Areas are elliptical and range from 5 to several thousand acres in size. Because of limited accessibility, the number of observations made in these areas was fewer than in areas that were mapped at a more detailed level. The detail of mapping, however, is adequate for the expected use of the soil. Slope is less than 1 percent.

Typically, the surface layer is black clay about 6 inches thick. The subsoil extends to a depth of about 19 inches. It is gray, mottled clay. The underlying material is grayish brown and gray, mottled very fine sandy loam between depths of 19 and 59 inches and greenish gray, mottled, very fluid sandy clay between depths of 59 and 69 inches.

Included with this soil in mapping are a few large areas of Bancker, Creole, and Scatlake soils. Also included are a few small areas of Hackberry and Peveto soils. Bancker, Creole, and Scatlake soils are lower on the landscape than the Mermentau soil. They are very fluid or slightly fluid throughout. Hackberry and Peveto soils are higher on the landscape than the Mermentau soil. Also, they have more sand throughout. Included soils make up about 20 percent of the map unit.

The Mermentau soil is frequently inundated by shallow floodwater during the highest of the normal tides and is occasionally inundated by deep floodwater during periods when tides are as much as 3 feet above normal because of hurricanes or tropical storms in or near the parish. The effective rooting depth is limited by the seasonal high water table, which is within 3.5 feet of the surface throughout the year. The soil is slightly saline to strongly saline throughout. Permeability is very slow. Water runs off the surface at a very slow rate. The surface layer is very sticky when wet and hard when dry. The shrink-swell potential is high. Fertility also is high.

The natural vegetation is mainly marshhay cordgrass, big cordgrass, gulf cordgrass, seashore paspalum, longtom, common reed, seashore saltgrass, and coastal waterhyssop.

Most of the acreage of this soil is used as rangeland or as habitat for wetland wildlife. A small acreage is used for camping, homesite development, or gas and oil fields.

This soil is moderately well suited to rangeland. The major management concerns in the areas of marsh rangeland are the wetness and the frequent flooding. Management that maintains or improves the native stands of seashore paspalum, seashore saltgrass, marshhay cordgrass, and gulf cordgrass is needed. Applying proper grazing management, controlling brush, and properly locating stock water, cattle walkways, and fences help to keep the range in good condition.

This soil is moderately well suited to habitat for wetland and rangeland wildlife. The habitat can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. Improving the condition of the range also improves the habitat for rangeland wildlife, such as white-tailed deer.

This soil is generally not suited to urban development because of the flooding, the wetness, the very slow permeability, the high shrink-swell potential, and the salinity. Major flood-control structures and extensive drainage systems are needed to protect the soil from flooding. Pilings or mounds can elevate buildings above the expected level of flooding. The very slow permeability and the high water table increase the possibility that septic tank absorption fields will fail. If flooding is controlled, sewage lagoons or self-contained sewage disposal units can be used.

This soil is generally not suited to cultivated crops, pasture, or woodland. The wetness, the flooding, and the salinity are severe limitations. Trees suitable for commercial timber production generally do not grow on this soil.

This soil is generally not suited to intensive recreational uses. The flooding and the wetness are severe limitations. The very slow permeability and the salinity are other major limitations. Also, hurricanes are common in areas of this soil.

The capability subclass is VIIw. The range site is Brackish Firm Mineral Marsh.

Mn—Midland silty clay loam. This level, poorly drained soil is on broad flats and in slightly depressional areas on the Gulf Coast Prairies. Areas are irregular in shape and range from 75 to 800 acres in size. Slope is less than 1 percent.

Typically, the surface layer is dark gray silty clay loam about 3 inches thick. The subsurface layer is dark grayish brown silty clay loam about 4 inches thick. The subsoil is dark gray and gray, mottled silty clay loam to a depth of about 27 inches; grayish brown and light brownish gray, mottled silty clay between depths of 27 and 43 inches; and gray, mottled clay between depths of 43 and 71 inches.

Included with this soil in mapping are a few small areas of Judice, Leton, Morey, and Mowata soils. These soils are in landscape positions similar to those of the Midland soil. Judice and Morey soils have a surface layer that is darker than that of the Midland soil. Leton and Mowata soils have a subsurface layer that tongues into the subsoil. Included soils make up about 15 percent of the map unit.

Fertility is medium in the Midland soil. Permeability is very slow. Water runs off the surface at a very slow rate. The water table is 0.5 foot to 1.5 feet below the surface during the period December through April. The soil is subject to rare flooding during unusually wet periods. It is wet for long periods in winter and spring. The shrink-swell potential is high.

Most areas are used for cultivated crops. A few areas are used as pasture or homesites.

This soil is moderately well suited to cultivated crops. Rice and soybeans are the main crops. The main limitations are the wetness, the medium fertility, and poor tilth. Maintaining good tilth is difficult. The soil can be worked only within a narrow range in moisture content. The wetness can delay planting and harvesting. A drainage system can improve the suitability for most cultivated crops. Land grading and smoothing can improve surface drainage and facilitate the use of farm equipment. The organic matter content can be maintained by returning all crop residue to the soil, plowing under cover crops, and using a suitable cropping system. Crops respond well to additions of lime and fertilizer.

This soil is well suited to pasture. The main suitable pasture plants are common bermudagrass, ryegrass, Dallisgrass, tall fescue, and white clover. Grazing when the soil is wet results in compaction of the surface layer, damages the plant community, and limits forage production. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. Additions of lime and fertilizer are needed for the optimum growth of grasses and legumes.

This soil is moderately well suited to woodland; however, few areas are likely to be used for commercial timber production. If the soil is used as woodland, the potential productivity is high. The main management concerns are severe equipment use limitations, a severe windthrow hazard, and a moderate seedling mortality rate caused by the wetness. Harvesting only during the drier periods helps to prevent compaction. Eastern cottonwood is suitable for planting.

This soil is poorly suited to recreational development. The main limitations are the wetness and the very slow permeability. The flooding is a hazard in camp areas. It can be controlled by constructing levees or diversions. A drainage system can improve the suitability for most recreational uses. The plant cover can be maintained by controlling traffic.

This soil is poorly suited to urban development. The main management concerns are the flooding, the very slow permeability, the high shrink-swell potential, and the wetness. Low strength is an additional limitation on sites for local roads and streets. A drainage system can improve the suitability for roads and buildings. Reinforcing the foundations and footings of buildings helps to prevent the structural damage caused by shrinking and swelling. If flooding is controlled, sewage lagoons or self-contained sewage disposal units can be used. Properly designing roads can offset the limited ability of the soil to support a load.

The capability subclass is IIIw.

Mr—Morey silt loam. This level, poorly drained soil is on broad flats on the Gulf Coast Prairies. Areas are irregular in shape and range from 40 to 1,400 acres in size. Slope is less than 1 percent.

Typically, the surface layer is very dark gray silt loam about 4 inches thick. The subsurface layer is very dark gray silty clay loam about 6 inches thick. The subsoil is very dark gray and gray, mottled silty clay loam and clay loam to a depth of about 62 inches and light olive gray, mottled silty clay between depths of 62 and 72 inches.

Included with this soil in mapping are a few small areas of Judice, Kaplan, Leton, Mowata, and Vidrine soils. Judice, Leton, and Mowata soils are in landscape positions similar to those of the Morey soil. Judice and Mowata soils contain more clay in the subsoil than the Morey soil. Leton soils have a subsurface layer that tongues into the subsoil. Kaplan soils are slightly higher on the landscape than the Morey soil. Also, they have more clay in the subsoil. Vidrine soils are in smoothed or unsmoothed areas on mounds. They have more clay in the lower part of the subsoil than the Morey soil. Included soils make up about 15 percent of the map unit.

Fertility is high in the Morey soil. Permeability is slow. Water runs off the surface at a slow rate. The water table is at the surface to 2 feet below the surface during the period December through April. The soil is subject to rare flooding during unusually wet periods. The surface layer remains wet for long periods after heavy rains. An adequate amount of water is available to plants in most years. The shrink-swell potential is moderate in the subsoil.

Most areas are used for cultivated crops. A few areas are used as pasture or homesites.

This soil is moderately well suited to cultivated crops. Rice and soybeans are the main crops. The main limitation is the wetness. The soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. A tillage pan forms easily if the soil is tilled when wet. Chiseling or subsoiling can break up the pan. Land grading and smoothing can improve surface drainage and facilitate the use of farm equipment. Keeping crop residue on or near the surface helps to control runoff and helps to maintain tilth and the organic matter content. Most crops respond well to additions of fertilizer.

This soil is well suited to pasture. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, ryegrass, winterpea, and white clover. Grazing when the soil is wet results in compaction of the surface layer, damages the plant community, and limits forage production. Excess surface water can be removed by land grading and smoothing. Proper grazing management, weed control, and applications of fertilizer improve the quality of the forage.

This soil is moderately well suited to woodland; however, it is not likely to be used for commercial timber production. The native vegetation is tall prairie grasses. The main concerns in producing and harvesting timber are severe equipment use limitations, a severe windthrow hazard, and severe seedling mortality caused by the wetness. Using ground equipment when the soil is moist compacts the soil and reduces its productivity. The main species of trees that are suitable for planting are loblolly pine and slash pine. Based on a 50-year site index curve, the mean site index for loblolly pine is 90.

This soil is poorly suited to recreational development. The main limitations are the wetness and the slow permeability. The flooding is a hazard in camp areas. It can be controlled by constructing levees or diversions. A drainage system can improve the suitability for most recreational uses. The plant cover can be maintained by controlling traffic.

This soil is poorly suited to urban development. The flooding is the main hazard. The main limitations are the slow permeability and the moderate shrink-swell potential. Low strength is an additional limitation on sites for local roads and streets. A drainage system can improve the suitability for roads and buildings. Properly designing the roads can offset the limited ability of the soil to support a load. Mounds can elevate buildings above the expected level of flooding. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the slow permeability. If flooding is controlled, sewage lagoons or self-contained sewage disposal units can be used.

The capability subclass is IIIw.

Mt—Mowata-Vidrine silt loams. These soils are on the Gulf Coast Prairies. The Mowata soil is level and poorly drained, and the Vidrine soil is gently sloping and somewhat poorly drained.The landscape consists of broad flats that have many small mounds. In places the mounds have been smoothed by construction or farm equipment. Before they are leveled, they are circular and range from 50 to 120 feet in diameter and from 1 to 4 feet in height. The Mowata soil is in areas between the mounds, and the Vidrine soil is in smoothed or unsmoothed areas on the mounds.The Mowata soil makes up about 55 percent of the map unit and the Vidrine soil about 35 percent. The two soils occur as small areas that are so closely intermingled that they cannot be mapped separately at the scale selected for mapping. Areas are irregular in shape and range mainly from 40 to 2,000 acres in size. A few areas are as large as 5,000 acres. Slope is less than 1 percent in the areas between mounds and ranges from 1 to 5 percent on the mounds.

Typically, the Mowata soil has a surface layer of gray silt loam about 8 inches thick. The subsurface layer is gray, mottled silt loam about 10 inches thick. The subsoil to a depth of about 60 inches is gray, mottled clay loam and silty clay.

Fertility is medium in the Mowata soil. Permeability is very slow. Water runs off the surface at a very slow rate. It stands in low areas for short periods after heavy rains. The water table is at the surface to 2 feet below the surface during the period December through April. The soil is subject to rare flooding during unusually wet periods. The surface layer remains wet for long periods after heavy rains. The shrink-swell potential is high.

Typically, the Vidrine soil has a surface layer of very dark grayish brown and dark grayish brown silt loam about 12 inches thick. The subsoil is light yellowish brown silt loam and grayish brown and red silty clay loam to a depth of about 22 inches; grayish brown and light brownish gray, mottled silty clay between depths of 22 and 60 inches; and light brownish gray, mottled silty clay loam between depths of 60 and 80 inches.

Fertility is medium in the Vidrine soil. Permeability is slow. Water runs off the surface at a medium rate. The water table is 1 to 2 feet below the surface during the period December through April. The shrink-swell potential is high.

Included with these soils in mapping are a few small areas of Crowley, Leton, Midland, and Morey soils. Crowley soils are on ridges. They are characterized by an abrupt textural change between the subsurface layer and the subsoil. Leton, Midland, and Morey soils are in landscape positions similar to those of the Mowata soil. Leton and Morey soils contain less clay in the subsoil than the Mowata and Vidrine soils. Midland soils are similar to the Mowata soil but do not have a subsurface layer that tongues into the subsoil. Included soils make up about 10 percent of the map unit.

Most areas of this map unit are used for cultivated crops. A few areas are used as pasture or homesites.

These soils are moderately well suited to cultivated crops. Rice (fig. 3), grain sorghum, and soybeans are the main crops. The main limitation is the wetness. The medium fertility is a minor limitation. The soils are

Figure 3.—Rice in a leveled area of Mowata-Vidrine silt loams. Levees and vinyl overflow structures are part of the irrigation water management system in this field.

friable, but maintaining good tilth is somewhat difficult because of surface crusting. A tillage pan forms easily if the soils are tilled when wet. Chiseling or subsoiling can break up the pan. Properly designed irrigation systems are needed in the areas used for rice. Land grading and smoothing can improve surface drainage, allow for a more uniform application of irrigation water, and facilitate the use of farm equipment. The organic matter content can be maintained by returning all crop residue to the soils, plowing under cover crops, and using a suitable cropping system. Most crops respond well to additions of lime and fertilizer.

These soils are well suited to pasture. The main suitable pasture plants are common bermudagrass, Dallisgrass, ryegrass, winterpea, and white clover. The main limitations are the medium fertility and the wetness. Grazing when the soils are wet results in compaction of the surface layer, damages the plant community, and limits forage production. Proper grazing management, weed control, and applications of fertilizer can improve the quality of the forage.

These soils are moderately well suited to woodland; however, they are not likely to be used for commercial timber production. The native vegetation is tall prairie grasses. If the soils are used as woodland, the main management concerns are severe equipment use limitations, a severe windthrow hazard, and a moderate or high seedling mortality rate caused by the wetness.

Using ground equipment when the soils are moist compacts the soils and reduces their productivity. The main species of trees that are suitable for planting are loblolly pine and slash pine. Based on a 50-year site index curve, the mean site index for these species is 90.

These soils are poorly suited to recreational development. The main limitations are the wetness and the very slow or slow permeability. The flooding is a hazard in camp areas. It can be controlled by levees and diversions. A drainage system can improve the suitability for most recreational uses. The plant cover can be maintained by controlling traffic.

These soils are poorly suited to urban development. The main managment concerns are the flooding, the wetness, the high shrink-swell potential, and the very slow or slow permeability. Low strength is an additional limitation on sites for local roads and streets. A drainage system can improve the suitability for most lawn grasses, shade trees, ornamental trees, shrubs, vines, and vegetable gardens. Mounds can raise buildings above the expected level of flooding on the Mowata soil. Properly designing buildings and roads helps to offset the limited ability of the soils to support a load. The very slow or slow permeability and the high water table increase the possibility that septic tank absorption fields will fail. If flooding is controlled, sewage lagoons or self-contained sewage disposal units can be used.

The capability subclass is IIIw.

Pe—Peveto fine sand, 1 to 3 percent slopes. This gently sloping, somewhat excessively drained soil is on low ridges that are generally parallel to the coast of the Gulf of Mexico. Areas are long and narrow and range from 5 to 200 acres in size.

Typically, the surface layer is very dark grayish brown fine sand about 9 inches thick. The subsurface layer is dark grayish brown fine sand about 6 inches thick. The next layer, to a depth of about 31 inches, is brown channery fine sand. Below this, to a depth of about 46 inches, is a buried surface layer of very dark grayish brown and very dark gray loamy fine sand. The underlying material to a depth of about 75 inches is brown loamy sand and fine sand.

Included with this soil in mapping are a few small areas of Hackberry soils. These soils are lower on the landscape than the Peveto soil. They have a well developed subsoil. Also included are a few small areas of soils that are similar to the Peveto soil but have more shells in the subsoil. Included soils make up about 10 percent of the map unit.

Fertility is medium in the Peveto soil. The soil is subject to rare flooding by tidal surges during tropical storms. Permeability is rapid. Water runs off the surface at a slow rate. The soil is droughty and generally does not supply a sufficient amount of water to plants during dry periods in the summer and fall of most years. The shrink-swell potential is low.

Most areas are used for homesite development, gardens, or orchards. A few areas are used as pasture.

This soil is poorly suited to urban development. The main hazard is the flooding. Also, seepage is a problem where sanitary facilities are constructed. Selection of suitable vegetation is critical if lawns, shrubs, trees, and vegetable gardens are to be established. Mulching, applying fertilizer, and irrigating help to establish the plants.

This soil is moderately well suited to pasture. Droughtiness is the main limitation. The medium fertility is a minor limitation. The main suitable pasture plants are common bermudagrass, improved bermudagrass, and bahiagrass. Applications of irrigation water and fertilizer can improve the growth of grasses and legumes. Rotation grazing helps to maintain the quality of the forage. Periodic mowing and clipping help to maintain uniform plant growth and discourage selective grazing.

This soil is poorly suited to most cultivated crops. It is limited mainly by the droughtiness and the medium fertility. Vegetables and other garden crops can be grown if the soil is irrigated. Tilth and fertility can be improved by returning crop residue to the soil. Crops respond well to additions of fertilizer.

This soil is moderately well suited to woodland; however, no areas are expected to be used for commercial timber production. If the soil is used as woodland, the droughtiness can limit production. Also, the windthrow hazard is severe because of strong winds and the sandy surface layer. Ornamental trees and shrubs and such trees as live oak can be grown in irrigated areas.

This soil is poorly suited to recreational development. The main limitations are the droughtiness and the sandy surface layer. The flooding is a hazard in camp areas. The plant cover can be maintained by applying fertilizer, irrigating, and controlling traffic. Protecting the soil from flooding by tides during severe storms generally is not feasible.

The capability subclass is IIIs.

SC—Scatlake mucky clay. This level, very poorly drained, very fluid, mineral soil is in saline marshes. It is ponded and flooded most of the time. Areas are irregular in shape and are several hundred acres in size. Because of limited accessibility, the number of observations made in these areas was fewer than in areas that were mapped at a more detailed level. The detail of mapping, however, is adequate for the expected use of the soil. Slope is less than 1 percent.

Typically, the surface layer is dark gray, very fluid mucky clay about 10 inches thick. The underlying material to a depth of about 60 inches is gray, very fluid clay. It is mottled between depths of 30 and 42 inches

Included with this soil in mapping are a few small areas of Bancker, Clovelly, and Creole soils. Also included are numerous small ponds and tidal channels. Bancker and Clovelly soils are in landscape positions similar to those of the Scatlake soil. Bancker soils are less saline than the Scatlake soil. Clovelly soils have an organic surface layer. Creole soils are slightly higher on the landscape than the Scatlake soil. Also, they are less fluid in the upper part. Included areas make up about 20 percent of the map unit.

The Scatlake soil is ponded with several inches of water most of the time. During storms, tides from the Gulf of Mexico cover the soil with as much as 10 feet of water. During periods when the soil is not flooded, the water table is 1.0 foot above to 0.5 foot below the surface. The soil is slightly saline or moderately saline throughout. The load-supporting capacity of the soil is low. The shrink-swell potential is low because the soil never dries enough to shrink. Permeability is very slow. The total subsidence potential is medium.

The natural vegetation consists mainly of smooth cordgrass, marshhay cordgrass, seashore saltgrass, bushy seaoxeye, woody glasswort, saltwort, and needlegrass rush.

Most of the acreage of this soil is used for wetland wildlife habitat and extensive recreational purposes. A small acreage is used for oil and gas fields.

This soil is well suited to habitat for wetland wildlife. When flooded, it provides roosting areas and a fair food supply for ducks, geese, and many other types of waterfowl. It also provides a good food supply for muskrats. It is part of an estuarine complex that supports marine life in the Gulf of Mexico. It is an important nursery for estuarine-dependent fish and crustaceans, such as menhaden, croaker, bay anchovy, shrimp, and blue crab. These fish and estuarine larval forms are the basis for a large fishing industry. Many natural and manmade ponds and waterways provide access for fishing, shrimping, hunting, and other outdoor activities.

This soil is not suited to cultivated crops, pasture, or woodland. The ponding, the flooding, the salinity, low strength, and the restricted accessibility are the main limitations. The soil is too soft and boggy to support the weight of farm machinery or of grazing cattle. It can be drained and protected from flooding, but extreme acidity and subsidence are continuing limitations. Trees suitable for commercial timber production generally do not grow on this soil.

This soil is not suited to urban or intensive recreational uses. The flooding, the wetness, the salinity, and low strength are the main limitations. Also, hurricanes are common in areas of this soil. If the soil is drained and protected from flooding, it shrinks, cracks, and subsides to elevations below sea level.

The capability subclass is VIIIw.

UD—Udifluvents, 1 to 20 percent slopes. This map unit consists of sandy, loamy, and clayey soil material that was hydraulically excavated from soils in marshes during the construction and maintenance of navigable waterways. These soils are on low to high spoil banks and are 1 to 15 feet higher than the surrounding soils in the marshes. They are stratified and are firm or friable throughout. Internal drainage and the slope vary, and the surface is uneven. Areas are irregularly shaped or long and narrow and range from 20 to several hundred acres in size. Because of limited accessibility, the number of observations made in these areas was fewer than in areas that were mapped at a more detailed level. The detail of mapping, however, is adequate for the expected use of the soils.

Included with these soils in mapping are a few large areas of Aquents and a few small areas of Allemands, Bancker, Ged, Larose, and Scatlake soils. All of the included soils are lower on the landscape than the Udifluvents. Aquents, Bancker soils, and Scatlake soils are more saline than the Udifluvents. Allemands and Larose soils are very fluid throughout. Ged soils have a very fluid or slightly fluid surface layer. Included soils make up about 20 percent of the map unit.

Fertility is medium in the Udifluvents. Permeability is very low to moderate. Water runs off the surface at a slow to rapid rate, depending on the slope. The soils are very slightly saline or slightly saline. Depth to the water table varies.

The natural vegetation consists mainly of rattlebox, ragweed, eastern baccharis, and common bermudagrass. Some areas along the Gulf Intracoastal Waterway are wooded. The major tree species are tallowtree, sugarberry, and willow.

Most of the acreage is used as habitat for wetland and openland wildlife. A small acreage is used as native grass pasture or has been developed for urban uses.

These soils are moderately well suited to habitat for waterfowl, rabbits, deer, and furbearers, such as muskrats, nutria, raccoons, and mink. The habitat can be improved by planting the appropriate vegetation or by promoting the natural establishment of desirable plants.

These soils are poorly suited to urban uses and to intensive recreational uses. The main limitations are the uneven surface, the slope, the wetness, the variability of the soil material, and the limited accessibility.

These soils are generally not suited to crops. The uneven surface, the slope, and the restricted accessibility are the main limitations.

These soils are poorly suited to pasture and woodland. The uneven surface, the slope, the variability of the soil material, and the restricted accessibility are the main limitations. The main suitable pasture plants are common bermudagrass and bahiagrass. The main species of trees that are suitable for planting are eastern cottonwood and American sycamore.

The capability subclass is VIe.

Prime Farmland

In this section, prime farmland is defined and the soils in Cameron Parish that are considered prime farmland are listed.

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, State, and Federal levels, as well as individuals, must encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to food, feed, forage, fiber, and oilseed crops. Such soils have properties that favor the economic production of sustained high yields of crops. The soils need only to be treated and managed by acceptable farming methods. The moisture supply must be adequate, and the growing season must be sufficiently long. Prime farmland soils produce the highest yields with minimal expenditure of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They are used for food or fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land is land not available for farming in National forests, National parks, military reservations, and State parks.

Prime farmland soils usually receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not frequently flooded during the growing season. The slope ranges mainly from 0 to 5 percent.

The map units in Cameron Parish that are considered prime farmland are listed in table 6. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 5. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

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 for predicting soil behavior.

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

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

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

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

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

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

A total of 117,258 acres in Cameron Parish was used for crops or pasture in 1982. Of this acreage, 67,811 acres was used for crops, mainly rice and soybeans, and 49,447 acres was used as pasture.

Perennial grasses or legumes, or mixtures of both, are grown in the parish for pasture and hay. The mixtures generally consist of either a summer or a winter perennial grass and a suitable legume. Also, many farmers seed small grain or ryegrass in the fall for winter and spring forage. Excess grass in summer is harvested as hay for use in winter. Farmers and ranchers commonly use improved pastures adjacent to marsh rangeland at the lower elevations as emergency foraging areas during periods of high water levels in the marshes or when fires or insects drive cattle from the marshes.

Common and improved bermudagrass and Pensacola bahiagrass are the most commonly grown summer perennials. Improved bermudagrass and Pensacola bahiagrass produce good-quality forage. Tall fescue, the chief winter perennial grass, grows well only on soils that have a favorable moisture content. All of the grasses respond well to applications of fertilizer, particularly nitrogen. White clover is the most commonly grown legume. It responds well to applications of lime, particularly where it is grown on acid soils.

Proper grazing management, brush and weed control, applications of fertilizer and lime, and pasture renovation are essential for high-quality forage, stand survival, and control of erosion.

The suitability of soils for crops and pasture and the management needed in areas of cropland or pasture are based on soil characteristics, such as the fertility level, erodibility, content of organic matter, availability of water to plants, and drainage. Each farm has a unique soil pattern; therefore, each has unique management problems. Some principles of farm management apply only to specific soils and certain crops. This section describes the general principles of management that can be applied widely to the soils in Cameron Parish.

Applications of fertilizer and lime.—The soils in Cameron Parish range from very strongly acid to moderately alkaline in the surface layer. Most of the soils that are used for crops are low or medium in content of organic matter and available nitrogen. The only exceptions are Judice and Morey soils, which are high in content of organic matter and available nitrogen. If used for crops or pasture, most of the soils require applications of lime and fertilizer. The amount of fertilizer needed depends on the kind of crop to be grown, the past cropping history, the desired level of yields, and the kind of soil. The amount should be based on the results of soil tests. Information about collecting and testing soil samples can be obtained from the Cooperative Extension Service.

Organic matter content.—Organic matter is an important source of nitrogen for crops. Also, it increases the rate of water intake, minimizes surface crusting, and improves tilth. Most of the soils in Cameron Parish that are used for crops are low or medium in organic matter content. The content can be maintained by growing crops that have an extensive root system and an abundance of foliage, by leaving plant residue on the surface, by growing perennial grasses and legumes in rotation with other crops, and by adding barnyard manure. In Cameron Parish the residue from rice straw helps to maintain the content of organic matter in the soils.

Tillage.—Soils should be tilled only when seedbed preparation and weed control are necessary. Excessive tillage destroys soil structure. The clayey soils in the parish become cloddy if they are cultivated when too wet or too dry. A compacted layer, generally known as a traffic pan or plowpan, commonly forms directly below the plow layer in loamy soils. Where rice is grown in loamy soils, farmers intentionally create a plowpan to keep ponded irrigation water from penetrating the surface. For crops other than rice, however, a plowpan is undesirable because it limits the rooting depth and the amount of moisture available to crops. The formation of a plowpan can be prevented by plowing when the soil is dry or by varying the depth of plowing. If a compacted layer does form or has been intentionally created, it can be broken up by subsoiling or chiseling. Tillage implements that stir the surface and leave crop residue in place protect the soil from beating rains and thus help to control erosion and runoff. The crop residue increases the rate of water infiltration, minimizes surface crusting, and helps to ensure good seed germination.

Drainage.—On most of the soils in Cameron Parish, a surface drainage system is needed to improve the suitability for crops, such as soybeans. The soils in high positions on the Gulf Coast Prairies are drained by a gravity system consisting of row drains and field drains. The soils in the lower landscape positions are drained by a gravity system consisting of a series of mains, or principal ditches, and laterals, or smaller drains that branch out from the mains. The success of the systems depends on the availability of adequate outlets. Drainage also can be improved by land grading, water leveling, or precisely leveling the fields to a uniform grade. Land grading improves surface drainage, eliminates cross ditches, and results in larger and more uniformly shaped fields that are better suited to the use of modern multirow farm machinery. Deep cutting of soils that have unfavorable subsoil characteristics, however, should be avoided.

Water for plant growth.—The available water capacity of the soils in the parish ranges from low to very high. The soils receive large amounts of rainfall in winter and spring. During dry periods in the summer and autumn of many years, however, most of the soils do not supply enough water at the critical time for optimum plant growth. As a result, an irrigation system is needed.

Cropping system.—A good cropping system includes a legume, which provides nitrogen; a crop that requires cultivation, which aids in weed control; a deep-rooted crop, which uses the plant nutrients in the subsoil and helps to maintain the permeability of the subsoil; and a close-growing crop, which helps to maintain the content of organic matter. The sequence of crops should keep the soil covered as much of the year as possible. Various cropping systems are used in Cameron Parish, depending on the main crop that is grown in a given area. Rice is commonly rotated with soybeans or pasture. Grass or legume cover crops are commonly grown during fall and winter.

Control of erosion.—Erosion is not a serious problem on most of the soils in Cameron Parish, mainly because the topography generally is level or nearly level. Nevertheless, sheet and gully erosion can be moderately severe in fallow-plowed fields, in newly constructed drainage ditches, and on ridges and mounds in undulating areas. Some gullies tend to form at overfalls into drainage ditches. New drainage ditches should be seeded immediately after construction.

Erosion is a hazard on some of the sloping soils that are left bare for extended periods. If the surface layer is lost through erosion, most of the available plant nutrients and most of the organic matter also are lost.

Erosion also results in the sedimentation of drainage systems and the pollution of streams by sediments, nutrients, and pesticides.

Cropping systems that keep a plant cover on the soil for extended periods reduce the hazard of erosion. Growing cover crops of grasses or legumes helps to control erosion, increases the content of organic matter and nitrogen in the soils, and improves tilth. Establishing diversions and grassed waterways, minimizing tillage, farming on the contour, and using cropping systems in which grasses or close-growing crops are rotated with row crops also help to control erosion. Pipe structures that drop water to different levels in drainageways can help to prevent gullying.

Additional information about erosion control, cropping systems, and drainage measures can be obtained from the local office of the Soil Conservation Service, the Cooperative Extension Service, or the Louisiana Agricultural Experiment Station.

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 7. 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. Rice is the only irrigated crop grown in Cameron Parish.

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

Crops other than those shown in table 7 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

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

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit. Only class and subclass are used in this survey.

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

Class I soils have few limitations that restrict their use.

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

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

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

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

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

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

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

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

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

The acreage of soils in each capability class and subclass is shown in table 8. The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Rangeland

Jack R. Cutshall, range conservationist, helped prepare this section.

About 171,086 acres in Cameron Parish is rangeland. The rangeland is mainly in areas of Creole and Mermentau soils in brackish marshes and Ged soils in freshwater marshes. A small acreage of rangeland also is in areas of Hackberry soils on cheniers, or low ridges. The hazards that affect grazing the rangeland in the marshes require unique management. These hazards include insects, disease, unusually high water levels during periods of heavy rainfall or storm tides, a scarcity of shelter, and unstable soil conditions in areas where cattle can become bogged down.

Insects, especially mosquitoes, can be a serious hazard during summer months, particularly in areas of brackish and saline marshes. Cattle can lose weight and even die during severe infestations. This hazard can be reduced by grazing mainly in winter and in other periods when the number of insects is limited.

High water levels during periods of heavy rainfall or storm tides force cattle to concentrate on higher ground, such as spoil banks and cattle walkways. Cattle lose weight under these conditions and are more susceptible to communicable diseases.

Unless shelter is provided, cold north winds in winter and high temperatures in summer can be detrimental to livestock.

Although Creole, Ged, Hackberry, and Mermentau soils are generally firm enough to support the weight of grazing livestock, the livestock can become bogged down in areas of less stable soils that are included with these soils in mapping. Also, prolonged periods of high water can increase the extent of the soils that are not firm enough to support livestock. Where fences are not properly located or are not used, cattle can stray into surrounding areas of less stable soils.

The measures that can help to overcome the hazards that affect grazing the rangeland in the marshes are described in the following paragraphs.

Cattle walkways.—A more uniform distribution of grazing can be achieved by constructing cattle walkways, which are earthen levees constructed in areas of marsh to improve accessibility. The walkways serve as trails, bedding and calving areas, and areas where calves can rest while their mothers graze; provide the rancher better access to cattle, especially during the calving season and during the winter; provide an emergency refuge for cattle during periods of high water caused by heavy rains or storm tides; and provide some relief for the cattle from mosquitoes.

Borrow pits from which earth is removed to build the walkways are staggered from side to side along the levee at intervals of about 600 feet. This arrangement permits cattle to move off the walkways on either side. The staggered pits also keep water from flowing off the range. Where the walkways are built along a property boundary, the earth can be taken from the boundary side of the levee. Plugs of earth left in the pits at various intervals help to control the flow of water. Walkway pits along range boundaries are effective in controlling marsh fires. They serve as resting and feeding areas for waterfowl and den sites for furbearers.

Bridges or culverts should be installed where the walkways cross natural drainageways. Staggering the pits along the walkways, leaving plugs in boundary pits, and installing bridges or culverts help to maintain the natural water level in the marshes. Properly constructed walkways do not alter the movement of water in the marshes.

Permits for construction must be obtained from the U.S. Army Corps of Engineers and the State Department of Natural Resources before walkways are built in areas of marsh rangeland.

Fencing.—Installing fences helps to distribute grazing. A four-strand barbed-wire fence is generally used. Posts should be treated with preservatives, and the fences should be protected from fire. Fire damages the galvanized coating on wire fences and thus allows the wire to rust. Where possible, fences should be located so that they separate range sites. The location of cattle crossings and gates requires careful consideration. The movement of cattle through a confined space can cause extreme bogging, which can be especially hazardous when small calves are moving with the herd.

Livestock watering facilities.—Water for livestock is needed on many range sites because the water in bayous, ponds, and pits can become too salty in summer for cattle to drink. Fresh water from wells is the most dependable source of water for livestock.

Controlled burning.—This measure is used widely in marshes. Stockmen and trappers burn off the dense cover of mature marsh vegetation to stimulate new, succulent growth for both cattle and wildlife and to improve the availability of forage. The natural vegetation can be severely damaged, however, during periods of drought, when the fire can reach the crowns and roots of the plants. The marshes should be burned no more than every other year and at a time when the surface is covered by water. A uniform distribution of grazing and the careful location of walkways, pits, and canals help to control unplanned or accidental fires.

Supplemental feeding.—Supplemental feeding or access to improved pastures is often necessary on most of the rangeland in marshes to provide an adequate supply of forage throughout the year. Timely supplemental feeding helps to prevent weight loss by cattle.

Where maidencane, giant cutgrass, and common reed make up a large percentage of the fresh marsh vegetation, the quality of the forage remains high even during the winter. Where the range in brackish firm mineral marshes is in good or excellent condition, grazing cattle can be expected to gain a sufficient amount of weight, even during the winter. Prolonged droughts, severe storms, or long periods of below-freezing temperatures, however, can sometimes reduce the rate at which the cattle gain weight. Protein supplement and roughage are needed during periods of severe weather. Protein supplements may be needed for cattle grazing in areas of mature vegetation. They generally are not needed if the cattle have access to areas that have been subject to controlled burning. High-energy supplemental feed is essential during cold, wet periods.

Insect control.—When insects, especially mosquitoes, become intolerable during the summer, cattle can be removed from the rangeland in brackish firm mineral marshes. The rangeland in these marshes should be grazed only during the period mid-October to mid-April, when the insect problem is not serious. Most summer grazing should occur on the rangeland in fresh firm mineral marshes or on improved pastures at the higher elevations.

Brush control.—Aerial spraying of herbicides can control rattlebox and hemp seebania, which are weedy legumes. Applying herbicides according to label instructions helps to prevent injury to humans, domestic animals, desirable plants, fish, and wildlife and the contamination of water supplies. Conventional and shredding types of mowers can be used to control annual weeds, small brush, and coarse grasses growing on ridges.

Water control.—Salt water from the Gulf of Mexico periodically intrudes into the marshes in the parish through rivers, bayous, and drainage and transportation canals. The vegetation on the rangeland in brackish firm mineral marshes can be severely damaged by water that has high concentrations of salt. During periods of low rainfall, when the amount of fresh water moving to the gulf is reduced, salt water can move landward in the waterways. Heavy south winds can push the salt water inland for considerable distances, allowing it to spread over the rangeland in marshes adjacent to the waterways. Where salt concentrations become high, vegetation is damaged and the habitat for various forms of wildlife may be impaired. Water-control structures commonly are needed to moderate the movement of salt water or maintain a freshwater gradient.

Short-term intrusions of sea water cause less damage to the soils and vegetation in areas of rangeland in brackish firm mineral marshes than to the soils and vegetation in other areas of rangeland in the parish. Long-term intrusions of sea water, however, can destroy the vegetation in these marshes. Clayey soils, which are dry before they are flooded, absorb large amounts of salt. The accumulations of salt kill the plants that are less salt tolerant and thus reduce the productivity of the range. Also, they cause fine textured mineral soils and organic soils to become unstable and thus hazardous to livestock.

The rangeland in Cameron Parish is assigned to one of three ranges sites. A range site is a distinctive kind of rangeland that produces a characteristic climax plant community that differs from climax plant communities on other range sites in kind, amount, and proportion of range plants. The relationship between soils and vegetation was ascertained during this survey; thus, range sites generally can be determined directly from the soil map. Soil properties that affect moisture supply and plant nutrients have the greatest influence on the productivity of range plants. Soil reaction, salt content, flooding, ponding, and a seasonal high water table are also important. The main forage plants on each of the range sites in the parish are specified in the following paragraphs.

Brackish Firm Mineral Marsh.—The main forage plants on this range site are marshhay cordgrass, big cordgrass, gulf cordgrass, common reed, seashore saltgrass, and seashore paspalum. Longtom is an example of the other productive forage plants on this site.

Fresh Firm Mineral Marsh.—The main forage plants on this range site are maidencane, southern wildrice, common reed, California bulrush, alligatorweed, switchgrass, bulltongue, eastern gamagrass, savannah panicum, and longtom.

Fresh Sandy Cheniers.—The main forage plants on this range site are common bermudagrass, common carpetgrass, and rattail smutgrass.

A complete list of the plants growing in saline, brackish, and freshwater marshes is given in table 9.

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

The objective in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential climax plant community for that site. Such management generally results in the optimum production of vegetation, control of undesirable brush species, conservation of water, and control of erosion. Sometimes, however, a range condition somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

Woodland Management and Productivity

Carl V. Thompson, forester, Soil Conservation Service, helped prepare this section.

Cameron Parish has no commercial forest land. The native vegetation was mainly tall prairie grasses and wetland and aquatic plants rather than trees. Originally, however, stands of hackberry, live oak, and other hardwoods and shrubs grew on the cheniers, or low ridges, along the coast of the Gulf of Mexico. The trees were used as sources of building material, posts, and firewood by the early settlers. Only scattered, thin stands of the trees remain on the cheniers. The trees are generally not harvested for timber or other uses, but they provide shade for livestock and wildlife and contribute to the esthetic value of the land.

Many of the soils on uplands in the parish are suited to the trees grown for commercial and other uses. Their potential for timber production generally is high. Wetness is the main limitation. The soils in the marshes generally are not suited to trees.

Trees can be planted to screen distracting views of dumps and other unsightly areas, muffle the sound of traffic, reduce the velocity of winds, lend beauty to the landscape, and produce fruits and nuts for people and wildlife. A few windbreaks have been established on the soils in the uplands to reduce the hazard of soil blowing. Windbreaks are effective in controlling soil blowing during periods when cultivated fields are bare. Several rows of low- and high-growing broad-leaved and needle-leaved trees and shrubs provide the most protection. To ensure the survival of windbreaks and environmental plantings, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

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

Soils vary in their ability to produce trees. Available water capacity and depth of the root zone have major effects on tree growth. Fertility and texture also influence tree growth.

This soil survey can be used in planning the management of forest land. Some soils respond better to applications of fertilizer than others. Some require special reforestation efforts. In the section "Detailed Soil Map Units," the description of each map unit in the survey area suitable for timber includes information about the trees that are suitable for planting, productivity, limitations in harvesting timber, and management concerns in producing timber. Each map unit is rated for a number of factors to be considered in woodland management. *Slight, moderate,* and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

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

Ratings of seedling mortality refer to the probability of the death of naturally occurring or properly planted seedlings of good stock in periods of normal rainfall, as influenced by kinds of soil or topographic features. Seedling mortality is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, and rooting depth. The mortality rate generally is highest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of moderate or severe indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, installing a surface drainage system, and providing artificial shade for seedlings. Reinforcement planting is often needed if the risk is moderate or severe.

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

The potential productivity of the trees planted on a soil is expressed as a site index. The site index is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands. It is calculated at age 30 years for eastern cottonwood, 35 years for American sycamore, and 50 years for all other species. Site index data are available at the local office of the Soil Conservation Service.

Recreation

Cameron Parish provides excellent opportunities for hunting ducks and geese. Most of the marshes that are suitable for hunting, however, are either privately owned or leased to private or commercial hunting clubs. The extent of public hunting areas is limited.

The parish has three large wildlife refuges. The Sabine National Wildlife Refuge, which is 142,000 acres in size, permits waterfowl hunting, fishing, and other recreational activities. The Lacassine National Wildlife Refuge, which is 31,765 acres in size, allows waterfowl hunting, archery deer hunting, fishing, and other recreational activities. Hunting is not allowed in the State-owned Rockefeller Wildlife Refuge, which is 85,000 acres in size, but fishing and other activities are permitted.

The parish provides excellent opportunities for saltwater and freshwater fishing. Charter yachts and other boats are readily available for deep-sea excursions. The many canals, rivers, bayous, and lakes provide opportunities for sport fishing. Outboard motorboats can be rented for fishing in the rivers and lakes. Grand Chenier is the center of activity for the Annual Deep-Sea Fishing Rodeo sponsored by the Southwest Louisiana Fishing Club. Cameron is the headquarters for the Annual Louisiana Fur and Wildlife Festival, which has been held every January for the past 20 years.

The 70 miles of beaches along the coastline of the parish can be used for a variety of recreational activities, such as swimming and fishing. The commercial facilities near the beaches include motels, cabins, restaurants, and grocery stores.

The parish provides opportunities not only for hunting, fishing, and swimming, but also for other recreational activities, such as crabbing, shrimping, oystering, camping, picnicking, sightseeing, bird-watching, and waterskiing.

In table 10, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational 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 table 10, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 10 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 13 and interpretations for dwellings without basements and for local roads and streets in table 12.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface absorbs rainfall readily but remains firm and is not dusty when dry.

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

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is firm after rains and is not dusty when dry.

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

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Billy R. Craft, biologist, Soil Conservation Service, helped prepare this section.

Wildlife plays an important part in the economy and environment of Cameron Parish. The parish has a wide variety of wildlife. The marshes are inhabited by many kinds of wildlife. They are nationally significant because they provide habitat for wintering waterfowl and for waterfowl migrating to tropical wintering areas.

The marshes make up 693,076 acres, or nearly 82 percent of the land area in the parish. They include about 171,000 acres that is used for grazing by cattle. Most of the species of waterfowl that use the Mississippi and Central Flyways either winter in the marshes or stop for food and rest during their migration to the tropics. The mottled duck is a permanent resident. Common furbearers that live in the marshes are nutria, muskrats, raccoons, otters, and mink. The American alligator is very abundant. The marshes also provide habitat for many resident and migratory nongame birds. Swamp and cottontail rabbits are abundant. They live mainly on spoil banks, on ridges, and in other high areas in the marshes. The marshes are part of a coastal estuary that supports marine life in the Gulf of Mexico. They provide important nursery areas for many kinds of finfish and shellfish. They produce large amounts of detritus, the basic link in the food chain.

The parish has three types of marsh, based on the level of salinity and the kind of vegetation. In order of increasing salinity, these are freshwater, brackish, and saline marshes. The kinds and numbers of wildlife in any part of the marshes depend to a large extent on the level of salinity and the kind of native plants. The location and extent of the soils in each of these types of marsh are shown on the general soil map at the back of this survey.

The native plants in the marshes differ in their tolerance of salt. Therefore, the composition of the plant community growing in an area indicates the type of marsh and the approximate level of salinity. Table 9 lists the dominant native plants growing on the soils in each type of marsh.

The saline marshes are adjacent to the Gulf of Mexico and near Sabine and Calcasieu Lakes. They make up 71,015 acres in the parish. The main soils in these marshes are those of the Scatlake series. They are regularly inundated by salt water from the gulf. The native plants growing on these soils are tolerant of a high level of salinity. Smooth cordgrass, seashore saltgrass, needlegrass rush, marshhay cordgrass, bushy seaoxeye, woody glasswort, and saltwort are the dominant plants.

The brackish marshes occur as bands paralleling the coastline and around Calcasieu and Sabine Lakes. They make up about 381,257 acres in the parish. The main soils in these marshes are those of the Bancker, Clovelly, Creole, and Gentilly series. The native plants growing on these soils are tolerant of moderate amounts of salt. Marshhay cordgrass, gulf cordgrass, big cordgrass, Olney bulrush, dwarf spikerush, common reed, seashore paspalum, seashore saltgrass, longtom, coastal waterhyssop, and saltmarsh morningglory are some of the dominant plants.

The brackish marshes provide habitat for large numbers of geese, muskrats, mink, otters, and raccoons. The highest population of muskrats is in the brackish marshes that are dominated by Olney bulrush and saltmarsh bulrush. The native plants in these marshes are a source of the food most favored by geese. Moderate or high numbers of ducks, nutria, American alligators, and swamp rabbits inhabit the brackish marshes. The brackish marshes around Calcasieu and Sabine Lakes are part of an estuary that provides a nursery for some species of fish and crustaceans.

The freshwater marshes are primarily in the northeastern part of the parish. They make up about 240,804 acres in the parish. The main soils in these marshes are those of the Allemands, Ged, and Larose series. The native plants growing on these soils are very intolerant of salt. Some of the dominant plants are maidencane, alligatorweed, bulltongue, pickerelweed, cattail, southern wildrice, California bulrush, eastern gamagrass, smartweed, and common rush.

The freshwater marshes provide habitat for large numbers of ducks, crawfish, nutria, rabbits, mink, otters, raccoons, white-tailed deer, and American alligators and for many nongame species of wildlife. They have the highest population of nutria of the three types of marsh. Many species of freshwater fish are in the lakes, ponds, and waterways in areas of these marshes.

The openland part of Cameron Parish is mainly on the Gulf Coast Prairies in the northern part of the parish and on some of the cheniers near the Gulf Coast. The main soils are those of the Crowley, Judice, Kaplan, Leton, Midland, Morey, Mowata, and Vidrine series on the prairies and those of the Hackberry and Peveto series on the cheniers. They make up about 110,000 acres, or 13 percent of the land area in the parish. Some areas of these soils provide habitat for small game species, mainly bobwhite quail, cottontail rabbits, and doves. A scarcity of good cover, however, limits the habitat available for these species. Many ducks, geese, and other waterfowl feed on the stubble and grain left on cropland after crops are harvested.

The rangeland in the parish is mainly in areas of slightly fluid or firm, mineral soils in the marshes and in areas of loamy soils on cheniers. The main soils are those of the Creole, Ged, and Mermentau series. They are in the Gulf Coast Marsh major land resource area. They make up about 171,000 acres, or 20 percent of the land area in the parish. The vegetation grazed by cattle is mainly the native grasses, rushes, and forbs that commonly grow in the marshes and on the cheniers. The soils used as rangeland provide habitat for both rangeland and wetland wildlife. The main species of rangeland wildlife are white-tailed deer and nongame birds, such as meadowlark and lark bunting.

The Gulf of Mexico and the many brackish and freshwater lakes, ponds, and waterways in Cameron Parish produce large numbers of fresh and estuarine fish. Sport fishing and commercial fishing are important enterprises in the parish.

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

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

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

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, rice, 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, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, Dallisgrass, bermudagrass, clover, and winterpea.

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

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, poplar, sweetgum, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are red mulberry and mayhaw.

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 cedar.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are French mulberry, privet, yaupon, and waxmyrtle.

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, and slope. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

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

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

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

Marshland Management

The general management needed to prevent the loss of marshes and to improve the habitat for wetland wildlife in the marshes is suggested in this section. Planners of management systems for individual areas should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information is available at the local office of the Soil Conservation Service, the Cooperative Extension Service, or the Louisiana Agricultural Experiment Station.

Loss of the coastal marshes in Louisiana has reached a crisis level. Cameron Parish is in an area of the State where the rate of this loss is highest. The loss is the result of both natural events and human activities.

Geologic subsidence of the Gulf Coast marshes is the main natural cause *(13)*. As the Continental Shelf and adjoining marshes slowly subside, some of the marshes at the lowest elevations become submerged below sea level. Little can be done about the losses caused by these natural events. The deterioration of marshes caused by human activities, however, can be controlled by better management and restraint. Installing drainage systems and constructing channels for navigation accelerate the rates of erosion, subsidence, and saltwater intrusion.

Coastal erosion changes areas of marshland to areas of open water. This loss generally is permanent because the open water is too deep for revegetation.

The population and diversity of fish and wildlife in the marshes of the parish are directly related to the marsh plant community. When the plants are killed by increases in the level of salinity or by other factors, the wildlife habitat is degraded. Each plant species and community requires a definite range of salinity and water levels. The marsh plants are the basic source of energy for the dependent animal populations, such as muskrats, and conditions that enhance plant growth improve the habitat for fish and wildlife.

The organic soils in the marshes are very sensitive to increases in the level of salinity. Intrusions of salt water into brackish and freshwater marshes have become more common in recent years. The increased salinity causes the loss of vegetation. When the plants die, they start decomposing and eventually are carried out of the marshes by tidal action. In a very short time, the surface soil is lost and the areas revert to open water.

Good management can improve the habitat in the marshes of Cameron Parish for fish and wildlife. The marshland is a delicately balanced ecosystem that requires an interdisciplinary approach when management measures that can improve the habitat for waterfowl, furbearers, and fish are planned and implemented. The following paragraphs describe some of the suggested measures.

Weirs are low-level dams built in watercourses in the marshes to improve water management. These water-control structures stabilize water levels in the marshes, reduce the turbidity level of the water, improve the condition of the plant community, and improve accessibility for trappers and hunters during the winter by holding water in bayous and canals. Weirs that have fixed crests, which are generally about 6 inches below the average marsh level, are most useful in brackish marshes. Other types of water-control structures are needed in freshwater marshes.

Prescribed or controlled burning is a very useful and economical technique that can improve the condition of the plant community in the marshes. Periodic controlled burning helps to maintain a good variety of marsh plants. This variety has a positive impact on furbearers, such as muskrats, and on other wildlife species. Prescribed burning is most effective in brackish marshes, but it also is effective in freshwater marshes. The best time for controlled burning is in the fall. Winter burning, however, also has some positive effects on the wildlife habitat.

Leveed impoundments can be installed in the areas where the soils are suitable for construction. Almost every form of marsh wildlife uses the impoundments as feeding, roosting, or cover areas. Landowner objectives, the type of marsh, and other factors determine the management techniques to be used on an impoundment.

Shoreline erosion control is one of the primary concerns in the parish and in the entire coastal area. Numerous studies and field trials have been conducted to determine measures that can help to control shoreline erosion. Structural and vegetative measures or a combination of both are currently used. Specific site information is needed when the erosion-control measures are planned.

Smooth cordgrass is one of the most promising plants grown to control erosion in the tidal zone of saline and brackish areas. This cordgrass generally is available locally. It can be easily established in the tidal zone, where a large part of the erosion is occurring. Smooth cordgrass can withstand a wide range in salinity, expands rapidly in the tidal zone, normally provides shoreline protection in one growing season, and forms a dense stand that dissipates the energy of waves. Many other plants can be established to control shoreline erosion.

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 in the "Soil Properties" section.

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

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

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

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

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

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

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

Building Site Development

Table 12 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 are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to a very firm layer, soil texture, and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and 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 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 a high water table, flooding, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic-supporting capacity.

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

Sanitary Facilities

Table 13 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 13 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 that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

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

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 is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

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

Table 13 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, flooding, 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.

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 table 13 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a high water table, slope, and flooding affect both types of landfill. Texture, 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 and wetness affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 14 gives information about the soils as a source of roadfill, sand, 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. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

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

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

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by a high water table. 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. They have at least 5 feet of suitable material and a low shrink-swell potential. 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. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10 or a high shrink-swell potential. 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 is a natural aggregate suitable for commercial use with a minimum of processing. It is used in many kinds of construction. Specifications for each use vary widely. In table 14, 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 are gradation of grain sizes (as indicated by the engineering classification of the soil) and the thickness of suitable material. 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 a layer of sand that is up to 12 percent silty fines. This material must be at least 3 feet thick. All other soils are rated as an improbable source.

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

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

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. 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 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 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 releases a variety of plant nutrients as it decomposes.

Water Management

Table 15 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for embankments, dikes, and levees and for aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

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

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

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

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

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

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

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The performance of a system is affected by the depth of the root zone, 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. Wetness and slope affect the construction of grassed waterways. Low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

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

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

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

Classification of the soils is determined according to the Unified soil classification system *(3)* and the system adopted by the American Association of State Highway and Transportation Officials *(2)*.

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

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

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

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

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

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

Physical and Chemical Properties

Table 17 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

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

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

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

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

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

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

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

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

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

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

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

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

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 17, 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 18 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

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

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

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

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

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 18 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional*, or *frequent. None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

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

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

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 18 are the depth to the seasonal high water table; the kind of water table, that is, *perched* or *apparent;* and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 18.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

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 is within a depth of 6 feet for less than a month.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. Table 18 shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

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

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

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

Soil Fertility Levels

Dr. M.C. Amacher and Dr. B.J. Miller, Department of Agronomy, Louisiana Agricultural Experiment Station, Louisiana State University Agricultural Center, prepared this section.

This section gives information concerning the environmental factors and physical and chemical properties that affect the potential of soils for crop production. It also lists the methods used to obtain the chemical analyses of the soils that are sampled.

Crop composition and yields are a function of many soil, plant, and environmental factors. The environmental factors include light (intensity and duration), temperature of the air and soil, precipitation (distribution and amount), and atmospheric carbon dioxide concentration.

Plant factors are species and hybrid specific. They include the rate of nutrient and water uptake and the rate of plant growth and related plant functions.

Soil factors consist of both physical and chemical properties. The physical properties include particle-size distribution, texture, structure, surface area, bulk density, water retention and flow, and aeration. The chemical properties can be separated into quantity, intensity, relative intensity, quantity-intensity relationship, and replenishment factors.

The *quantity factor* refers to the amount of an element in the soil that is readily available for uptake by plants. When the quantity factor is ascertained, the available supply of an element is removed from the soil by a suitable extractant and is analyzed.

The *intensity factor* refers to the concentration of an element species in the soil water. It is a measure of the availability of an element for uptake by plant roots. The availability of an element to plants differs in two soils that have identical quantities of the element but have different intensity factors.

The *relative intensity factor* refers to the effect that the availability of one element has on the availability of another.

The *quantity-intensity relationship factor* refers to the reactions between the surface and soil water that control the distribution of element species between the available supply in the soil and the soil water. A special quantity-intensity relationship is the buffer capacity of the soil for a given element. The buffer capacity is the amount of a given element that must be added to or removed from the available supply to produce a given change in the intensity factor for that element.

The *replenishment factor* refers to the rate of replenishment of the available supply and intensity factors by weathering reactions, additions of fertilizer, and transport by mass flow and diffusion.

These factors are interdependent. The magnitude of the factors and the interactions among them control crop response. The relative importance of each factor changes from soil to soil, crop to crop, and environment to environment. The soil factors are only part of the overall system.

The goal of soil testing is to provide information for a soil and crop management program that establishes and maintains optimum levels and proportions of the essential elements in the soil for crop and animal nutrition and protects the environment against the buildup of potentially toxic levels of essential and nonessential elements. Current soil tests measure one soil factor—the available supply of one or more nutrients in the plow layer. Existing soil tests can generally diagnose the problem, and reliable recommendations can be made to correct the problem. Soil management systems generally are based on physical and chemical alterations of the plow layer. The characteristics of this layer can vary from one location to another, depending on management practices and land use.

Subsurface horizons are less likely to change as a result of alteration of the plow layer, or they change very slowly. They reflect the inherent ability of the soil to supply nutrients for plant growth. If soil fertility recommendations based on current soil tests are followed, major fertility deficiencies in the plow layer are normally corrected.

Crop and environmental factors, the physical properties of the plow layer, and the physical and chemical properties of the subsoil can limit crop production. Information about the supply of available nutrients in the subsoil can be used as the basis for an evaluation of the native fertility level of the soil.

A number of soils were sampled during the soil survey and analyzed for reaction; content of organic carbon; extractable phosphorus; exchangeable cations of calcium, magnesium, potassium, sodium, aluminum, and hydrogen; total acidity; and cation-exchange capacity *(1, 20, 21, 36, 37, 41)*. The results are summarized in table 19. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods *(41)*.

pH—1:1 soil/water solution (8C1a).

Organic carbon—acid-dichromate oxidation (6A1a).

Extractable phosphorus—Bray 2 extractant (0.03 molar ammonium fluoride-0.1 molar hydrochloric acid).

Exchangeable bases—pH 7, 1 molar ammonium acetate-calcium (6N2), magnesium (6O2), potassium (6Q2), sodium (6P2).

Exchangeable aluminum and hydrogen—1 molar potassium chloride (6G2).

Total acidity—pH 8.2, barium chloride-triethanolamine (6H1a).

Effective cation-exchange capacity—sum of bases plus exchangeable aluminum and hydrogen (5A3b).

Sum cation-exchange capacity—sum of bases plus total acidity (5A3a).

Base saturation—sum of bases/sum cation-exchange capacity (5C3).

Effective cation-exchange capacity saturated with sodium—exchangeable sodium/sum cation-exchange capacity.

Sum cation-exchange capacity saturated with aluminum—exchangeable aluminum/effective cation-exchange capacity.

Based on soil fertility, four major types of soil profiles can be distinguished in Cameron Parish. The first type includes soils having a relatively high level of available nutrients throughout. This type reflects the relatively high fertility status of the parent material in which the soils formed and a relatively young age or limited weathering in the soil profile.

The second type includes soils in which the level of available nutrients is relatively low in the surface layer but generally increases with increasing depth. These soils formed in relatively fertile parent material. They have been subject to weathering over a long period or to relatively intense weathering. Crops on these soils exhibit deficiency symptoms early in the growing season if the level of available nutrients in the surface layer is low. If the crop roots are able to penetrate to the more fertile subsoil as the growing season progresses, deficiency symptoms generally disappear.

The third type includes soils that have a relatively high level of available nutrients in the surface layer but a relatively low level in the subsurface layer. These soils formed in material that is low in fertility or are old soils that have been subject to intense weathering over a long period. The higher nutrient levels in the surface layer generally are a result of the addition of fertilizer to agricultural soils or biocycling in undisturbed soils.

The fourth type includes soils that have a relatively low level of available nutrients throughout. These soils formed in material that is low in fertility or are old soils that have been subject to intense weathering over a long period. They have not accumulated nutrients in the surface layer as a result of the addition of fertilizer or biocycling.

Soil properties, such as reaction, can also show the general distribution patterns described in the previous paragraphs. These patterns result from the interactions of parent material, weathering (climate), time, and, to a lesser extent, living organisms and topography.

Nitrogen is generally the most limiting nutrient element affecting crop production because plants have a high demand for it. Because reliable nitrogen soil tests are not available, nitrogen fertilizer recommendations are nearly always based on the nitrogen requirement of the crop rather than on nitrogen soil test levels.

Generally, more than 90 percent of the nitrogen in the surface layer is organic. Most of the nitrogen in the subsoil commonly is fixed ammonium nitrogen. These forms of nitrogen are unavailable for plant uptake, but they can be converted to readily available ammonium and nitrate species.

Despite the lack of adequate nitrogen soil tests, the amount of readily available ammonium and nitrate nitrogen in soils, the amount of organic nitrogen, the rate of mineralization of organic nitrogen to available forms, and the rate of conversion of fixed ammonium nitrogen to available forms can indicate the fertility status of a soil with respect to nitrogen. Because the amounts and rates of transformation of the various forms of nitrogen in the soils of Cameron Parish are unknown, no assessment of the nitrogen fertility status of these soils can be made.

Phosphorus occurs in soils as discrete solid phase minerals, such as hydroxyapatite, variscite, and strengite; as occluded or coprecipitated phosphorus in other minerals; as retained phosphorus on mineral surfaces, such as carbonates, metal oxides, and layer silicates; and in organic compounds. Most of the phosphorus is unavailable for plant uptake.

The Bray 2 extractant tends to remove more phosphorus than the more commonly used Bray 1, Mehlich I, and Olsen extractants. These extractants provide an estimate of the supply of phosphorus available to plants. The Bray 2 extractable phosphorus content is very low throughout most of the soils on the Gulf Coast Prairies in Cameron Parish. These soils are used mainly for rice or soybeans. Phosphorus fertilizer is required for optimum crop production on these soils.

The extractable phosphorus content in the soils of the Gulf Coast Marsh ranges from low to high, depending on the soil and the depth within the profile. Bancker, Clovelly, Kaplan, and Larose soils can have a high content of extractable phosphorus in the lower part, but they are typically not used for cultivated crops because of the hazard of flooding. Native vegetation is predominant on soils of the Gulf Coast Marsh. It can take advantage of the nutrient cycling that occurs in the marsh.

Potassium occurs in three major forms in soils—exchangeable potassium associated with negatively charged sites on clay mineral surfaces, nonexchangeable potassium trapped between clay mineral interlayers, and structural potassium within the crystal lattice of minerals. Exchangeable potassium in soils can be replaced by other cations and generally is readily available for plant uptake. To become available for plant uptake, nonexchangeable potassium and structural potassium must be converted to exchangeable potassium through weathering reactions.

The content of exchangeable potassium in soils is an estimate of the supply of potassium available to plants. The content of available potassium in soils of the Gulf Coast Prairies generally is very low, low, or medium, according to soil test interpretation guidelines. As depth increases, the content of exchangeable potassium increases in some soils, such as Crowley and Mowata soils; decreases in some soils, such as Judice soils; and remains about the same in other soils, such as Ged, Leton, and Midland soils. In Bancker, Clovelly, and Gentilly soils of the Gulf Coast Marsh, the content of exchangeable potassium is high in the upper part of the profile and decreases with increasing depth.

Crops respond to applications of potassium fertilizer if the content of potassium is very low or low. Very low or low levels should be gradually built up by adding potassium fertilizer where possible. Where the soils contain a sufficient amount of clay to hold the potassium, the content of exchangeable potassium can be maintained by adding enough potassium fertilizer to make up for that removed by crops, the fixation of exchangeable potassium to nonexchangeable potassium, and leaching.

Magnesium occurs in soils as exchangeable magnesium associated with negatively charged sites on clay mineral surfaces and as structural magnesium in mineral crystal lattices. Exchangeable magnesium generally is readily available for plant uptake, whereas structural magnesium must to be converted to exchangeable magnesium during weathering reactions.

The content of exchangeable magnesium generally is high and increases with increasing depth in the soils on the Gulf Coast Prairies. It generally is very high and varies with increasing depth in the soils of the Gulf Coast Marsh. In most of the soils in the parish, the content is more than adequate for crop production. Magnesium deficiencies in plants are rare. As a result, magnesium fertilizer generally is not needed.

Calcium occurs in soils as exchangeable calcium associated with negatively charged sites on clay mineral surfaces and as structural calcium in mineral crystal lattices. Unlike structural calcium, exchangeable calcium generally is available for plant uptake.

Calcium generally is the most abundant exchangeable cation in the soils in Cameron Parish. In Bancker, Clovelly, Gentilly, and Larose soils of the Gulf Coast Marsh, however, the content of exchangeable magnesium is higher than the content of exchangeable calcium. In the other soils of the parish, the content of exchangeable calcium is higher than or about the same as the content of exchangeable magnesium.

As depth increases, the content of exchangeable calcium increases in some soils, such as Crowley, Ged, Leton, Midland, Mowata, and Vidrine soils on the Gulf Coast Prairies and Hackberry and Kaplan soils of the Gulf Coast Marsh; remains about the same in some soils, such as Judice soils on the Gulf Coast Prairies; and decreases in other soils, such as Bancker, Clovelly, Gentilly, and Larose soils of the Gulf Coast Marsh. A higher content in the subsoil than in the surface layer generally is associated with a higher content of clay in the subsoil or with free carbonates. A high content of exchangeable calcium and other cations in the upper horizons of Bancker, Clovelly, Gentilly, and Larose soils is associated with a high content of organic matter in these horizons.

The content of organic matter in a soil greatly influences other soil properties. A high content of organic matter in mineral soils is desirable, and a low content can lead to many problems. Increasing the content of organic matter can greatly improve soil structure, drainage, and other physical properties and can increase the available water capacity, the cation-exchange capacity, and the content of nitrogen.

Increasing the content of organic matter in a soil is very difficult because organic matter is continually subject to microbial degradation, especially in Louisiana, where higher temperatures increase the extent of microbial activity and thus also increase the degradation rate. Native plant communities are in a dynamic state if the rate of organic matter breakdown is balanced by the rate at which fresh material is added. Disruption of this natural process can lead to a significant decrease in the content of organic matter in the soil. Unsound management practices can lead to a further decrease in organic matter content.

Even if no degradation of organic matter occurs, 10 tons of organic matter per acre is needed to raise the organic matter content in the upper 6 inches of the soil by just 1 percent. Since breakdown of organic matter occurs in the soil, large amounts must be added for several years before a small increase in the content can be achieved. Conservation tillage and cover crops slowly increase the content of organic matter or at least prevent further decreases.

The content of organic matter in the soils of the Gulf Coast Prairies generally is low. In Ged soils it decreases sharply with increasing depth because additions of fresh organic material are limited to the surface layer. The low content of organic matter reflects a high rate of organic matter degradation, erosion, and cultural practices that make maintenance of a higher content of organic matter difficult. Except for Hackberry and Kaplan soils, the soils of the Gulf Coast Marsh have a high content of organic matter in the surface layer.

Sodium occurs in soils as exchangeable sodium associated with negatively charged sites on clay mineral surfaces and as structural sodium in mineral crystal lattices. Because sodium is readily soluble and generally is not strongly retained by soils, well drained soils that are subject to a moderate or more intense degree of weathering from rainfall normally do not have significant amounts of sodium. Soils in low rainfall environments, soils in which drainage is restricted in the subsoil, and coastal marsh soils have significant or substantial amounts of sodium. High levels of exchangeable sodium are associated with undesirable physical properties, such as poor structure, slow permeability, and restricted drainage.

The soils of the Gulf Coast Prairies and Gulf Coast Marsh have more exchangeable sodium than exchangeable potassium. Where the content of exchangeable sodium is more than about 6 percent of the cation-exchange capacity within the rooting depth of crops, production can be limited. The soils on the Gulf Coast Prairies that are used for agricultural purposes have a high content of exchangeable sodium. This high content is below the surface layer. Nevertheless, it helps to restrict the drainage of these soils.

The pH of the soil solution in contact with the soil greatly affects other soil properties. Soil pH is an intensity factor rather than a quantity factor. The lower the pH, the more acidic the soil. The pH controls the availability of essential and nonessential elements for plant uptake by controlling mineral solubility, ion exchange, and adsorption and desorption reactions with the surface. The pH also affects microbial activity.

Aluminum occurs in soils as exchangeable monomeric hydrolysis species, nonexchangeable polymeric hydrolysis species, aluminum oxides, and aluminosilicate minerals. Exchangeable aluminum in soils is determined by extraction with neutral salts, such as potassium chloride and barium chloride. The exchangeable aluminum in soils is directly related to pH. If the pH is less than 5.5, the soils have significant amounts of exchangeable aluminum that has a charge of plus 3. This amount of aluminum is toxic to plants. The toxic effects of aluminum on plants can be alleviated by adding lime to convert exchangeable aluminum to nonexchangeable polymeric hydrolysis species. A high content of organic matter also can alleviate aluminum toxicity by complexing the aluminum.

Sources of exchangeable hydrogen in soils include hydrolysis of exchangeable and nonexchangeable aluminum and pH-dependent exchange sites on metal oxides, certain layer silicates, and organic matter. As determined by extraction with neutral salts, such as potassium chloride, exchangeable hydrogen generally is not a major component of soil acidity because it is not readily replaced by other cations unless accompanied by a neutralized reaction. Most of the neutral salt exchangeable hydrogen in soils apparently results from aluminum hydrolysis.

Acidity from hydrolysis of neutral salt exchangeable aluminum plus neutral salt exchangeable hydrogen from pH-dependent exchange sites makes up the exchangeable acidity in soils. Exchangeable acidity is determined by the pH of the soil. Titratable acidity is the amount of acidity neutralized to a selected pH, generally pH 7.0 or 8.2, and constitutes the total potential acidity of a soil determined up to a given pH. All sources of soil acidity, including hydrolysis of monomeric and polymeric aluminum species and hydrogen from pH-dependent exchange sites on metal oxides, layer silicates, and organic matter, contribute to the total potential acidity. Total potential acidity in soils is ascertained by titration with base or incubation with lime, extraction with a buffered extractant followed by titration of the buffered extractant (pH 8.2, barium chloride-triethanolamine method), or equilibration with buffers followed by estimation of acidity from changes in buffer pH.

The soils of the Gulf Coast Prairies have a low pH and a high level of total acidity in the upper horizons, but pH generally increases with increasing depth. Judice, Midland, Mowata, and other soils have an alkaline or high pH level in the subsoil and an acid surface layer. The total acidity, however, may not change much with increasing depth. The soils of the Gulf Coast Marsh generally have a low pH in the surface layer and a high pH in the subsoil.

The cation-exchange capacity represents the available supply of nutrient and nonnutrient cations in the soil. It is the amount of cations on permanent and pH-dependent, negatively charged sites on soil surfaces. Permanent-charge cation-exchange sites occur because a net negative charge develops on a mineral surface from substitution of ions within the crystal lattice. A negative charge developed from ionization of surface hydroxyl groups on minerals and organic matter produces pH-dependent cation-exchange sites.

Several methods for determining cation-exchange capacity are available. They can be classified as one of two types—methods that use unbuffered salts to measure the cation-exchange capacity at the pH of the soil and methods that use buffered salts to measure the cation-exchange capacity at a specified pH. These methods produce different results because the method that uses unbuffered salts includes only part of the pH-dependent cation-exchange capacity in the overall cation-exchange capacity and the method that uses buffered salts includes all of the pH-dependent cation-exchange capacity up to the pH of the buffer (generally 7.0 or 8.2) in the overall cation-exchange capacity. Errors in the saturation, washing, and replacement steps also cause different results.

The effective cation-exchange capacity is the sum of exchangeable bases (calcium, magnesium, potassium, and sodium) determined by extraction with pH 7.0, 1 molar ammonium acetate plus the sum of neutral salt exchangeable aluminum and hydrogen (exchangeable acidity). The sum cation-exchange capacity is the sum of exchangeable bases plus the total acidity determined by extraction with pH 8.2, barium chloride-triethanolamine. The effective cation-exchange capacity includes only that part of the pH-dependent cation-exchange capacity that is determined by exchange of hydrogen with a neutral salt, whereas the sum cation-exchange capacity includes all of the pH-dependent cation-exchange capacity up to pH 8.2. If a soil has no pH-dependent exchange sites or the pH of the soil is about 8.2, the effective cation-exchange capacity and the sum cation-exchange capacity are approximately the same. The larger the cation-exchange capacity, the greater the capacity to store nutrient cations.

Most of the cation-exchange capacity of the soils in Cameron Parish is permanent-charge cation-exchange capacity from the clays in the soils. The pH-dependent charge is a significant source of the cation-exchange capacity in many of the soils.

Physical and Chemical Analyses of Selected Soils

The results of physical analysis of several typical pedons in the survey area are given in table 20 and the results of chemical analysis in table 21. The data are for soils sampled at carefully selected sites. Most of the pedons are typical of the series and are described in the section "Soil Series and Their Morphology." Soil samples were analyzed by the Soil Characterization Laboratory, Louisiana Agricultural Experiment Station.

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an ovendry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods *(41)*.

Sand—(0.05-2.0 mm fraction) weight percentages of material less than 2 mm (3A1).

Silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all material less than 2 mm (3A1).

Clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of material less than 2 mm (3A1).

Water retained—pressure extraction, percentage of ovendry weight of less than 2 mm material; ⅓ or ⅒ bar (4B1), 15 bars (4B2).

Water-retention difference—between ⅓ bar and 15 bars for whole soil (4C1).

Moist bulk density—of less than 2 mm material, saran-coated clods at field moist (4A3a), air-dry (4A1b), and ovendry (4A1h) conditions.

Organic carbon—wet combusion. Walkley-Black modified acid dichromate, ferric sulfate titration (6A1c).

Extractable cations—ammonium acetate pH 7.0, atomic absorption; calcium (6N2e), magnesium (6O2d), sodium (6P2b), potassium (6Q2b).

Cation-exchange capacity—ammonium acetate, pH 7.0 (5ABA).

Base saturation—ammonium acetate, pH 7.0 (5C1).

Reaction (pH)—1:1 water dilution (8C1f).

Reaction (pH)—potassium chloride (8C1g).

Reaction (pH)—calcium chloride (8C1f).

Aluminum—potassium chloride extraction (6G2).

Iron—dithionate-citrate extract (6C1).

Available phosphorus—(Bray 1 and Bray 2 extraction reagents).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(40)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 22 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

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

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hydraquents (*Hydr*, meaning presence of water, plus *aquent*, the suborder of the Entisols that has an aquic moisture regime).

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

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

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the underlying material within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(39)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(40)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

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

Allemands Series

The Allemands series consists of very poorly drained, organic soils in freshwater coastal marshes. These soils are ponded most of the time and are frequently flooded. They formed in moderately thick accumulations of decomposed herbaceous material and in clayey and loamy alluvium. Elevation ranges from sea level to about 2 feet above sea level. Slope is less than 1 percent.

Soils of the Allemands series are clayey, montmorillonitic, euic, thermic Terric Medisaprists.

Allemands soils commonly are near Bancker, Clovelly, Ged, Larose, and Scatlake soils. All of the nearby soils are in landscape positions similar to those of the Allemands soils. Bancker, Ged, Larose, and Scatlake are mineral soils. Clovelly soils are more saline than the Allemands soils.

Typical pedon of Allemands muck; 1.75 miles south of the Gulf Intracoastal Waterway, 0.25 mile east of Boudreaux Lake, 200 feet east of Louisiana State Highway 27:

Oa1—0 to 14 inches; very dark grayish brown (10YR 3/2) muck; about 5 percent fiber, 2 percent rubbed; massive; very fluid (flows easily between fingers when squeezed, leaving a small amount of residue in the hand); many medium and fine roots; about 60 percent mineral material; strongly acid; clear smooth boundary.

Oa2—14 to 30 inches; very dark grayish brown (10YR 3/2) muck; about 30 percent fiber, 5 percent rubbed; massive; very fluid (flows easily between fingers when squeezed, leaving a large amount of residue in the hand); many medium and fine roots; about 35 percent mineral material; strongly acid; abrupt smooth boundary.

Abg—30 to 37 inches; black (10YR 2/1) mucky clay; massive; very fluid (flows easily between fingers when squeezed, leaving a small amount of residue in the hand); many medium and fine roots; medium acid; clear smooth boundary.

Cg1—37 to 51 inches; greenish gray (5BG 6/1) clay; few streaks of black mucky clay; massive; very fluid (flows easily between fingers when squeezed, leaving a small amount of residue in the hand); few medium and fine roots; medium acid; gradual wavy boundary.

Cg2—51 to 66 inches; greenish gray (5BY 5/1) silty clay loam; massive; very fluid (flows easily between fingers when squeezed, leaving a small amount of residue in the hand); few fine roots; mildly alkaline.

The organic material is 16 to 51 inches thick. The underlying material is dominantly clay, but strata of loamy or organic material are in some pedons.

The surface tier is 0 to 14 inches thick. It has value of 2 to 4 and chroma of 1 or 2. The content of fiber ranges from 2 to 30 percent after rubbing. Reaction ranges from strongly acid to slightly acid.

The subsurface tier is 14 to 30 inches thick. It has hue of 10YR or 7.5YR, value of 2 to 4, and chroma of 1 to 3. The content of fiber ranges from 1 to 10 percent after rubbing. Reaction ranges from strongly acid to neutral.

The Abg horizon, if it occurs, has hue of 10YR, 2.5Y, or 5Y, value of 2 to 4, and chroma of 1. The texture is clay or mucky clay. Reaction ranges from medium acid to moderately alkaline.

The Cg horizon has hue of 5Y, 5G, 5GY, or 5BG, value of 4 to 6, and chroma of 1. The texture is silty clay, clay, or silty clay loam. Reaction ranges from medium acid to moderately alkaline.

Bancker Series

The Bancker series consists of very poorly drained, very slowly permeable, slightly saline, very fluid, mineral soils in brackish marshes. These soils are ponded most of the time and are frequently flooded. They formed in unconsolidated clayey alluvium and herbaceous plant remains. Elevation ranges from sea level to 1 foot above sea level. Slope is less than 1 percent.

Soils of the Bancker series are very fine, montmorillonitic, nonacid, thermic Hydraquents.

Bancker soils commonly are near Clovelly, Creole, and Scatlake soils. Clovelly and Scatlake soils are in landscape positions similar to those of the Bancker soils. Clovelly soils are organic. Scatlake soils are more saline than the Bancker soils. Creole soils are slightly higher on the landscape than Bancker soils. They have a slightly fluid surface layer and subsurface layer.

Typical pedon of Bancker muck; 0.75 mile west of Sabine Lake, 1.5 miles north of Pines Ridge, 6.5 miles west of Sabine Reservoir, 3 miles west of Grays Camp; T. 12 S., R. 14 W.

Oa—0 to 6 inches; very dark grayish brown (10YR 3/2) muck; about 60 percent fiber, 8 percent rubbed; massive; very fluid (flows easily between fingers when squeezed, leaving only roots and fiber in the hand); many fine roots; about 40 percent mineral material; slightly acid; clear smooth boundary.

Ag—6 to 18 inches; very dark gray (10YR 3/1) mucky clay; massive; very fluid (flows easily between fingers when squeezed, leaving a small amount of residue in the hand); many fine and medium roots; neutral; clear smooth boundary.

Cg1—18 to 46 inches; dark gray (N 4/0) clay; massive; very fluid (flows easily between fingers when squeezed, leaving the hand empty); common fine roots; mildly alkaline; clear smooth boundary.

Cg2—46 to 88 inches; gray (N 5/0) clay; massive; very fluid (flows easily between fingers when squeezed, leaving the hand empty); mildly alkaline.

The soils are slightly saline. The electrical conductivity of the saturation extract ranges from 3 to 8 millimhos per centimeter throughout the profile. Reaction ranges from strongly acid to mildly alkaline in the Oa horizon and from medium acid to moderately alkaline in the Ag and Cg horizons. All of the mineral horizons within a depth of 60 inches have an n value of 1 or more.

The Oa horizon, if it occurs, has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 or 2. It is muck or peat.

The Ag horizon has hue of 10YR, 2.5Y, or 5Y, value of 2 to 4, and chroma of 1, or it is neutral in hue and has value of 3 or 4.

The Cg horizon has hue of 10YR, 5YR, 5BG, or 5GY, value of 4 to 6, and chroma of 1, or it is neutral in hue. The texture is very fluid clay or mucky clay.

Clovelly Series

The Clovelly series consists of very poorly drained, very slowly permeable, organic soils that are slightly saline and very fluid. These soils are in brackish coastal marshes. They are ponded most of the time and are frequently flooded. They formed in moderately thick accumulations of herbaceous plant remains and in clayey alluvium. Elevation ranges from sea level to 1 foot above sea level. Slope is less than 1 percent.

Soils of the Clovelly series are clayey, montmorillonitic, euic, thermic Terric Medisaprists.

Clovelly soils commonly are near Allemands, Bancker, and Scatlake soils. All of the nearby soils are in landscape positions similar to those of the Clovelly soils. Allemands soils are less saline than the Clovelly soils. Bancker and Scatlake are mineral soils.

Typical pedon of Clovelly muck; 6.5 miles west of Louisiana State Highway 27, about 0.25 mile north of North Prong of Grand Bayou, 3.25 miles east of Calcasieu Lake; T. 13 S., R. 8 W.

Oa1—0 to 12 inches; very dark grayish brown (10YR 3/2) muck; about 40 percent fiber, 8 percent rubbed; massive; very fluid (flows easily between fingers, leaving only fiber and roots in the hand); many medium and fine roots; about 50 percent mineral material; neutral; clear smooth boundary.

Oa2—12 to 24 inches; black (10YR 2/1) muck; about 40 percent fiber, 8 percent rubbed; very fluid (flows easily between fingers when squeezed, leaving the hand empty); few medium and fine roots; about 60 percent mineral material; neutral; gradual smooth boundary.

Abg—24 to 36 inches; black (10YR 2/1) mucky clay; massive; very fluid (flows easily between fingers when squeezed, leaving the hand empty); mildly alkaline; gradual smooth boundary.

Cg1—36 to 51 inches; gray (10YR 5/1) clay; massive; very fluid (flows easily between fingers when squeezed, leaving the hand empty); mildly alkaline; clear smooth boundary.

Cg2—51 to 82 inches; light gray (10YR 6/1) clay; common medium distinct light olive brown (2.5Y 5/4) mottles; massive; very fluid (flows easily between fingers when squeezed, leaving the hand empty); mildly alkaline.

The organic material is 16 to 51 inches thick. The organic fraction is dominantly herbaceous, sapric material. Some pedons, however, have a hemic or fibric surface layer, the cumulative thickness of which is less than half the total thickness of the organic horizons. Reaction ranges from slightly acid to moderately alkaline in the organic layers and from neutral to moderately alkaline in the mineral layers. The electrical conductivity of the saturation extract ranges from 4 to 8 millimhos per centimeter in at least one layer within a depth of 40 inches.

The Oa horizon has hue of 10YR or 7.5YR, value of 2 to 4, and chroma of 2 or less. The content of mineral material ranges from 40 to 70 percent.

The Abg horizon, if it occurs, has hue of 10YR or 5Y, value of 2 to 4, and chroma of 2 or less. The texture is mucky clay, clay, or silty clay. The n value ranges from 0.7 to more than 1.0.

The Cg horizon has hue of 10YR, 5Y, 5BG, 5GY, or 5G, value of 4 to 6, and chroma of 1, or it is neutral in hue and has value of 5 or 6. It is mucky clay, clay, or silty clay. The n value ranges from 0.7 to more than 1.0 to a depth of 60 inches or more.

A few pedons have mineral overwash layers, which are 2 to 10 inches thick.

Creole Series

The Creole series consists of very poorly drained, very slowly permeable, slightly saline or moderately saline soils in coastal brackish marshes. These soils formed in unconsolidated clayey, sandy, and loamy coastal alluvium. They generally are slightly fluid in the upper part and very fluid in the lower part. Slope is less than 1 percent.

Soils of the Creole series are fine, montmorillonitic, nonacid, thermic Typic Hydraquents.

Creole soils commonly are near Bancker, Hackberry, Larose, Mermentau, Peveto, and Scatlake soils. Bancker, Larose, and Scatlake soils are slightly lower on the landscape than the Creole soils. They are very fluid throughout. Hackberry and Peveto soils are on low ridges. They have a sandy textural control section. Mermentau soils are higher on the landscape than the Creole soils. Their control section is clayey in the upper part and loamy in the lower part.

Typical pedon of Creole mucky clay; 0.8 mile south of Creole, 300 feet east of Louisiana State Highway 27, about 200 feet south of an oil field road; T. 14 S., R. 7 W.

A1—0 to 3 inches; dark gray (10YR 4/1) mucky clay; massive; very fluid (flows easily between fingers when squeezed, leaving a small amount of residue in the hand); many fine and medium roots; very strongly acid; abrupt smooth boundary.

A2—3 to 17 inches; very dark gray (10YR 3/1) clay; massive; slightly sticky and plastic; slightly fluid (flows with difficulty between fingers when squeezed, leaving a large amount of residue in the hand); many fine roots; strong brown oxidation stains along root channels; medium acid; clear wavy boundary.

Cg1—17 to 27 inches; gray (5Y 5/1) clay; many medium distinct strong brown (7.5YR 5/6) mottles; massive; slightly sticky and plastic; slightly fluid (flows with difficulty between fingers when squeezed, leaving a large amount of residue in the hand); common fine roots; strong brown oxidation stains along root channels; neutral; gradual wavy boundary.

Cg2—27 to 48 inches; gray (5Y 5/1) clay; common medium distinct olive (5Y 5/6) mottles; massive; very fluid (flows easily between fingers when squeezed, leaving a small amount of residue in the hand); few fine roots; neutral; abrupt smooth boundary.

2Cg3—48 to 52 inches; gray (5Y 5/1) loamy fine sand; massive; very fluid (flows easily between fingers when squeezed, leaving a small amount of residue in the hand); neutral; abrupt smooth boundary.

3Cg4—52 to 72 inches; gray (N 5/0) clay loam; massive; very fluid (flows easily between fingers when squeezed, leaving a small amount of residue in the hand); common root channels; mildly alkaline; gradual wavy boundary.

3Cg5—72 to 96 inches; gray (N 5/0) clay; massive; very fluid (flows easily between fingers when squeezed, leaving a small amount of residue in the hand); common root channels; few fine shell fragments; few lenses and pockets of sand in the lower part of the horizon; moderately alkaline.

In all layers in the upper 27 to 40 inches, except for a thin surface layer in some pedons, the n value ranges from 0.7 to 1.0. It is 1.0 or more in the lower part of the profile. The electrical conductivity of the saturation extract ranges from 5 to 19 millimhos per centimeter in at least one layer within a depth of 40 inches.

The A horizon has hue of 10YR, 2.5Y, or 5Y, value of 2 to 4, and chroma of 1, or it is neutral in hue and has value of 3 or 4. Reaction ranges from very strongly acid to mildly alkaline. This horizon ranges from 7 to 30 inches in thickness.

The Cg horizon has hue of 10YR, 2.5Y, 5Y, 5GY, 5G, or 5BG, value of 4 to 6, and chroma of 1, or it is neutral in hue and has value of 4 or 5. It has few to many mottles in shades of olive or brown. The texture is clay or silty clay. Reaction ranges from slightly acid to moderately alkaline.

The 2Cg and 3Cg horizons, if they occur, have the same range in color as the Cg horizon. The 2Cg horizon is sandy loam, loamy fine sand, or very fine sandy loam. The 3Cg horizon is clay, silty clay, or clay loam. Both horizons are neutral to moderately alkaline.

Crowley Series

The Crowley series consists of somewhat poorly drained, very slowly permeable soils that formed in loamy and clayey alluvium of late Pleistocene age. These soils are in areas between mounds on broad ridges on the Gulf Coast Prairies. Slope is less than 1 percent.

Soils of the Crowley series are fine, montmorillonitic, thermic Typic Albaqualfs.

Crowley soils commonly are near Kaplan, Leton, Midland, Morey, Mowata, and Vidrine soils. All of the nearby soils, except for Vidrine soils, are slightly lower on the landscape than the Crowley soils. Vidrine soils are on mounds. Kaplan soils have a subsoil that is alkaline throughout. Leton soils are fine-silty. Midland soils are clayey throughout. Morey soils have a mollic epipedon. In Mowata soils tongues of the E horizon extend into the Btg horizon. Vidrine soils are browner in the upper part of the subsoil than the Crowley soils.

Typical pedon of Crowley silt loam, in an area of Crowley-Vidrine silt loams; 4 miles northeast of Sweet Lake, 200 yards west of a blacktop road; SE¼NE¼ sec. 5, T. 12 S., R. 7 W.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; weak very fine granular structure; friable; very strongly acid; abrupt smooth boundary.

A—6 to 16 inches; dark grayish brown (10YR 4/2) silt loam; few fine faint dark yellowish brown oxidation stains in root channels; weak coarse subangular blocky structure; friable; very strongly acid; clear wavy boundary.

Eg—16 to 22 inches; grayish brown (10YR 5/2) silt loam; few fine faint dark yellowish brown oxidation stains in root channels; weak medium subangular blocky structure; firm; common medium tubular pores; very strongly acid; abrupt smooth boundary.

Btg1—22 to 35 inches; grayish brown (10YR 5/2) silty clay; many medium distinct red (2.5YR 5/6) and few fine distinct strong brown (7.5YR 5/6) mottles; very dark gray (10YR 3/1) and black (10YR 2/1) faces of peds; moderate medium prismatic and moderate coarse subangular blocky structure; firm; common distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg2—35 to 44 inches; grayish brown (10YR 5/2) silty clay; common medium distinct red (2.5YR 4/8) and strong brown (7.5YR 5.6) mottles; most faces of peds are dark grayish brown (10YR 4/2) but a few are very dark gray (10YR 3/1); moderate medium prismatic and subangular blocky structure; firm; common distinct continuous clay films on faces of peds; strongly acid; gradual irregular boundary.

BCg—44 to 62 inches; light brownish gray (10YR 6/2) silty clay; many medium distinct brownish yellow (10YR 6/6) and few medium distinct yellowish red (5YR 5/6) mottles; few peds coated with dark gray (10YR 4/1) very fine sand; weak medium subangular blocky structure; firm; few faint clay films on faces of peds; neutral.

The thickness of the solum ranges from 40 to 75 inches.

The A or Ap horizon has value of 4 or 5 and chroma of 1 or 2. Reaction ranges from very strongly acid to medium acid. This horizon ranges from 5 to 16 inches in thickness.

The Eg horizon has value of 5 or 6 and chroma of 1 or 2. Reaction ranges from very strongly acid to medium acid. This horizon ranges from 5 to 15 inches in thickness.

The Btg horizon has value of 4 to 6 and chroma of 1 or 2. It has few to many mottles in shades of red or brown. The texture is silty clay or silty clay loam. Reaction ranges from very strongly acid to slightly acid.

The BCg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. It has few to many mottles in shades of brown or red. The texture is silty clay loam or silty clay. Reaction ranges from medium acid to moderately alkaline.

Ged Series

The Ged series consists of very poorly drained, very slowly permeable soils that formed in recently deposited, clayey alluvium and in the underlying clayey alluvium of late Pleistocene age. These soils are in freshwater marshes that border the Gulf Coast Prairies. They are ponded most of the time and are frequently flooded. Elevation ranges from sea level to 2 feet above sea level. Slope is less than 1 percent.

Soils of the Ged series are very fine, mixed, thermic Typic Ochraqualfs.

Ged soils commonly are near Allemands, Gentilly, Judice, Larose, Leton, Midland, Morey, Mowata, and Vidrine soils. Allemands, Gentilly, and Larose soils are in landscape positions similar to those of the Ged soils. Allemands soils have an organic surface layer that is more than 16 inches thick. Gentilly soils are saline. Judice and Morey soils are higher on the landscape than the Ged soils. They have a mollic epipedon. Larose soils are very fluid throughout. Leton, Midland, and Mowata soils are higher on the landscape than the Ged soils. In Leton and Mowata soils, tongues of the E horizon extend into the Btg horizon. Midland soils are fine textured in the control section. Vidrine soils are on mounds. They are coarse-silty in the upper part and clayey in the lower part.

Typical pedon of Ged mucky clay; 2.5 miles north of the Gibbstown bridge, 0.25 mile east of Louisiana State Highway 27; NW¼SE¼ sec. 28, T. 12 S., R. 7 W.

A1—0 to 4 inches; very dark gray (10YR 3/1) mucky clay; massive; very fluid (flows easily between fingers when squeezed, leaving a small amount of residue in the hand); many fine and medium roots; very strongly acid; abrupt wavy boundary.

A2—4 to 14 inches; very dark gray (10YR 3/1) clay; massive; slightly fluid (flows with difficulty between fingers when squeezed, leaving a large amount of residue in the hand); many fine and medium roots; strongly acid; clear wavy boundary.

Btg1—14 to 34 inches; gray (10YR 5/1) clay; weak medium and coarse subangular blocky structure; firm; few fine and medium roots; common dark yellowish brown oxidation stains along root channels; slightly acid; gradual wavy boundary.

Btg2—34 to 44 inches; gray (5Y 6/1) clay; common medium faint olive gray (5Y 5/2) mottles; weak medium and coarse subangular blocky structure; firm; many dark yellowish brown oxidation stains along root channels; slightly acid; gradual wavy boundary.

Btkg—44 to 60 inches; gray (5Y 6/1) clay; common medium prominent yellowish brown (10YR 5/8) and common medium distinct grayish brown (10YR 5/2) mottles; weak medium and coarse subangular blocky structure; firm; common medium concretions of iron and manganese oxide and common medium and coarse concretions of calcium carbonate; mildly alkaline.

The thickness of the solum ranges from 45 to 80 inches.

The A1 horizon has hue of 10YR or 5Y, value of 2 to

4, and chroma of 2 or less. Reaction ranges from very strongly acid to mildly alkaline. The n value ranges from 0.7 to 2.0. This horizon ranges from 4 to 18 inches in thickness.

The A2 horizon has the same range in color and reaction as the A1 horizon. The texture is silty clay, clay, or mucky clay. The n value ranges from 0.1 to 0.6.

Some pedons have a BCg horizon. The Btg, Btkg, and BCg horizons have hue of 10YR, 2.5Y, 5Y, or 5GY, value of 4 to 6, and chroma of 1 or less. They have no mottles or have few to many mottles in shades of olive, brown, or gray. The texture is silty clay or clay. Reaction ranges from slightly acid to moderately alkaline. The n value is less than 0.5.

Gentilly Series

The Gentilly series consists of very poorly drained, very slowly permeable, slightly saline, fluid, mineral soils. These soils are in brackish coastal marshes. They are continuously ponded and are frequently flooded. They formed in herbaceous plant remains and in clayey alluvium. Elevation ranges from sea level to 2 feet above sea level. Slope is less than 1 percent.

Soils of the Gentilly series are very fine, montmorillonitic, nonacid, thermic Typic Hydraquents.

Gentilly soils commonly are near Bancker, Clovelly, Ged, and Scatlake soils. All of the nearby soils are in landscape positions similar to those of the Gentilly soils. Bancker and Scatlake soils are very fluid throughout. Clovelly soils are organic. Ged soils are not so saline as the Gentilly soils.

Typical pedon of Gentilly muck; 2.5 miles southwest of Hackberry, 0.25 mile south of Stark's North Canal, 0.5 mile northeast of Wild Cow Lake; T. 13 S., R. 11 W.

Oa1—0 to 5 inches; very dark gray (10YR 3/1) muck; about 50 percent fiber, 8 percent rubbed; massive; very fluid (flows easily between fingers when squeezed, leaving only roots and fiber in the hand); many fine and medium roots; about 50 percent mineral material; medium acid; abrupt smooth boundary.

Oa2—5 to 8 inches; very dark grayish brown (10YR 3/2) muck; about 60 percent fiber, 8 percent rubbed; massive, very fluid (flows easily between fingers when squeezed, leaving only roots and fiber in the hand); many fine and medium roots; about 50 percent mineral material; medium acid; abrupt smooth boundary.

Cg1—8 to 18 inches; dark gray (N 4/0) clay; massive; slightly fluid (flows with difficulty between fingers when squeezed, leaving a large amount of residue in the hand); few fine roots; neutral; clear smooth boundary.

Cg2—18 to 22 inches; gray (10YR 5/1) clay; common medium distinct light olive brown (2.5Y 5/6) mottles; massive; slightly fluid (flows with difficulty between fingers when squeezed, leaving a large amount of residue in the hand); mildly alkaline; gradual wavy boundary.

Cg3—22 to 43 inches; gray (N 5/0) clay; common medium distinct light olive brown (2.5Y 5/6) and common medium distinct brown (7.5YR 5/4) mottles; massive; slightly fluid (flows with difficulty between fingers when squeezed, leaving a large amount of residue in the hand); mildly alkaline; gradual smooth boundary.

2Cg4—43 to 82 inches; gray (N 5/0) clay; common medium distinct light olive brown (2.5Y 5/6) mottles; massive; firm; common medium concretions of carbonate; mildly alkaline.

The soils are slightly saline. The electrical conductivity of the saturation extract ranges from 2 to 8 millimhos per centimeter in at least one layer within a depth of 40 inches. The n value is more than 0.7 in the upper 8 to 20 inches of the mineral material and less than 0.7 in the lower 20 to 43 inches of this material.

The Oa horizon has value of 2 or 3 and chroma of 1 or 2. Reaction ranges from medium acid to mildly alkaline.

Some pedons have an A horizon. This horizon has hue of 10YR, 2.5Y, or 5Y, value of 2 to 4, and chroma of 1. The texture is mucky clay, silty clay, or clay. Reaction is neutral or mildly alkaline.

The Cg and 2Cg horizons have hue of 10YR, 5Y, or 5GY, value of 4 to 6, and chroma of 1, or they are neutral in hue and have value of 4 or 5. The texture is silty clay or clay. Reaction is neutral or mildly alkaline. The Cg horizon is slightly fluid or very fluid. The 2Cg horizon is firm and consolidated.

Hackberry Series

The Hackberry series consists of somewhat poorly drained, rapidly permeable soils that formed in sandy and loamy beach deposits. These soils are on toe slopes and in other areas on low ridges, which are generally parallel to the coast of the Gulf of Mexico. Slope ranges from 0 to 3 percent.

Soils of the Hackberry series are sandy, mixed, thermic Aeric Haplaquepts.

Hackberry soils commonly are near Bancker, Creole, Mermentau, Peveto, and Scatlake soils. Bancker, Creole, Mermentau, and Scatlake soils are lower on the landscape than the Hackberry soils. Bancker, Creole, and Scatlake soils have clayey underlying material. Mermentau soils are clayey in the upper part and loamy in the lower part. Peveto soils are in the higher landscape positions. They do not have a recognizable subsoil.

Typical pedon of Hackberry loamy fine sand; 3 miles east of Cameron, 300 feet north of Louisiana State Highway 27, about 250 feet east of a parish road; NW¼NE¼ sec. 27, T. 15 S., R. 9 W.

Ap—0 to 6 inches; dark brown (10YR 4/3) loamy fine sand; common yellowish brown (10YR 5/8) oxidation stains along root channels; weak medium subangular blocky structure parting to weak fine granular; very friable; many fine and medium roots; neutral; abrupt smooth boundary.

Bw1—6 to 13 inches; brown (10YR 5/3) very fine sandy loam; common fine distinct yellowish brown (10YR 5/6) and few fine faint grayish brown mottles; moderate coarse prismatic structure parting to moderate coarse subangular blocky; friable; many fine and medium roots; very dark gray (10YR 3/1) coatings on faces of peds; common soft black accumulations; black coatings on the walls of root channels; moderately alkaline; abrupt smooth boundary.

Bw2—13 to 17 inches; grayish brown (2.5Y 5/2) very fine sandy loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; very friable; many fine and medium roots; very dark grayish brown (10YR 3/2) coatings on faces of peds; few soft brown accumulations; strongly alkaline; abrupt smooth boundary.

Bw3—17 to 28 inches; brown (10YR 5/3) loamy fine sand; common medium distinct yellowish brown (10YR 5/6) and common medium faint grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; friable; common fine and medium roots; few soft brown accumulations; black coatings in root channels; strongly alkaline; abrupt smooth boundary.

C—28 to 37 inches; pale brown (10YR 6/3) fine sand; common coarse distinct dark yellowish brown (10YR 4/6) and few fine faint light gray mottles; single grained; loose; few fine and medium roots; common soft black accumulations; about 40 percent shell fragments and shells as much as 1 inch in diameter; very strongly alkaline; abrupt smooth boundary.

Cg—37 to 40 inches; gray (10YR 6/1) fine sandy loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; common soft brown accumulations; black stains along root channels; strongly alkaline; abrupt smooth boundary.

C′—40 to 61 inches; brown (10YR 5/3) fine sand; common medium distinct dark yellowish brown (10YR 4/6) mottles; single grained; loose; about 15 percent shell fragments and shells as much as 1 inch in diameter; many black streaks; very strongly alkaline.

The solum typically is 20 to 35 inches thick, but it ranges from 14 to 44 inches. The content of shell fragments generally varies within individual layers throughout the profile, but it ranges from 2 to 15 percent, by weighted average, in the 10- to 40-inch control section. The electrical conductivity of the saturation extract ranges from 2 to 4 millimhos per centimeter throughout the profile.

The A or Ap horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 or 4, and chroma of 1 to 3. The texture is fine sandy loam or loamy fine sand. Reaction ranges from slightly acid to mildly alkaline. The content of shell fragments ranges from 0 to 15 percent. This horizon ranges from 3 to 12 inches in thickness.

The Bw horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 3. It has subhorizons that have chroma of 1 or 2 within a depth of 20 inches. This horizon is loamy fine sand, very fine sandy loam, or sand. At least one subhorizon is very fine sandy loam. Reaction ranges from neutral to strongly alkaline.

The C, Cg, and C′ horizons have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 or 3. The texture is fine sand, loamy fine sand, or fine sandy loam. Reaction ranges from neutral to very strongly alkaline.

Judice Series

The Judice series consists of poorly drained, very slowly permeable soils. These soils are in broad, slightly concave areas on the Gulf Coast Prairies. They formed in clayey and loamy alluvium of late Pleistocene age. Slope is less than 1 percent.

Soils of the Judice series are fine, montmorillonitic, thermic Vertic Haplaquolls.

Judice soils commonly are near Kaplan, Leton, Midland, Morey, and Mowata soils. Kaplan, Leton, Midland, and Mowata soils do not have a mollic epipedon. Morey soils are fine-silty. Kaplan soils are on ridges. Leton, Midland, Morey, and Mowata soils are in landscape positions similar to those of the Judice soils.

Typical pedon of Judice silty clay; 7 miles northeast of Sweet Lake, 150 feet east of an oil well road; T. 12 S., R. 6 W.

Ap—0 to 4 inches; black (10YR 2/1) silty clay; massive; extremely hard, extremely firm, very plastic; many roots; medium acid; abrupt smooth boundary.

A—4 to 10 inches; black (10YR 2/1) silty clay; weak medium angular blocky structure; extremely firm, very plastic; many roots; slightly acid; clear irregular boundary.

Bg1—10 to 15 inches; dark gray (10YR 4/1) silty clay; common fine prominent dark yellowish brown (10YR 4/4) mottles; moderate fine and medium angular blocky structure; firm, very plastic; neutral; diffuse irregular boundary.

Bg2—15 to 26 inches; gray (10YR 5/1) silty clay; few fine prominent light olive brown (2.5Y 5/6) mottles; weak fine prismatic and moderate fine angular blocky structure; few tongues of black (10YR 2/1) clay; dark gray (10YR 4/1) coatings on faces of peds; shiny faces of peds; few slickensides; very dark gray (10YR 3/1) silty clay in many vertical root channels; firm, very plastic; neutral; diffuse irregular boundary.

Bg3—26 to 42 inches; gray (5Y 6/1) clay loam; many medium distinct yellowish brown (10YR 5/8) mottles; weak fine prismatic and moderate fine angular blocky structure; few tongues of black (10YR 2/1) clay; dark gray (10YR 4/1) and gray (10YR 5/1) coatings on faces of peds; shiny faces of peds; few slickensides; very dark gray (10YR 3/1) silty clay in many vertical root channels; firm, very plastic; few soft white concretions; neutral; gradual wavy boundary.

BCg1—42 to 54 inches; gray (5Y 6/1) silty clay; many medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; few tongues of black (10YR 2/1) clay; very plastic; few soft white concretions; neutral; gradual wavy boundary.

BCg2—54 to 80 inches; light olive gray (5Y 6/2) and greenish gray (5G 5/1) silty clay; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; very plastic; mildly alkaline.

The thickness of the solum ranges from 50 to 80 inches.

The A horizon has value of 2 or 3 and chroma of 1 or 2. Reaction ranges from medium acid to neutral. This horizon ranges from 5 to 10 inches in thickness.

The Bg and BCg horizons have hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. They have few to many mottles in shades of brown or olive. The texture is silty clay loam, clay loam, or silty clay. Reaction ranges from medium acid to moderately alkaline.

Kaplan Series

The Kaplan series consists of somewhat poorly drained, slowly permeable soils that formed in clayey and loamy alluvium of late Pleistocene age. These soils are on broad, slightly convex ridges on the Gulf Coast Prairies. Slope is less than 1 percent.

Soils of the Kaplan series are fine, mixed, thermic Aeric Ochraqualfs.

Kaplan soils commonly are near Crowley, Leton, Midland, Morey, Mowata, and Vidrine soils. Crowley soils are slightly higher on the landscape than the Kaplan soils. They are characterized by an abrupt textural change from the subsurface layer to the subsoil. Leton, Midland, Morey, and Mowata soils are lower on the landscape than the Kaplan soils. Leton and Morey soils are fine-silty. Also, Morey soils have a mollic epipedon. Midland soils do not have subhorizons in which ped interiors have chroma of 2 or 3. In Mowata soils tongues of the subsurface layer extend into the subsoil. Vidrine soils are on mounds. Their subsoil is browner in the upper part than that of the Kaplan soils.

Typical pedon of Kaplan silt loam; 2.1 miles south of the intersection of Louisiana State Highways 14 and 98, about 200 feet east of a gravel road; northeast corner of T. 12 S., R. 5 W.

Ap1—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; common fine and medium roots; slightly acid; abrupt smooth boundary.

Ap2—4 to 10 inches; dark grayish brown (10YR 4/2) silt loam; few fine faint dark yellowish brown mottles; few reddish brown (5YR 4/4) stains along root channels; weak medium granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

Btg1—10 to 16 inches; dark gray (10YR 4/1) silty clay loam; few fine faint grayish brown mottles; many yellowish brown (10YR 5/4) stains along root channels; moderate medium angular blocky structure; firm; few fine roots; few faint dark gray clay films on faces of peds; common medium concretions of iron and manganese; neutral; clear smooth boundary.

Btg2—16 to 22 inches; grayish brown (10YR 4/2) silty clay; common medium prominent red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; common distinct dark gray clay films on faces of peds; few fine black concretions of iron and manganese oxide; neutral; gradual wavy boundary.

Btkg1—22 to 27 inches; silty clay that is light yellowish brown (2.5Y 6/4) in the interior of peds and gray (10YR 5/1) and dark gray (10YR 4/1) on faces of peds; many medium faint light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/6) and common fine prominent red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; few fine vesicular pores; few faint gray and dark gray clay films on faces of peds; few fine black concretions of iron and manganese oxide; few medium concretions of calcium carbonate; moderately alkaline; gradual wavy boundary.

Btkg2—27 to 44 inches; light brownish gray (2.5Y 6/2) silty clay; common medium distinct olive yellow (2.5Y 6/8) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; common fine vesicular pores; common distinct gray and dark gray clay films on faces of peds; common fine black concretions of iron and manganese oxide; common medium and coarse concretions of calcium carbonate; moderately alkaline; gradual wavy boundary.

Btkg3—44 to 53 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine prominent yellowish red (5YR 5/8) mottles; moderate coarse prismatic structure parting to weak medium subangular blocky; firm; common fine vesicular pores; common distinct gray clay films on vertical faces of peds; few medium and coarse black concretions of iron and manganese oxide; common medium and coarse concretions of calcium carbonate; few slickensides; moderately alkaline; gradual wavy boundary.

Btkg4—53 to 65 inches; gray (5Y 6/1) silty clay loam; many coarse prominent yellowish red (5YR 5/6) mottles; moderate coarse subangular blocky structure; firm; common fine vesicular pores; few faint clay films on vertical faces of peds; common medium black concretions of iron and manganese oxide; common medium and coarse concretions of calcium carbonate; few slickensides; moderately alkaline.

The thickness of the solum ranges from 40 to 70 inches.

The Ap horizon has value of 3 or 4 and chroma of 1 or 2. It has few to many mottles in shades of brown in the lower part. Reaction is slightly acid or neutral. This horizon ranges from 4 to 15 inches in thickness.

The Btg horizon has value of 4 or 5 and chroma of 1 or 2. It has few to many mottles in shades of red, brown, or gray. The faces of peds are dark gray or gray. The texture is silty clay or silty clay loam. Reaction ranges from neutral to moderately alkaline.

The Btkg horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 to 3. It has few to many mottles in shades of brown, red, or gray. The texture is silty clay loam or silty clay. Reaction is mildly alkaline or moderately alkaline.

Larose Series

The Larose series consists of very poorly drained, very slowly permeable, very fluid, mineral soils that formed in herbaceous plant remains and in clayey alluvium. These soils are in freshwater marshes. They are ponded most of the time and are frequently flooded. Elevation ranges from sea level to 1 foot above sea level. Slope is less than 1 percent.

Soils of the Larose series are very fine, montmorillonitic, nonacid, thermic Typic Hydraquents.

Larose soils commonly are near Allemands, Bancker, Clovelly, Ged, and Scatlake soils. All of the nearby soils are in landscape positions similar to those of the Larose soils. Allemands and Clovelly soils are organic. Bancker and Scatlake soils are more saline than the Larose soils. Ged soils have a firm, mineral subsoil.

Typical pedon of Larose muck; 500 feet east of Collicon Lake, 900 feet west of Alligator Lake, 0.75 mile north of Gulf Intracoastal Waterway; T. 14 S., R. 3 W.

Oa—0 to 6 inches; very dark grayish brown (10YR 3/2) muck; about 40 percent fiber, 8 percent rubbed; massive; very fluid (flows easily between fingers when squeezed, leaving only roots and fiber in the hand); about 60 percent mineral material; slightly acid; clear smooth boundary.

Ag—6 to 18 inches; very dark gray (10YR 3/1) mucky clay; massive; very fluid (flows easily between fingers when squeezed, leaving the hand empty); neutral; gradual smooth boundary.

Cg1—18 to 68 inches; very dark gray (10YR 3/1) mucky clay; massive; very fluid (flows easily between fingers when squeezed, leaving the hand empty); neutral; mildly alkaline; gradual wavy boundary.

Cg2—68 to 88 inches; gray (N 5/0) clay; massive; very fluid (flows easily between fingers when squeezed, leaving the hand empty); mildly alkaline.

All mineral horizons within a depth of 60 inches have an n value of 1.0 or more. Reaction ranges from medium acid to mildly alkaline in the Oa and Ag horizons and from slightly acid to moderately alkaline in the Cg horizon.

The Oa horizon has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 or 2. It is 2 to 15 inches thick.

The Ag horizon has hue of 10YR, 2.5Y, or 5Y, value of 2 to 4, and chroma of 1 or 2, or it is neutral in hue and has value of 3 or 4. The texture is clay, silty clay, or mucky clay. This horizon is 4 to 12 inches thick.

The Cg horizon has hue of 10YR, 5Y, 5GY, or 5BG, value of 3 to 5, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 6. The texture is clay, silty clay, or mucky clay. In some pedons this horizon has a thin organic layer.

Leton Series

The Leton series consists of poorly drained, slowly permeable soils that formed in loamy alluvium of late Pleistocene age. These soils are on broad flats and along drainageways on the Gulf Coast Prairies. Slope is less than 1 percent.

Soils of the Leton series are fine-silty, mixed, thermic, Typic Glossaqualfs.

Leton soils commonly are near Crowley, Judice, Midland, Morey, Mowata, and Vidrine soils. Crowley, Judice, Midland, and Mowata soils have a fine textured control section. Crowley soils are on low ridges. Judice, Midland, Morey, and Mowata soils are in landscape positions similar to those of the Leton soils. Morey soils have a mollic epipedon. Vidrine soils are on mounds or in smoothed mound areas. They are coarse-silty in the upper part and clayey in the lower part.

Typical pedon of Leton silt loam; 0.75 mile south of Gum Cove Ferry Landing, 1,800 feet east of a parish road, 200 feet north of a farm road; NW¼NE½ sec. 6, T. 12 S., R. 11 W.

Ap1—0 to 3 inches; grayish brown (10YR 5/2) silt loam; weak fine granular structure; friable; many fine and medium roots; common pockets and lenses of uncoated grains of very fine sand; strongly acid; abrupt smooth boundary.

Ap2—3 to 6 inches; grayish brown (10YR 5/2) silt loam; yellowish brown (10YR 5/6) oxidation stains along root channels; weak fine granular structure; friable; common fine and medium roots; common lenses of uncoated grains of very fine sand; medium acid; clear smooth boundary.

Eg1—6 to 13 inches; grayish brown (10YR 5/2) silt loam; common medium distinct gray (10YR 6/1) mottles; yellowish brown (10YR 5/6) oxidation stains along root channels; weak coarse subangular blocky structure; friable; few spots of uncoated very fine sand; common fine roots; few fine tubular pores; slightly acid; gradual wavy boundary.

Eg2—13 to 19 inches; gray (10YR 5/1) silt loam; common fine faint dark grayish brown and few fine prominent yellowish brown (10YR 5/6) mottles; yellowish brown (10YR 5/6) oxidation stains along root channels; weak coarse prismatic structure parting to weak medium subangular blocky; friable; few fine roots; common fine tubular pores; common streaks of uncoated very fine sand; slightly acid; gradual wavy boundary.

B/E—19 to 24 inches; grayish brown (10YR 5/2) silty clay loam (Bt); common medium distinct yellowish brown (10YR 5/6) mottles; 30 percent tongues of gray (10YR 5/1) silt loam about 2 inches wide (E); weak medium prismatic structure parting to moderate medium and fine subangular blocky; firm; distinct discontinuous clay films on faces of peds and along root channels; few spots of uncoated very fine sand; few fine barite crystals; neutral; clear wavy boundary.

Btg1—24 to 36 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure parting to weak medium and fine subangular blocky; firm; few distinct gray (10YR 5/1) clay films on faces of peds; few medium black and brown concretions; few fine barite crystals; common krotovinas; neutral; gradual wavy boundary.

Btg2—36 to 46 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure parting to weak medium and fine subangular blocky; firm; few faint clay films on faces on peds; common krotovinas; common large black and brown concretions; few fine barite crystals; neutral; gradual wavy boundary.

BCg—46 to 60 inches; grayish brown (10YR 5/2) clay loam; common medium distinct yellowish brown (10YR 6/8) and greenish gray (5GY 6/1) mottles; weak coarse subangular blocky structure parting to medium and fine subangular blocky; firm; common krotovinas; common large black and brown concretions; neutral.

The thickness of the solum ranges from 40 to more than 60 inches. The content of sand ranges from 15 to 42 percent in the control section.

The Ap horizon has value of 4 or 5 and chroma of 1 or 2. Reaction ranges from strongly acid to neutral. This horizon ranges from 3 to 7 inches in thickness.

The Eg horizon and the E part of the B/E horizon have value of 5 or 6 and chroma of 1 or 2. They are silt loam, loam, or very fine sandy loam. Reaction ranges from strongly acid to neutral. The Eg horizon ranges from 6 to 20 inches in thickness. Tongues of this horizon extend into the Bt horizon.

The Btg and BCg horizons and the Bt part of the B/E horizon have value of 5 or 6 and chroma of 1 or 2. They have few to many mottles, mainly in shades of brown. They are medium acid to mildly alkaline. The Btg horizon and the Bt part of the B/E horizon are loam, silty clay loam, or clay loam. The BCg horizon is loam, silty clay loam, clay loam, or clay.

Mermentau Series

The Mermentau series consists of poorly drained, moderately saline or strongly saline, very slowly permeable soils that formed in clayey and loamy coastal alluvium. These soils are on low ridges and in depressions near the Gulf of Mexico and in broad areas of brackish marsh. Slope is less than 1 percent.

Soils of the Mermentau series are clayey over loamy, montmorillonitic, nonacid, thermic Typic Haplaquepts.

Mermentau soils commonly are near Bancker, Creole, Hackberry, Peveto, and Scatlake soils. Bancker, Creole, and Scatlake soils are in the lower landscape positions. They are slightly fluid throughout. Hackberry and Peveto soils are higher on the landscape than Mermentau soils. They have a sandy particle-size control section.

Typical pedon of Mermentau clay; 0.5 mile north of Grand Chenier, 250 feet northeast of the Mermentau River, 75 feet northwest of electrical pole number 25; SW¼SW¼ sec. 2, T. 15 S., R. 6 W.

A—0 to 6 inches; black (10YR 2/1) clay; moderate medium angular blocky structure; firm; many fine and medium roots; mildly alkaline; gradual wavy boundary.

Bg—6 to 19 inches; gray (5Y 5/1) clay; few fine faint dark yellowish brown (10YR 4/4) mottles; weak coarse prismatic structure parting to moderate medium angular blocky; firm; common fine roots; few fine pores; dark gray (10YR 4/1) shiny faces of peds; moderately alkaline; abrupt wavy boundary.

2Cg1—19 to 42 inches; grayish brown (10YR 5/2) very fine sandy loam; many medium distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; few fine roots; few black accumulations; common crawfish channels; a 2-inch horizontal band of gray (10YR 5/1) silty clay loam at a depth of 31 to 33 inches; moderately alkaline; gradual wavy boundary.

2Cg2—42 to 48 inches; gray (10YR 5/1) very fine sandy loam; common medium distinct dark yellowish brown (10YR 4/6) mottles; massive; friable; few fine roots; many fine shell fragments; few black accumulations; common crawfish channels; moderately alkaline; gradual wavy boundary.

2Cg3—48 to 59 inches; gray (N 5/0) very fine sandy loam; few fine faint yellowish brown mottles; massive; friable; few fine shell fragments; common crawfish channels; moderately alkaline; clear smooth boundary.

3Cg4—59 to 69 inches; greenish gray (5GY 5/1) sandy clay; few fine faint yellowish brown mottles; massive; very fluid (flows easily between fingers when squeezed, leaving a small amount of residue in the hand); few fine roots; few black accumulations; moderately alkaline.

The thickness of the solum ranges from 10 to 30 inches. Reaction ranges from neutral to moderately alkaline throughout the profile. The electrical conductivity of the saturation extract ranges from 7 to 23 millimhos per centimeter.

The A horizon has hue of 10YR, 2.5Y, or 5Y, value of 2 to 4, and chroma of 1 or 2. It ranges from 4 to 15 inches in thickness.

The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 1 or 2, or it is neutral in hue and has value of 4 or 5. The texture is silty clay or clay.

The 2Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma dominantly of 1 or 2, or it is neutral in hue and has value of 4 to 6. Some subhorizons have hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3. The texture is very fine sandy loam, fine sandy loam, or loam. The number of sand-sized shell fragments ranges from none to many.

The 3Cg horizon, if it occurs, has hue of 10YR, 2.5Y, 5Y, or 5GY, value of 5 or 6, and chroma of 1, or it is neutral in hue and has value of 5 or 6. The texture is sandy clay, silty clay, or clay. N value ranges from 0.7 to more than 1.0. The number of sand-sized shell fragments is none or few.

The Mermentau soil in map unit Hm is a taxadjunct to the series because it has an A horizon that is thicker than is typical for the series and meets the requirements for a mollic epipedon. This difference, however, does not significantly affect the use and management of the soil.

Midland Series

The Midland series consists of poorly drained, very slowly permeable soils that formed in loamy and clayey alluvium of late Pleistocene age. These soils are on broad flats and in slightly depressional areas on the Gulf Coast Prairies. Slope is less than 1 percent.

Soils of the Midland series are fine, montmorillonitic, thermic Typic Ochraqualfs.

Midland soils commonly are near Crowley, Judice, Kaplan, Leton, Morey, and Mowata soils. Crowley and Kaplan soils are on ridges. Judice, Leton, Morey, and Mowata soils are in landscape positions similar to those of the Midland soils. Crowley soils have an abrupt boundary between the subsurface layer and the subsoil. Kaplan soils have subhorizons in which ped interiors have chroma of 2 or 3. Judice and Morey soils have a mollic epipedon. Leton soils are fine-silty. In Mowata soils the subsurface layer tongues into the subsoil.

Typical pedon of Midland silty clay loam; 2 miles southwest of Lowry; NE¼NW¼ sec. 9, T. 12 S., R. 4 W.

Ap1—0 to 3 inches; dark gray (10YR 4/1) silty clay loam; weak fine granular structure; friable; many fine roots; very strongly acid; abrupt smooth boundary.

Ap2—3 to 7 inches; dark grayish brown (10YR 4/2) silty clay loam; many strong brown (7.5YR 4/6) oxidation stains along root channels; moderate medium subangular blocky structure; firm; common fine roots; strongly acid; abrupt smooth boundary.

Btg1—7 to 17 inches; dark gray (10YR 4/1) silty clay loam; few fine distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; common fine roots; many discontinuous pores; strongly acid; clear smooth boundary.

Btg2—17 to 27 inches; gray (10YR 5/1) silty clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; few discontinuous pores; common distinct clay films; slightly acid; clear wavy boundary.

Btg3—27 to 37 inches; grayish brown (10YR 5/2) silty clay; common medium distinct olive yellow (2.5Y 6/8) mottles; strong coarse subangular blocky structure; firm; common distinct clay films; few fine discontinuous pores; common concretions of iron and manganese oxide; vertical cracks filled with dark gray (10YR 4/1) silty clay loam; neutral; clear smooth boundary.

Btg4—37 to 43 inches; light brownish gray (10YR 6/2) silty clay; many medium distinct yellow (10YR 7/8) mottles; strong coarse subangular blocky structure; firm; few distinct clay films; common concretions of iron and manganese oxide; neutral; abrupt smooth boundary.

Btkg—43 to 53 inches; gray (5Y 6/1) clay; common medium distinct olive yellow (2.5Y 6/8) mottles; strong coarse subangular blocky structure; few faint clay films; firm; many fine and medium concretions of calcium carbonate; common concretions of iron and manganese oxide; moderately alkaline; abrupt smooth boundary.

BCg1—53 to 61 inches; gray (5Y 6/1) clay; common medium distinct olive yellow (2.5Y 6/8) mottles; strong coarse subangular blocky structure; firm; common concretions of iron and manganese oxide; mildly alkaline; clear smooth boundary.

BCg2—61 to 71 inches; gray (5Y 6/1) clay; many medium distinct yellowish brown (10YR 5/8) mottles; strong coarse subangular blocky structure; firm; many accumulations of manganese oxide; neutral.

The thickness of the solum ranges from 40 to 80 inches.

The Ap horizon has value of 4 or 5 and chroma of 1 or 2. Reaction ranges from very strongly acid to slightly acid. This horizon ranges from 3 to 15 inches in thickness.

The Btg, Btkg, and BCg horizons have hue of 10YR or 5Y. They generally have value of 4 or 5 and chroma of 1 or value of 6 and chroma of 1 or 2. In some pedons the BCg horizon has hue of 10YR, value of 5, and chroma of 2. These horizons have few to many mottles in shades of brown, yellow, or olive. They are clay, silty clay, or silty clay loam. Reaction ranges from medium acid to moderately alkaline.

Morey Series

The Morey series consists of poorly drained, slowly permeable soils that formed in loamy and clayey alluvium of late Pleistocene age. These soils are on the Gulf Coast Prairies. Slope is less than 1 percent.

Soils of the Morey series are fine-silty, mixed, thermic Typic Argiaquolls.

Morey soils commonly are near Crowley, Judice, Kaplan, Leton, Midland, Mowata, and Vidrine soils. Of the nearby soils, only Judice soils have a mollic epipedon. They do not have an argillic horizon. Crowley and Kaplan soils are on ridges. Judice, Leton, Midland, and Mowata soils are in landscape positions similar to those of the Morey soils. Vidrine soils are on low mounds or in smoothed mound areas.

Typical pedon of Morey silt loam; 1 mile north of Sweet Lake, 50 feet east of a road and telephone pole number 19; NW¼NW¼ sec. 19, T. 12 S., R. 7 W.

Ap1—0 to 4 inches; very dark gray (10YR 3/1) silt loam; weak very fine granular structure; friable; very strongly acid; abrupt smooth boundary.

Ap2—4 to 10 inches; very dark gray (10YR 3/1) silt loam; few fine distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/8) mottles; dark yellowish brown (10YR 4/4) coatings along root channels and between peds; moderate medium platy structure; firm; medium acid; abrupt smooth boundary.

BA—10 to 15 inches; very dark gray (10YR 3/1) silty clay loam; dark yellowish brown (10YR 4/4) coatings along root channels; moderate coarse prismatic structure; firm; few fine discontinuous pores; few soft brown concretions; slightly acid; abrupt irregular boundary.

Btg1—15 to 32 inches; gray (10YR 5/1) clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic and moderate medium angular blocky structure; pockets of very dark gray (10YR 3/1) clay loam; firm; very dark gray (10YR 3/1) and dark gray (10YR 4/1) coatings on peds; common shiny faces of peds; neutral; gradual irregular boundary.

Btg2—32 to 42 inches; gray (5Y 5/1) silty clay loam; common fine prominent light olive brown (2.5Y 5/6) and few fine faint dark yellowish brown mottles; weak medium prismatic and moderate medium angular blocky structure; firm; dark gray (5Y 4/1) and gray (5Y 5/1) coatings on peds; common shiny faces of peds; few fine black concretions and few fine soft concretions of calcium carbonate; neutral; gradual irregular boundary.

Btg3—42 to 62 inches; gray (5Y 5/1) silty clay loam; common fine prominent dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; firm; tongues of very dark gray (10YR 3/1) clay loam; free water at a depth of about 44 inches; neutral; gradual irregular boundary.

BCg—62 to 72 inches; light olive gray (5Y 6/2) silty clay; common medium prominent yellowish brown (10YR 5/8) and light olive brown (2.5Y 5/6) mottles; massive; sticky and plastic; few fine soft black concretions; mildly alkaline.

The thickness of the solum ranges from 40 to 80 inches.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. Reaction ranges from very strongly acid to neutral.

The BA horizon has the same range in color as the A horizon. The texture is silt loam, loam, or silty clay loam. Reaction ranges from strongly acid to neutral.

The Btg1 horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or less. It has mottles in shades of brown or olive. The texture is silty clay loam or clay loam. Reaction ranges from medium acid to mildly alkaline.

The Btg2 and Btg3 horizons have hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 or 2. They have few to many mottles in shades of brown or olive. The texture is silty clay loam, silty clay, clay loam, or clay. Reaction ranges from medium acid to moderately alkaline.

The BCg horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 or 2. It has few to many mottles in shades of brown or olive. The texture is silty clay loam, silty clay, or clay loam. Reaction ranges from medium acid to moderately alkaline.

Mowata Series

The Mowata series consists of poorly drained, very slowly permeable soils that formed in loamy and clayey alluvium of late Pleistocene age. These soils are on broad flats and along drainageways on the Gulf Coast Prairies. Slope is less than 1 percent.

Soils of the Mowata series are fine, montmorillonitic, thermic Typic Glossaqualfs.

Mowata soils commonly are near Crowley, Judice, Kaplan, Leton, Midland, Morey, and Vidrine soils. Crowley and Kaplan soils are on ridges. Crowley soils have an abrupt boundary between the subsurface layer and the subsoil. Judice, Leton, Midland, and Morey soils are in landscape positions similar to those of the Mowata soils. Judice and Morey soils have a mollic epipedon. Kaplan soils have subhorizons in which ped interiors have chroma of 2 or 3. Leton soils are fine-silty. Midland soils do not have a subsurface layer that tongues into the subsoil. Vidrine soils are on mounds. Their textural control section is coarse-silty in the upper part and clayey in the lower part.

Typical pedon of Mowata silt loam, in an area of Mowata-Vidrine silt loams; on Sweet Lake Land and Oil Company property; SW¼SE¼ sec. 8, T. 12 S., R. 7 W.

Ap1—0 to 4 inches; gray (10YR 5/1) silt loam; weak fine granular structure; firm; strongly acid; abrupt smooth boundary.

Ap2—4 to 8 inches; gray (10YR 5/1) silt loam; moderate medium platy structure; firm; dark yellowish brown (10YR 4/4) coatings on peds; strongly acid; abrupt smooth boundary.

Eg—8 to 18 inches; gray (10YR 5/1) silt loam; few coarse faint light gray (10YR 7/1) mottles; weak coarse subangular blocky structure; firm; dark yellowish brown (10YR 4/4) coatings in root channels; neutral; abrupt irregular boundary.

Btg1—18 to 34 inches; gray (10YR 5/1) clay loam; many coarse prominent yellowish brown (10YR 5/6) mottles; strong medium prismatic and moderate medium subangular blocky structure; firm; dark gray (10YR 4/1) and dark yellowish brown (10YR 3/4) coatings on peds; common distinct clay films; few fine concretions of iron and manganese oxide; tongues of gray silt loam, which extend to a depth of 26 inches; neutral; gradual irregular boundary.

Btg2—34 to 60 inches; gray (5Y 6/1) silty clay; many coarse prominent reddish yellow (7.5YR 6/8) mottles; strong medium prismatic structure; firm; peds completely coated with gray (10YR 6/1) fine sand that is bridged with clay; few concretions of iron and manganese oxide; neutral.

The thickness of the solum ranges from 40 to 75 inches.

The Ap horizon has value of 3 to 5 and chroma of 1 or 2. Where moist value is less than 3.5, the horizon is less than 6 inches thick. Reaction ranges from strongly acid to neutral. This horizon ranges from 4 to 8 inches in thickness.

The Eg horizon has value of 5 or 6 and chroma of 1 or 2. Reaction ranges from medium acid to neutral. This horizon ranges from 9 to 16 inches in thickness.

The Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 or 2. It has few to many mottles in shades of brown or yellow. The texture is silty clay, silty clay loam, or clay loam. Reaction ranges from strongly acid to moderately alkaline. Tongues of silt loam extend into the Btg horizon. They are as much as 8 inches wide.

Peveto Series

The Peveto series consists of somewhat excessively drained, rapidly permeable soils that formed in beach deposits of sand and shells. These soils are on ridges that are generally parallel to the coast of the Gulf of Mexico. Slope ranges from 1 to 3 percent.

Soils of the Peveto series are mixed, thermic Typic Udipsamments.

Peveto soils commonly are near Bancker, Creole, Hackberry, Mermentau, and Scatlake soils. All of the nearby soils are lower on the landscape than the Peveto soils. Also, Bancker, Creole, Mermentau, and Scatlake soils contain less sand. Hackberry soils have a well developed subsoil.

Typical pedon of Peveto fine sand, 1 to 3 percent slopes; 2.7 miles west of Oak Grove, 45 feet north of Louisiana State Highway 82; NE¼NW¼ sec. 2, T. 14 S., R. 8 W.

A1—0 to 9 inches; very dark grayish brown (10YR 3/2) fine sand; massive; very friable; many fine roots; few shell fragments; neutral; clear wavy boundary.

A2—9 to 15 inches; dark grayish brown (10YR 4/2) fine sand; massive; very friable; few fine roots; mildly alkaline; clear smooth boundary.

C—15 to 31 inches; brown (10YR 5/3) fine sand; massive; very friable; about 20 percent fine to coarse shell fragments; moderately alkaline; abrupt smooth boundary.

Ab1—31 to 38 inches; very dark grayish brown (10YR 3/2) loamy fine sand; massive; very friable; mildly alkaline; clear wavy boundary.

Ab2—38 to 46 inches; very dark gray (10YR 3/1) loamy fine sand; weak medium subangular blocky structure; friable; mildly alkaline; abrupt smooth boundary.

C′1—46 to 59 inches; brown (10YR 5/3) loamy sand; massive; very friable; about 20 percent shell fragments and shells as much as 10 centimeters in diameter; moderately alkaline; abrupt smooth boundary.

C′2—59 to 75 inches; brown (10YR 5/3) fine sand; many coarse faint grayish brown (10YR 5/2) and common fine faint dark grayish brown mottles; massive; friable; moderately alkaline.

The soils range from neutral to moderately alkaline throughout.

The A and Ab horizons have value of 3 or 4 and chroma of 1 to 3. The A horizon is sand, fine sand, loamy fine sand, or fine sandy loam. The Ab horizon is sand, fine sand, or loamy fine sand. Shell fragments make up 0 to about 20 percent of both horizons.

The C and C′ horizons have value of 4 or 5 and chroma of 2 to 4. These horizons are sand, fine sand, loamy sand, or loamy fine sand. The content of shell fragments varies in individual subhorizons. It ranges from 5 to 35 percent, by weighted average, in the 10- to 40-inch control section.

Scatlake Series

The Scatlake series consists of very poorly drained, very slowly permeable, moderately saline and strongly saline, very fluid, mineral soils. These soils formed in unconsolidated clayey alluvium. They are in saline marshes. They are ponded and flooded most of the time. Elevations range from sea level to about 1 foot above sea level. Slope is less than 1 percent.

Soils of the Scatlake series are very fine, montmorillonitic, nonacid, thermic Typic Hydraquents.

Scatlake soils commonly are near Bancker, Clovelly, and Creole soils. Bancker and Clovelly soils are in landscape positions similar to those of the Scatlake soils. Bancker soils are slightly saline. Clovelly soils are organic. Creole soils are slightly higher on the landscape than the Scatlake soils. Also, they are less fluid in the upper part.

Typical pedon of Scatlake mucky clay; 5 miles south of Hackberry, 300 feet north of West Cover Canal, 200 feet east of Louisiana State Highway 27; T. 13 S., R. 10 W.

Ag—0 to 10 inches; dark gray (10YR 4/1) mucky clay; massive; many fine and medium roots; very fluid (flows easily between fingers when squeezed, leaving a small amount of residue in the hand); extremely acid; clear wavy boundary.

Cg1—10 to 30 inches; gray (N 5/0) clay; massive; common fine roots; very fluid (flows easily between fingers when squeezed, leaving the hand empty); mildly alkaline; clear wavy boundary.

Cg2—30 to 42 inches; gray (N 6/0) clay; many medium distinct olive (5Y 4/4) mottles; massive; common fine roots; very fluid (flows easily between fingers when squeezed, leaving the hand empty); moderately alkaline; clear wavy boundary.

Cg3—42 to 60 inches; gray (N 5/0) clay; massive; few fine roots; very fluid (flows easily between fingers when squeezed, leaving the hand empty); strongly acid.

The electrical conductivity of the saturation extract ranges from 7 to 16 millimhos per centimeter throughout the profile. All mineral horizons have an n value of 1.0 or more. Reaction ranges from neutral to moderately alkaline throughout the profile.

The Ag horizon has hue of 10YR or 5Y, value of 2 to 4, and chroma of 1, or it is neutral in hue and has value of 3 or 4. This horizon ranges from 3 to 10 inches in thickness. Some pedons have a surface layer of muck or peat 2 to 8 inches thick.

The Cg horizon has hue of 5Y, 10YR, 5BG, or 5GY, value of 4 to 6, and chroma of 1, or it is neutral in hue and has value of 5 or 6.

The Scatlake soils in Cameron Parish are taxadjuncts because they are slightly more acid in the Ag and Cg3 horizons than is defined as the range of the series. This difference, however, does not significantly affect the use and management of the soils.

Vidrine Series

The Vidrine series consists of somewhat poorly drained, slowly permeable soils that formed in loamy and clayey alluvium of late Pleistocene age. These soils are on low mounds or in smoothed mound areas on broad flats and broad ridges on the Gulf Coast Prairies. Slope ranges from 1 to 5 percent.

Soils of the Vidrine series are coarse-silty over clayey, mixed, thermic Glossaquic Hapludalfs.

Vidrine soils commonly are near Crowley, Morey, and Mowata soils. The nearby soils are in areas between mounds. They have lower chroma than the Vidrine soils. Also, Morey soils have a mollic epipedon.

Typical pedon of Vidrine silt loam, in an area of Crowley-Vidrine silt loams; 4 miles northeast of Sweet Lake, 150 feet west of a blacktop road; SE¼NE¼ sec. 5, T. 12 S., R. 7 W.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; friable; very strongly acid; abrupt smooth boundary.

A—6 to 12 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; very strongly acid; clear wavy boundary.

BA—12 to 19 inches; light yellowish brown (10YR 6/4) silt loam; weak medium subangular blocky structure; friable; many tubular pores; common medium black and brown concretions; very strongly acid; clear irregular boundary.

B/E—19 to 22 inches; grayish brown (10YR 5/2) and red (2.5YR 4/8) silt loam (Bt); pale brown (10YR 6/3) and light yellowish brown (10YR 6/4) silt coatings 1 to 5 millimeters thick on faces of peds (E); moderate medium angular blocky structure; firm; few faint clay films on vertical faces of peds; very strongly acid; clear wavy boundary.

Btg1—22 to 35 inches; grayish brown (10YR 5/2) silty clay; many medium distinct red (2.5YR 4/8) mottles; moderate medium angular blocky structure; firm; common distinct clay films on all faces of peds; very strongly acid; gradual wavy boundary.

Btg2—35 to 60 inches; light brownish gray (10YR 6/2) silty clay; many medium distinct red (2.5YR 4/8) and common fine distinct yellowish brown (10YR 5/8) mottles; moderate medium angular blocky structure; firm; common distinct clay films on all faces of peds; very strongly acid; gradual wavy boundary.

BCg—60 to 80 inches; light brownish gray (10YR 6/2) silty clay loam; many medium distinct strong brown (7.5YR 5/6) and common medium distinct yellowish brown (10YR 5/6) mottles; weak medium angular blocky structure; firm; few faint clay films on vertical faces of peds; slightly acid.

The thickness of the solum ranges from 48 to 80 inches. The combined thickness of the loamy A and BA horizons ranges from 14 to 30 inches.

The A and Ap horizons have value of 3 to 6 and chroma of 2 or value of 4 to 6 and chroma of 3. If value is 3 in areas that have been smoothed, the A horizon is less than 6 inches thick. Reaction ranges from very strongly acid to medium acid. The combined thickness of these horizons ranges from 5 to 12 inches.

The BA horizon has value of 5 and chroma of 3 to 6 or value of 6 and chroma of 3 or 4. The texture is silt loam or very fine sandy loam. Reaction ranges from very strongly acid to medium acid.

The Btg horizon has value of 4 to 6 and chroma of 1 or 2. It has few to many mottles in shades of red or brown. The texture is silty clay loam or silty clay. Reaction ranges from very strongly acid to medium acid.

The BCg or BC horizon has value of 5 or 6 and chroma of 1 to 6. The texture is silty clay loam or silty clay. Reaction ranges from slightly acid to moderately alkaline.

Formation of the Soils

Wayne H. Hudnall, Agronomy Department, Agricultural Experiment Station, Louisiana State University Agricultural Center, helped prepare this section.

This section relates the processes and factors of soil formation to the soils in Cameron Parish and describes the landforms and surface geology in the parish.

Processes of Soil Formation

The processes of soil formation influence the kind and degree of profile development. The factors of soil formation—climate, living organisms, relief, parent material, and time—determine the rate and relative effectiveness of the different processes.

Soil-forming processes are those that result in additions of organic, mineral, and gaseous materials to the soil; losses of these materials from the soil; translocation of the materials from one point to another within the soil; and physical and chemical transformation of mineral and organic material within the soil *(5, 34)*.

Many processes occur simultaneously. Examples are the accumulation of organic matter, the development of soil structure, and the leaching of bases from some soil horizons. The contribution of a particular process can change over a period of time. The installation of drainage and water-control systems, for example, can change the length of time that some soils are flooded or saturated with water. Some of the processes that have contributed to the formation of the soils in Cameron Parish are described in the following paragraphs.

Organic matter has accumulated in all of the soils, has partly decomposed, and has been incorporated into the soils. The organic accumulations range from humus in mineral horizons in Crowley and Morey soils to muck in organic horizons in Allemands and Clovelly soils. Most of the organic matter is produced in and above the surface layer. As a result, this layer is higher in content of organic matter than the lower horizons. Living organisms decompose, incorporate, and mix organic residue into the soil. Some of the more stable products of decomposition remain as finely divided material that helps to darken the soil and increases the water-holding and cation-exchange capacities and the degree of granulation in the soil. As much as 4 feet of organic matter has accumulated on the surface of some soils in the coastal marsh. Because these soils are continually saturated, aquatic vegetation grows well, producing large amounts of organic matter. This organic matter decomposes slowly and remains in the soils for long periods.

The addition of alluvium and beach deposits on the surface has provided new parent material in some areas of the parish. The soils that formed in these areas generally do not have prominent horizons. For example, Hackberry soils formed in areas characterized by accumulations of sandy beach deposits. These soils have essentially uniform textures throughout and do not have a strongly expressed B horizon.

Processes resulting in the development of soil structure have occurred in most of the soils in the parish. Plant roots and other organisms help to rearrange soil material into secondary aggregates. The decomposition products of organic residue and the secretions of organisms serve as cementing agents that help to stabilize structural aggregates. Alternating periods of wetting and drying and shrinking and swelling contribute to the development of structural aggregates, particularly in soils that have appreciable amounts of clay. Soil structure is typically most pronounced in the surface layer, which contains the most organic matter, and in clayey horizons that are subject to alternating periods of wetting and drying. The saturated state of the soils in marshes and swamps, however, has hindered the structure-forming processes. As a result, these soils are massive.

Most of the soils in the parish are characterized by horizons that have reduced iron and manganese compounds. Reducing conditions prevail for long periods in poorly aerated horizons. Consequently, the relatively soluble reduced forms of iron and manganese predominate over the less soluble oxidized forms. The reduced compounds of these elements result in the gray colors in the Bg and Cg horizons that are characteristic of many of the soils. Appreciable amounts of the more soluble reduced forms of iron and manganese can be removed from the soils or translocated within the soils by water.

Iron and manganese concretions and brown mottles in predominantly gray horizons indicate the segregation and local concentration of oxidizing and reducing conditions in the soils. The well drained and somewhat excessively drained soils do not have the gray color associated with wetness and poor aeration because they are not dominated by a reducing environment.

Another process of soil formation is the loss of elements from the soils. Water moving through the soils has leached soluble bases and free carbonates from at least one horizon in most of the soils in the parish. Most of the mineral soils are less acid with increasing depth.

The formation, translocation, and accumulation of clay have aided in the formation of most of the soils in Cameron Parish. Silicon and aluminum, which are released as a result of the weathering of such minerals as hornblende, amphiboles, and feldspars, can recombine to form secondary clay minerals, such as kaolinite. Secondary accumulations of clay result largely from the translocation of clay from the upper to the lower horizons. As water moves downward, it can carry small amounts of clay in suspension. As the clay is redeposited, it accumulates in the part of the profile where water penetration is deepest or in horizons in which the clay becomes flocculated or is filtered out by fine pores in the soil. Over long periods, these processes can result in distinct horizons of clay accumulation. Most of the soils on the Prairie Terrace (Gulf Coast Prairies) of Cameron Parish have a subsoil characterized by a secondary accumulation of clay.

The secondary accumulation of calcium carbonate in the lower horizons has aided in the formation of some of the soils in the parish. In places Kaplan, Midland, and Morey soils have secondary accumulations of carbonate within a depth of 60 inches. Dissolved carbonates from overlying horizons can be translocated to lower horizons by water. Other processes can result in the accumulation of carbonate. Examples are the segregation of material within a horizon, the upward translocation of material from the lower horizons during periods when the water table fluctuates, and the accumulation of material derived from readily weatherable minerals, such as plagioclase.

Factors of Soil Formation

Soil is a natural, three-dimensional body that formed on the earth's surface. It has properties resulting from the integrated effects of climate and living organisms acting on parent material, as conditioned by relief over periods of time.

The interaction of five main factors influences the processes of soil formation and results in differences among soils. These factors are climate, the physical arrangement and chemical composition of the parent material, the kinds of plants and other organisms living in and on the soil, the relief of the land and its effect on runoff and soil moisture conditions, and the amount of time that has elapsed since soil formation began *(19, 34)*.

The relative effect of any one factor can differ from place to place, but the interaction of all the factors determines the kind of soil that forms. As a result, many of the differences in soils cannot be attributed to differences in only one factor. For example, the content of organic matter in the soils of Cameron Parish is influenced by several factors, including relief, parent material, and living organisms.

Climate

Cameron Parish is in a region characterized by a humid, subtropical climate. A detailed description of the climate in the parish is given under the heading "General Nature of the Survey Area."

The climate is relatively uniform throughout the parish. Local differences among the soils are not the result of great differences in climate. Warm average temperatures and large amounts of precipitation favor the rapid weathering of readily weatherable minerals in the soils. Weathering processes involving the release and reduction of iron and manganese are indicated by gray colors in the Bg or Cg horizon in many of the soils. The oxidation and segregation of these elements resulting from alternating oxidizing and reducing conditions are indicated by mottled horizons and iron and manganese concretions in most of the soils on the Gulf Coast Prairies.

Differences between soils can occur on landscapes of differing ages in part because of climatic variations over thousands of years. On landscapes of comparable ages, differences in the weathering, leaching, and translocation of clay are caused chiefly by variations in time, relief, and parent material rather than by variations in climate.

Living Organisms

The living organisms affecting the processes of soil formation exert a major influence on the kind and extent of horizon development. Plant growth and animal activity physically modify the soils, thereby affecting porosity, tilth, and content of organic matter. Through photosynthesis, plants use energy from the sun to synthesize the compounds necessary for growth. The decomposition of plants returns nutrients to the soils and serves as a major source of organic residue. The decomposition and incorporation of organic matter by micro-organisms improve tilth and generally increase the infiltration rate and available water capacity in the soils.

Relatively stable organic compounds in soils generally have a high cation-exchange capacity and thus improve the ability of the soils to absorb and store nutrients, such as calcium, magnesium, and potassium. The extent of these and other processes and the kind of organic matter produced can vary widely, depending on the kinds of organisms living in and on the soils. For example, the content of organic matter typically is higher in soils that formed under aquatic vegetation than in soils that formed under prairie vegetation *(5, 19)*.

The soils in Cameron Parish formed under three different major groups of native vegetation. Crowley, Judice, Kaplan, Leton, Midland, Morey, Mowata, and Vidrine soils formed under prairie vegetation, predominantly tall grasses, such as big bluestem. Allemands, Bancker, Clovelly, Creole, Ged, Gentilly, Larose, Mermentau, and Scatlake soils formed under aquatic vegetation. Hackberry and Peveto soils formed under short grasses, such as common bermudagrass and common carpetgrass.

The content of organic matter generally is higher in the soils that formed under tall grasses than in the soils that formed under short grasses. None of the soils on the Gulf Coast Prairies or cheniers have large accumulations of organic matter. Most have less than 2 percent in the surface layer, which generally has more organic matter than other parts of the profile. Allemands and Clovelly soils, which formed under aquatic vegetation in the marshes, have 30 to 85 percent and 30 to 60 percent organic matter, by weight, respectively, in the surface layer. The content of organic matter typically is lower in cultivated soils than in similar uncultivated soils. It can vary widely in the cultivated soils, depending on use and management.

The role of vegetation in the leaching of plant nutrients is apparent in nearly all of the soils in the parish. The growing vegetation removes nutrients from the soil horizons and translocates many of them to the parts of the plant above ground. When the plant dies, these nutrients are released on the surface and in the surface layer. They can be absorbed again and used by growing plants. In soils that become highly leached and weathered, this process can influence the quantity and distribution of bases over long periods. For example, base saturation and pH can increase as the depth to less leached and less weathered zones increases.

Differences in the amount of organic matter that has accumulated in and on the soils are influenced by the kind and number of micro-organisms. Using oxygen from the air, aerobic organisms decompose organic matter through rapid oxidation. These organisms are most abundant and prevail for long periods in the better drained and aerated soils, such as Hackberry and Peveto soils. Anaerobic organisms are dominant in the more poorly drained soils for long periods during the year. They do not require oxygen from the air, and they decompose organic residue very slowly. The different rates of decomposition can result in a higher content of organic matter in the poorly drained soils than in the better drained soils.

In most of the poorly drained soils in the parish, burrowing crawfish redistribute some of the organic matter in the profile. Commonly, the organic matter is carried downward in the profile and occurs as coatings on the walls of the burrows.

Relief

The major physiographic features in Cameron Parish are described under the heading "Landforms and Surface Geology." Relief and other physiographic features influence soil formation through their effects on drainage, runoff, erosion, deposition, and exposure to sunlight and the wind.

Most of the soils in Cameron Parish are level or nearly level. Therefore, the influence of relief on the soils has not been of great significance. Subtle changes in surface elevation and in the shape of slopes, however, influence some soil factors, such as runoff, drainage, and depth to and duration of a seasonal high water table. For example, the somewhat poorly drained Crowley soils have a slightly convex slope and are at a slightly higher elevation than the poorly drained, level Mowata soils.The seasonal high water table is slightly farther from the surface in the Crowley soils than in the Mowata soils. Reddish mottles in the upper part of the subsoil in the Crowley soils indicate that this part of the profile is above the water table long enough for oxidation to occur.

Parent Material and Time

Parent material is the unconsolidated mass in which soil forms. Its effects are particularly expressed as differences in soil color, texture, permeability, and degree of leaching. Parent material also has a major influence on the mineralogy of the soils and is a significant factor in determining the susceptibility of the soils to erosion.

Parent material and time are independent factors of soil formation. The parent material is exposed to the processes of soil formation for periods ranging from a few years to more than a million years. The length of time influences the kinds of soil horizons and their degree of expression. Long periods are generally required for the formation of prominent horizons. The possible differences in the length of time that the processes of soil formation have been active amount to several thousand years for some of the soils in Cameron Parish.

The soils in the parish formed in various kinds of parent material ranging in age from the most recent deposits along beaches and in marshes to the Pleistocene sediments that form the core of the Gulf Coast Prairies. The characteristics, distribution, and depositional pattern of the different kinds of parent material are described in detail under the heading "Landforms and Surface Geology."

Landforms and Surface Geology

Saul Aronow, Department of Geology, Lamar University, helped prepare this section.

Cameron Parish, which is in southwestern Louisiana, is in the West Gulf Coastal Plain geomorphic province *(18)*. The surface sediments dip gently toward the Gulf of Mexico and are of late Pleistocene to Holocene (Recent) age. They are underlain by Tertiary rocks to a depth of thousands of feet *(6, 17, 29)*.

Salt domes, which are thin spires of salt rising from depths of several thousand feet, are the source of some of the elevations and features of the topographic surface *(16)*. An example of a conspicuous dome feature is the Hackberry Dome. This dome is outlined by Crowley and Vidrine soils on the detailed soil map. It has a local relief of at least 10 feet.

Cheniers also are conspicuous topographic features. Most are relict Holocene beach ridges, which are evident along the shoreline of the Gulf of Mexico. They are in areas of the east-west trending Mermentau-Hackberry general soil map unit.

The surface geology of the parish has been depicted on small-scale maps *(6, 33, 42)* derived or adapted from earlier maps prepared by H.N. Fisk *(12)*. The "Geologic Map of Louisiana" *(31)*, which also is on a small scale (1:500,000), correlates well with the soils shown on the detailed soil maps in this survey.

The soil series and detailed soil map units in the parish are based on a variety of factors, including the kind of sediments or parent material, the depositional topography associated with the sediments, and the subsequent gradual obliteration of the depositional topography. The developing soils respond to these factors under long-term changes in climate, plant cover, and depth to the water table.

The principal surface geologic units in Cameron Parish are divided into two categories based on age and geomorphic expression. From older to younger, these are the Pleistocene and Holocene sequences. The Pleistocene sequence includes the Prairie Formation or Terrace, and the Holocene sequence includes the Recent alluvium on the Chenier Plain.

Pleistocene Sequence

The oldest surface deposits in Cameron Parish are of late Pleistocene age. The Prairie Formation is a Pleistocene coastwise, fluvial-deltaic terrace. Because this terrace formation was deposited under various fluvial conditions, describing a typical depositional sequence is difficult. The composition of the terrace ranges from the coarsest sediments near the base, through sands and silts, to clayey deposits near the surface. The deposits consist of relatively thin strata or lenses of varying horizontal extent. Few, if any, individual lenses are horizontally continuous.

The deposition of Pleistocene formation and Holocene alluvium was controlled by changes in the sea level caused by several advances and retreats of continental glaciers. During advances of the glaciers, water was removed from the oceans and returned to land as snow, causing the sea level to drop about 250 to 300 feet. Streams that drained into the oceans graded to a new sea level, lowered their valleys, and extended across continental shelves that are now concealed. Between the major glaciations, the sea level rose to a level similar to that of the present. Previously enlarged valleys were alluviated, and the lower reaches of the streams were submerged *(10, 13, 33)*. The Pleistocene formation in Cameron Parish is possibly the product of the interglacial periods of high sea level.

During the cyclic changes in sea level, the whole gulf coast tilted progressively seaward, continuing the general subsidence of the gulf, which started more than 70 million years earlier. Subsidence of the continental shelf is caused by the accumulating load of sediments from the Mississippi River. Preserved depositional surfaces of the older formations have been subject to successive tilting and have progressively greater slopes than surfaces of the younger formations.

The Prairie Formation or Terrace is in areas of the Mowata-Vidrine-Crowley, Morey-Mowata-Midland, Morey-Midland, and Kaplan-Midland-Morey general soil map units. To the south, the terrace is overlapped by Holocene marsh deposits.

The Prairie Formation is fluviatile to deltaic in origin *(12, 22)*. Most radiocarbon dates on the Prairie Formation are older than 40,000 years, possibly falling within a high sea level episode of the Wisconsin Glaciation. Following the deposition of the Prairie Formation, the sea level dropped, the major local streams widened and deepened their channels, and the fluviatile portions of the Prairie Formation acquired their raised or terrace positions. The subsequent Holocene alluvium, which is mainly in areas of the Ged general soil map unit and in some areas of the Allemands general soil map unit, was deposited in the deeper channels.

The Prairie Formation has relict traces of large meandering stream channels, levee ridges, and large interstream areas. These patterns range in degree of preservation from well defined meander loops to fragments of channels and detached, discontinuous loops. Ged, Judice, Leton, and Midland soils generally are in the relict channels. Morey and Mowata soils are in the large interstream areas. Crowley, Kaplan, and Vidrine soils are in the higher interstream areas or on natural levee ridges. The variations in degree of preservation result partly from the burial of previously functioning channels by flood basin or overbank deposits and later by the incisions made during and since the last great lowering of the sea level between 22,000 and 15,000 years ago *(4)*.

Pimple mounds are small, round or elliptical knolls 30 to 150 feet in diameter and 2 to 6 feet high. They are generally in the flatter areas. Vidrine soils, which are loamy in the upper part and clayey in the lower part, are on the mounds. The mounds could have originated as residual patches left after sheet flood erosion or deflation of the surface by the wind *(8, 14)*; as the accumulation of wind-transported sand, silt, or clay chips around clumps of vegetation *(8, 30)*; as eolian accumulations started by, or later topographically enhanced by, erosion processes; or as a result of the "fluffing up" or lowering of the bulk density in the A and B horizons by the burrowing activities of animals, with possible eolian increments *(9)*.

Holocene Sequence

The major events in the development of the Chenier Plain in southwestern Louisiana can be determined because of studies of the surface features and underlying Recent sediments of the plain. A chronological framework for these events has been determined through radiocarbon dating of surface and subsurface samples *(15)*.

The wedge of Recent sediments indicates the final stage in the postglacial rise of the sea level and the subsequent stillstand at the present elevation. The basal part of the wedge consists of transgressive brackish water and marine deposits that were laid down on the underlying Pleistocene surface as the sea rose from -17 feet 5,600 years ago to its present level about 3,000 years ago. Coincident with or shortly before reaching this level, the longshore influx of sediments, chiefly from the Mississippi River, brought about a general outbuilding of the coast. In the western part of the area, the coastal deposits near the surface rest on a seaward-thickening accumulation of gulf-bottom sediments that form the upper part of the sedimentary wedge. During periods when the supply of sediments was abundant, the shore moved rapidly seaward through the accumulation of marsh-capped mudflat deposits. During periods when the influx of sediments was slight, waves slowed or halted the advance and locally brought about a retreat of the shore. During these periods the beach ridges, or cheniers, which now stand as relict "islands" in the marsh, formed *(15)*. Ranging in age from 2,800 to less than 300 years, these ridges indicate progressive changes in the configuration of the shoreline as it advanced seaward more than 10 miles to its present position *(15, 32)*.

Relation to Mississippi River Discharge

The Chenier Plain is made up of sediments deposited chiefly by the Mississippi River. The alternations of coastal outbuilding and relative stability reflect changes in the supply of sediments from this source. These changes have resulted from widespread lateral shifts in the position of the mouth of the river during the formation of the Mississippi deltaic plain to the east. Periods of rapid progradation resulted when the river discharged into the western part of the plain, while intervals of coastal stability and local retreat followed shifts in discharge to more easterly positions. Through analysis of available dated samples from the Mississippi delta area *(24)*, the major events in the formation of the Chenier Plain can be related to specific courses and associated subdeltas on the deltaic plain *(15)*.

According to dated samples, the initial outbuilding of the marshes north of the earliest formed shoreline was brought about by the rapid influx of sediments from the Teche subdelta, which developed in the western part of the deltaic plain 3,800 to 2,800 years ago. With the shift from the Teche course to the St. Bernard subdelta on the opposite side of the plain, progradation was brought to a halt and the 2,800-year shoreline formed along a trend that includes Little Pecan Island, Little Chenier, High Island, and possibly Junius Ridge *(15)*.

The main discharge remained in the St. Bernard area until at least 2,200 years ago, but its position during the following interval, from 2,200 to about 1,200 years ago, has not been fully established. Physiographic and archaeological evidence suggests that the river may have discharged during at least part of the interval through the Bayou Barataria system about 30 miles west of the present mouth of the river, thus permitting moderate amounts of sediments from the Mississippi to be swept westward *(11, 25, 42)*.

On the Chenier Plain, the interval from 2,800 to 1,200 years ago is represented by a series of alternating marshes and chenier complexes culminating in the 1,100- to 1,250-year shoreline. This shoreline can be traced with only minor interruptions for more than 50 miles from the Calcasieu River to an area about 10 miles east of White Lake along the Oak Grove-Grand Chenier-Pecan Island trend. The marked coastal stability reflected by this shore suggests that the main discharge of the river at this stage was still on the eastern side of the deltaic plain and that the flow of sediments to the west was greatly diminished *(15)*.

Dates from the deltaic plain suggest that beginning about 1,200 years ago, the main outlet of the Mississippi shifted to the Lafourche subdelta midway between the modern mouth of the river and the eastern end of the Chenier Plain. During the ensuing period, from 1,200 to 600 years ago, discharge from the Lafourche Mississippi, supplemented perhaps by flow from the Plaquemines-Modern system, which had then become established, brought a tremendous influx of sediments to the west. During this period the wide belt of marshes that now form the shore in the eastern part of the plain southwest of White Lake developed *(15)*.

The general stability of the shore during the past 600 years indicates abandonment of the Lafourche delta and a shift of the main discharge to the modern Mississippi, which has subsequently built the modern bird-foot delta into deep water, forming the extreme southeast part of the deltaic plain. Appreciable progradation of the Chenier Plain has occurred only in local areas at the mouths of Sabine Pass and the Calcasieu River during the past 600 years *(28)*.

A very rapid coastal progradation is occurring in the Vermilion Bay area as a direct result of increased discharge of the Atchafalaya River, which enters the gulf to the east *(28)*. This river, which is the main distributary of the Mississippi north of Head of Passes, has in recent years diverted progressively larger quantities of both water and sediments from the main channel of the Mississippi, until today the Atchafalaya carries approximately 30 percent of the total Mississippi River flow *(38)*. Sand transported by the Atchafalaya is deposited chiefly in lakes along its course, whereas silt and clay are carried into the gulf, are swept westward by longshore currents, and are deposited as mudflats. The rate of coastal advance in this area is presently accelerating. This shift of appreciable Mississippi River discharge through the Atchafalaya distributary to the western part of the deltaic plain clearly demonstrates the role of the Mississippi in the development of the Chenier Plain.

Development of Cheniers

Detailed stratigraphy and nearby surface features indicate the several stages and methods of chenier development. In the vicinity of local embayments, cheniers may originate as barrier islands or as land-tied spits, which project as gently curving arcs into the bay opening. As bay filling and coastal progradation proceed, secondary spits with little curvature form farther into the bay, developing the bifurcating pattern typical of relict shorelines of the Chenier Plain. Along straight or gently curving coasts, cheniers have developed as elongated beaches, frequently diverging in trend as the sites of beach and mudflat deposition shift laterally along the shore. Locally, where the coast has remained stable for considerable periods, accretionary ridges form directly seaward of the first ridge. Examples of these compound cheniers are Creole Ridge and Oak Grove Ridge. Finally, incipient cheniers develop sporadically along exposed mudflat coasts. These small ridges consist of sand and shells excavated from the bottom of the gulf and piled back on the marsh during brief storms *(15)*.

Except for the small incipient ridges, cheniers generally rest on shallow gulf-bottom shoreface deposits. They extend over the adjacent marsh only on the landward side. The stratigraphy shows that in large part they developed as accretionary ridges along relatively stable segments of the shore. Development began directly seaward of previously formed mudflats through shoaling of the water by accumulation of the gulf-bottom shoreface deposits upon which the basal beds of the cheniers rest. Once established, the cheniers continued to develop slowly seaward through the addition of sand and shells on their front slopes. The sand and shells were deposited on the adjoining mudflats and marshes on the landward side of the cheniers only during stormy periods when waves overrode or breached the ridges. This deposition accounts for the irregular landward margin of the cheniers *(27)*.

Beach ridges commonly form directly downcurrent from actively eroding marsh headlands. This formation is exemplified by the modern beach in the vicinity of the Mermentau River. Active erosion of the broad marsh headland extending eastward from this beach to an area directly south of White Lake is demonstrated not only by the truncation of lakes and tidal inlets but also by the retreat of the shore *(26)*. Apparently, sand derived from this source has been carried by longshore currents and deposited on the Mermentau beach directly downcurrent, while the finer silt and clay particles have been swept farther downcoast and deposited as expanding mudflats, which extend westward to the mouth of the Calcasieu River.

Examples of other chenier systems that have resulted at least in part from upcurrent erosion of prominent headlands are Mulberry Island and the Cypress Point-Coupe Ridge systems. Both of these are related to truncation of older Mississippi subdeltas to the east, which in the past apparently projected far seaward of their present positions *(42)*. The closely spaced cheniers to the north of the 1,100-year shoreline west of White Lake may be related to erosion of a marsh promontory, which was south of the lake prior to the formation of the 1,100-year shoreline *(15)*.

Transgressive Stage

The final stage in the postglacial rise in sea level, beginning when the sea stood about 30 feet lower than the present level, is clearly reflected in the facies and environments represented in the basal part of the Recent sedimentary wedge along a north-south line extending from Gibbstown into the gulf. The early part of the stage is marked by a thin layer of transgressive organic-clay and peat deposits that rest unconformably on the oxidized and entrenched surface of the Prairie Formation. These sediments were deposited first in estuaries and later in shallow bays and marshes as the sea spread across intervalley divides of the surface of the Prairie Formation.

The continued rise in sea level to within at least 2 feet of the present level is indicated by a strand deposit on the surface of the Prairie Formation about 1,000 feet south of where the formation crops out and by the progressive onlap of a seaward-thickening wedge of gulf-bottom sands and silty clays above the basal marsh and bay sequence. This wedge of open-gulf sediments extended inland to an area only 3,000 feet short of where the Prairie Formation crops out.

Details of the final rise of the sea to its present level are obscured by the rapid accumulation of brackish bay and marsh deposits that unconformably overlie the gulf-bottom sediments to the north. The possibility that these deposits began to prograde the coast while the sea was still rising is suggested by a gentle rise in the base of the marsh sequence southward from where the Prairie Formation crops out to an area in the vicinity of Little Chenier and High Island.

Progradational Stage

With the onset of the progradational stage, the area north of Little Chenier and High Island was converted from an open-gulf environment to a partially closed bay, as is demonstrated by the sequence of bay sediments that directly overlie the open-gulf deposits in this area. Embayment was evidently brought about by the development of Little Chenier, which formed as a spit extending westward into the area, and by the development of High Island as a barrier to the west.

South of High Island, the stratigraphy indicates a general outbuilding of the coast upon a seaward-thickening wedge of gulf-bottom sediments laid down in advance of the prograding shore. Although the overall pattern is one of progradation, details of the stratigraphy reflect a complicated series of shoreline advances interrupted by periods of stability and in places by retreat of the coast. The alternations in coastal outbuilding indicate changes in the supply of sediments, chiefly Mississippi River sediments, carried into the area by longshore currents *(38)*.

The intervals of rapid coastal advance are marked by marsh-capped tidal-flat and shallow gulf-bottom deposits, which project seaward from each previously formed chenier. The intervals of discontinuous and less rapid advance are indicated by closely spaced beach ridges, such as those of Creole Ridge. Except for their close spacing, these ridges are similar to the cheniers that developed during periods of relative coastal stability.

The smaller incipient ridges, such as those between Creole Ridge and Oak Grove Ridge, represent only brief periods of stability or minor retreat when sand and shells from the gulf bottom were piled back on the previously formed tidal-flat deposits. In contrast, the larger cheniers, such as Oak Grove Ridge and the modern beach, represent appreciably longer intervals of coastal stability. These periods are reflected not only in the ridges but also in the distinctive gulf-bottom foreshore deposits underlying and extending seaward from each ridge front. The many thin layers and lenses of sand, the abundance of shells, and the worn condition of the shells indicate that these deposits were laid down under the influence of strong wave and current action. The sand in these deposits and in the adjacent beach ridges probably was derived not only from winnowing of previously formed tidal-flat deposits and offshore gulf-bottom mud but also from longshore currents.

As each ridge developed upward, the increased load compacted the underlying strata, thereby allowing the basal part of the ridge to settle below its depositional level. The salt marsh capping the tidal-flat deposits behind each developing ridge gave way to the development of brackish and freshwater marshes, which currently make up large areas between the ridges.

The marsh south of High Island lies at or near modern sea level. This fact indicates that the sea has been maintained at its present level during the entire period of coastal progradation, starting with the formation of the earliest chenier.

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Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bottom land. The normal flood plain of a stream, subject to flooding.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil. Sand or loamy sand.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

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.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

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 fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Excess salt (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Fast intake (in tables). The movement of water into the soil is rapid.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, or clay.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluidity, soil. Soils that are saturated much of the time are likely to have a very low bearing capacity when wet. They behave like fluids and flow under pressure. This kind of yielding is called fluidity. Two classes of fluidity commonly are recognized:

Slightly fluid.—When a sample is squeezed in the hand, some material tends to flow between the fingers. After full pressure is applied, however, most of the residue is left in the hand.

Very fluid.—When a sample is squeezed in the hand, soil material flows easily between the fingers. After full pressure is applied, little residue is left in the hand.

Forb. Any herbaceous plant that is not a grass or a sedge.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or

E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

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 plants that are the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material. This contrasts with percolation, which is movement of water through soil layers or material.

Infiltration 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

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, invader plants follow disturbance of the surface.

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.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

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. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor on the basis of how much the present plant community has departed from the potential.

Rangeland. Land on which the potential 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 natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil. A measure of the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs the growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Seepage (in tables). The movement of water through the soil adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

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.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Subsurface layer. Generally, the layer directly below the surface layer. It can be an A horizon, an E horizon, or both.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). An otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, such as zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Water leveling. A method of smoothing or leveling fields that are to be planted to rice. The fields are flooded to a shallow depth by irrigation water. The surface is then scraped and stirred up so that a soil-water suspension is created. After the soil particles settle out of the suspension, the surface is smooth.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1962-77 at Lake Charles, Louisiana)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	60.2	41.9	51.1	78	19	164	4.42	1.79	6.55	6	0.3
February----	64.0	43.6	53.9	80	27	170	3.06	1.55	4.29	5	.0
March-------	70.4	50.7	60.6	84	32	345	2.77	.96	4.20	5	.0
April-------	78.2	59.7	69.0	87	41	570	4.10	1.18	6.45	5	.0
May---------	83.7	65.6	74.7	91	52	766	5.00	2.01	7.42	6	.0
June--------	89.0	71.3	80.1	96	60	903	4.20	1.80	6.14	6	.0
July--------	90.7	73.4	82.1	97	66	995	4.44	1.66	6.66	7	.0
August------	90.4	72.8	81.6	96	64	980	5.80	2.36	8.58	8	.0
September---	87.0	69.0	78.0	94	53	840	5.31	2.35	7.70	6	.0
October-----	80.5	58.0	69.3	91	41	598	4.06	.88	6.58	4	.0
November----	70.8	49.4	60.1	86	29	327	3.62	1.14	5.59	5	.0
December----	63.4	44.1	53.8	80	24	180	5.60	3.31	7.64	6	.0
Yearly:											
Average---	77.4	58.3	67.9	---	---	---	---	---	---	---	---
Extreme---	---	---	---	98	19	---	---	---	---	---	---
Total-----	---	---	---	---	---	6,838	52.38	43.02	61.27	69	.3

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1962-77 at Lake Charles, Louisiana)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Jan. 25	Feb. 21	Mar. 10
2 years in 10 later than--	Jan. 19	Feb. 13	Mar. 3
5 years in 10 later than--	Jan. 5	Jan. 27	Feb. 18
First freezing temperature in fall:			
1 year in 10 earlier than--	Dec. 12	Nov. 27	Nov. 11
2 years in 10 earlier than--	Dec. 21	Dec. 8	Nov. 18
5 years in 10 earlier than--	Jan. 11	Dec. 29	Dec. 2

TABLE 3.--GROWING SEASON

(Recorded in the period 1962-77 at Lake Charles, Louisiana)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	333	304	259
8 years in 10	350	311	269
5 years in 10	>365	327	286
2 years in 10	>365	>365	304
1 year in 10	>365	>365	313

TABLE 4.--SUITABILITY AND LIMITATIONS OF GENERAL SOIL MAP UNITS FOR MAJOR LAND USES

Map unit	Percent of area	Cultivated crops	Pasture	Urban uses
Mowata-Vidrine-Crowley	5	Moderately well suited: wetness, medium fertility.	Well suited	Poorly suited: wetness, shrink-swell potential, very slow or slow permeability, flooding.
Morey-Mowata	3	Moderately well suited: wetness, medium fertility.	Well suited	Poorly suited: wetness, flooding, slow or very slow permeability, shrink-swell potential.
Morey-Midland	2	Moderately well suited: wetness, medium fertility.	Well suited	Poorly suited: wetness, flooding, slow or very slow permeability, shrink-swell potential.
Kaplan-Midland-Morey	2	Well suited	Well suited	Poorly suited: wetness, flooding, slow or very slow permeability, shrink-swell potential.
Ged	4	Not suited: flooding, ponding.	Not suited: flooding, ponding.	Not suited: flooding, ponding, low load-supporting capacity.
Gentilly-Ged	7	Not suited: flooding, ponding, salinity, low load-supporting capacity.	Not suited: flooding, ponding. salinity, low load-supporting capacity.	Not suited: flooding, ponding, low load-supporting capacity.
Creole	12	Not suited: flooding, ponding, salinity.	Not suited: flooding, ponding. salinity.	Not suited: flooding, ponding, low load-supporting capacity.
Larose	5	Not suited: flooding, ponding, low load-supporting capacity.	Not suited: flooding, ponding, low load-supporting capacity.	Not suited: flooding, ponding, low load-supporting capacity.
Bancker	17	Not suited: flooding, ponding, salinity, low load-supporting capacity.	Not suited: flooding, ponding, low load-supporting capacity, salinity.	Not suited: flooding, ponding, low load-supporting capacity.

TABLE 4.--SUITABILITY AND LIMITATIONS OF GENERAL SOIL MAP UNITS FOR MAJOR LAND USES--Continued

Map unit	Percent of area	Cultivated crops	Pasture	Urban uses
Scatlake	8	Not suited: flooding, ponding, salinity, low load-supporting capacity.	Not suited: flooding, ponding, salinity, low load-supporting capacity.	Not suited: flooding, ponding, low load-supporting capacity.
Allemands	18	Not suited: flooding, ponding, low load-supporting capacity.	Not suited: flooding, ponding, salinity, low load-supporting capacity.	Not suited: flooding, ponding, low load-supporting capacity.
Clovelly	9	Not suited: flooding, ponding, salinity, low load-supporting capacity.	Not suited: flooding, ponding, salinity, low load-supporting capacity.	Not suited: flooding, ponding, low load-supporting capacity.
Mermentau-Hackberry	6	Not suited: flooding, wetness, salinity.	Poorly suited: flooding, wetness, salinity.	Poorly suited: flooding, very slow permeability.
Udifluvents-Aquents	2	Not suited: flooding, wetness, slope, salinity, uneven surface.	Poorly suited: flooding, wetness, salinity, slope.	Poorly suited: flooding, wetness, very high shrink-swell potential, slope.

TABLE 5.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AE	Allemands muck	150,546	12.5
AN	Aquents, frequently flooded	7,321	0.6
BA	Bancker muck	139,838	11.7
Be	Beaches, coastal	2,581	0.2
CO	Clovelly muck	78,286	6.5
CR	Creole mucky clay	106,060	8.8
Cw	Crowley-Vidrine silt loams	14,525	1.2
GB	Ged mucky clay	47,433	3.9
GC	Gentilly muck	37,438	3.1
Hb	Hackberry loamy fine sand	3,953	0.3
Hm	Hackberry-Mermentau complex, gently undulating	23,207	1.9
Ju	Judice silty clay	4,969	0.4
Kd	Kaplan silt loam	7,572	0.6
LE	Larose muck	42,728	3.6
Lt	Leton silt loam	1,188	0.1
ME	Mermentau clay	24,383	2.0
Mn	Midland silty clay loam	12,886	1.1
Mr	Morey silt loam	34,651	2.9
Mt	Mowata-Vidrine silt loams	27,382	2.3
Pe	Peveto fine sand, 1 to 3 percent slopes	1,419	0.1
SC	Scatlake mucky clay	71,015	5.9
UD	Udifluvents, 1 to 20 percent slopes	8,884	0.7
	Small water areas	849	0.1
	Large water areas	354,924	29.5
	Total	1,204,038	100.0

TABLE 6.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland)

Map symbol	Soil name
Cw	Crowley-Vidrine silt loams
Hb	Hackberry loamy fine sand
Ju	Judice silty clay
Kd	Kaplan silt loam
Lt	Leton silt loam
Mn	Midland silty clay loam
Mr	Morey silt loam
Mt	Mowata-Vidrine silt loams

TABLE 7.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Map symbol and soil name	Land capability	Rice	Soybeans	Grain sorghum	Common bermudagrass	Improved bermudagrass
		Bu	Bu	Bu	AUM*	AUM*
AE------------------------ Allemands	VIIIw	---	---	---	---	---
AN**---------------------- Aquents	VIIw	---	---	---	---	---
BA------------------------ Bancker	VIIIw	---	---	---	---	---
Be**---------------------- Beaches	VIIw	---	---	---	---	---
CO------------------------ Clovelly	VIIIw	---	---	---	---	---
CR------------------------ Creole	VIIw	---	---	---	---	---
Cw**---------------------- Crowley-Vidrine	IIIw	115	30	80	5.5	10.0
GB------------------------ Ged	VIIw	---	---	---	---	---
GC------------------------ Gentilly	VIIw	---	---	---	---	---
Hb------------------------ Hackberry	IIIw	---	---	---	7.0	11.0
Hm**:						
Hackberry----------------	IIw	---	---	---	5.0	8.0
Mermentau----------------	VIIw	---	---	---	---	---
Ju------------------------ Judice	IIIw	119	35	---	6.5	---
Kd------------------------ Kaplan	IIIw	---	---	---	7.0	10.5
LE------------------------ Larose	VIIw	---	---	---	---	---
Lt------------------------ Leton	IIIw	115	25	---	6.5	---
ME------------------------ Mermentau	VIIw	---	---	---	---	---
Mn------------------------ Midland	IIIw	115	30	---	6.5	---
Mr------------------------ Morey	IIIw	115	35	75	8.0	10.0
Mt**---------------------- Mowata-Vidrine	IIIw	115	30	70	5.8	---

See footnotes at end of table.

TABLE 7.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Rice	Soybeans	Grain sorghum	Common bermudagrass	Improved bermudagrass
		Bu	Bu	Bu	AUM*	AUM*
Pe------------------------ Peveto	IIIs	---	---	---	5.5	8.0
SC------------------------ Scatlake	VIIIw	---	---	---	---	---
UD**---------------------- Udifluvents	VIe	---	---	---	---	---

* 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.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--CAPABILITY CLASSES AND SUBCLASSES

(Absence of an entry indicates no acreage)

Class	Total acreage	Major management concerns (Subclass)			
		Erosion (e)	Wetness (w)	Soil problem (s)	Climate (c)
		Acres	Acres	Acres	Acres
I	---	---	---	---	---
II	13,924	---	13,924	---	---
III	108,545	---	107,126	1,419	---
IV	---	---	---	---	---
V	---	---	---	---	---
VI	8,884	8,884	---	---	---
VII	277,227	---	277,227	---	---
VIII	439,685	---	439,685	---	---

TABLE 9.--NATIVE PLANTS ON SELECTED SOILS IN AREAS OF MARSH

Soil series	Type of marsh	Scientific name	Common name
Scatlake	Saline	Batis maritima	*Saltwort
		Borrichia frutescens	*Bushy seaoxeye
		Croton punctatus	Gulf croton
		Distichlis spicata	*Seashore saltgrass
		Iva frutescens	Bigleaf sumpweed
		Juncus roemeranus	*Needlegrass rush
		Salicornia virginica	Virginia samphire
		Spartina alterniflora	*Smooth cordgrass
		Spartina patens	*Marshhay cordgrass
Bancker, Clovelly, Creole, Gentilly, Mermentau	Brackish	Amaranthus cuspidata	Southern waterhemp
		Aster tenuifolius	Saline aster
		Bacopa monnieri	*Coastal waterhyssop
		Cyperus odoratus	Fragrant flatsedge
		Distichlis spicata	*Seashore saltgrass
		Echinochloa walteri	Coast cockspur
		Eleocharis parvula	*Dwarf spikerush
		Eleocharis sp.	Spikesedge
		Hibiscus lasiocarpus	Wooly rosemallow
		Ipomoea sagittata	*Saltmarsh morningglory
		Kosteletzkya virginica	Virginia saltmarsh mallow
		Leptochloa fascicularis	Bearded sprangletop
		Lythrum lineare	Wand lythrum
		Paspalum lividum	*Longtom
		Paspalum vaginatum	*Seashore paspalum
		Phragmites communis (australis)	*Common reed
		Pluchea camphorata	Camphor pluchea
		Potamogeton pectinatus	Sago pondweed
		Ruppia maritima	Widgeongrass
		Scirpus olneyi	*Olney bulrush
		Scirpus robustus	Saltmarsh bulrush
		Spartina cynosuroides	*Big cordgrass
		Spartina patens	*Marshhay cordgrass
		Spartina spartinae	*Gulf cordgrass
		Vigna luteola	Hairypod cowpea
Allemonds, Ged, Larose	Freshwater	Alternanthera philoxeroides	*Alligatorweed
		Andropogon glomeratus	Bushy bluestem
		Axonopus affinis	Common carpetgrass
		Baccharis halimifolia	Eastern baccharis
		Bacopa caroliniana	Carolina waterhyssop
		Bidens laevis	Smooth beggartick
		Carex sp.	Sedge
		Cerotophyllum demersum	Coontail
		Cladium jamaicense	Jamaica sawgrass
		Colocasia antiquorum	Elephant ears
		Cynodon dactylon	Common bermudagrass
		Daubentonia punicea	Rattlebox
		Dichromena colorata	Starrush whitetop (white-topped sedge)
		Echinochloa crusgalli	Barnyardgrass
		Echinochloa walteri	Walters millet (coast cockspur)
		Eclipta alba	Eclipta
		Eichhornia crassipes	Water hyacinth
		Eleocharis quadrangulata	Squarestem spikesedge

See footnote at end of table.

TABLE 9.--NATIVE PLANTS ON SELECTED SOILS IN AREAS OF MARSH--Continued

Soil series	Type of marsh	Scientific name	Common name
	Freshwater--continued	Hydrocotyle ranunculoides	Floating pennywort
		Hymenocallis liriosme	Spiderlily
		Hypericum virginicum	Virginia St Johnswort
		Iva ciliata	Seacoast sumpweed
		Iva frutescens	Bigleaf sumpweed
		Juncus effusus	*Common rush
		Leersia oryzoides	Rice cutgrass
		Lemna minor	Common duckweed
		Leptochloa filiformis	Red sprangletop
		Ludwigia repens	Water primrose
		Magnolia virginiana	Sweetbay
		Mimosa strigillosa	Sensitive brier
		Najas guadalupensis	Southern waternymph
		Nuphar advena	Spatterdock cowlily
		Nymphaea odorata	American waterlily
		Panicum hemitomon	*Maidencane
		Panicum virgatum	*Switchgrass
		Panicum sp.	Panicgrass
		Paspalum lividum	Longtom
		Polygonum	*Smartweed
		Pontederia cordata	*Pickerelweed
		Phragmites communis (australis)	*Common reed
		Sacciolepis striata	American cupscale
		Sagittaria lancifolia	*Bulltongue
		Sagittaria platyphylla	Delta arrowhead
		Sagittaria sp.	Arrowhead
		Saururus cernuus	Lizards tail
		Scirpus californicus	*California bulrush
		Scirpus validus	Softstem bulrush
		Sesbania exaltata	Hemp sesbania
		Setaria magna	Giant bristlegrass
		Solidago	Goldenrod
		Sphenoclea zeylanica	Gooseweed
		Tripsacum dactyloides	*Eastern gamagrass
		Typha sp.	*Cattail
		Zizaniopsis miliacea	Southern wildrice or giant cutgrass

* The most common plants in the type of marsh.

TABLE 10.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AE------------------- Allemands	Severe: flooding, ponding, percs slowly.	Severe: ponding, excess humus, percs slowly.	Severe: flooding, excess humus, ponding.	Severe: ponding, excess humus.	Severe: flooding, ponding, excess humus.
AN*. Aquents					
BA------------------- Bancker	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly, excess humus.	Severe: wetness, flooding, excess humus.	Severe: wetness, excess humus.	Severe: wetness, flooding, excess humus.
Be* Beaches					
CO------------------- Clovelly	Severe: flooding, ponding, percs slowly.	Severe: ponding, excess humus, percs slowly.	Severe: flooding, excess humus, ponding.	Severe: ponding, excess humus.	Severe: flooding, ponding, excess humus.
CR------------------- Creole	Severe: flooding, ponding, percs slowly.	Severe: ponding, too clayey, excess salt.	Severe: too clayey, ponding, flooding.	Severe: ponding, too clayey.	Severe: excess salt, ponding, flooding.
Cw*:					
Crowley--------------	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
Vidrine--------------	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
GB------------------- Ged	Severe: flooding, ponding, percs slowly.	Severe: ponding, too clayey, percs slowly.	Severe: too clayey, ponding, flooding.	Severe: ponding, too clayey.	Severe: ponding, flooding, too clayey.
GC------------------- Gentilly	Severe: flooding, ponding, percs slowly.	Severe: ponding, excess humus, percs slowly.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: ponding, flooding, excess humus.
Hb------------------- Hackberry	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
Hm*:					
Hackberry------------	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, droughty.

See footnote at end of table.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Hm*:					
Mermentau	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, excess salt.	Severe: too clayey, wetness, flooding.	Severe: wetness, too clayey.	Severe: excess salt, wetness, flooding.
Ju: Judice	Severe: wetness, percs slowly, flooding.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness, percs slowly.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
Kd: Kaplan	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
LE: Larose	Severe: flooding, ponding, percs slowly.	Severe: ponding, excess humus, percs slowly.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: flooding, ponding, excess humus.
Lt: Leton	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
ME: Mermentau	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, excess salt.	Severe: too clayey, wetness, flooding.	Severe: wetness, too clayey.	Severe: excess salt, wetness, flooding.
Mn: Midland	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
Mr: Morey	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Mt*:					
Mowata	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
Vidrine	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Pe: Peveto	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
SC: Scatlake	Severe: flooding, ponding, percs slowly.	Severe: ponding, too clayey, excess humus.	Severe: excess humus, ponding, too clayey.	Severe: ponding, too clayey, excess humus.	Severe: excess salt, ponding, flooding.
UD*. Udifluvents					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Wetland wildlife	Rangeland wildlife
AE----------------- Allemands	Very poor.	Very poor.	Very poor.	Very poor.	---	---	Good	Very poor.	Very poor.	Good	Very poor.
AN*. Aquents											
BA----------------- Bancker	Very poor.	Very poor.	Very poor.	Very poor.	---	---	Good	Good	Very poor.	Good	Very poor.
Be*. Beaches											
CO----------------- Clovelly	Very poor.	Very poor.	Very poor.	Very poor.	---	---	Good	Good	Very poor.	Good	Very poor.
CR----------------- Creole	Very poor.	Very poor.	Very poor.	---	---	Poor	Good	Good	Very poor.	Good	Poor.
Cw*:											
Crowley-----------	Fair	Fair	Fair	Fair	Fair	Good	Good	Good	Fair	Good	---
Vidrine-----------	Fair	Good	Good	Good	Good	Good	Fair	Fair	Good	Fair	---
GB----------------- Ged	Very poor.	Very poor.	Poor	Very poor.	---	Poor	Good	Fair	Very poor.	Good	Fair.
GC----------------- Gentilly	Very poor.	Very poor.	Very poor.	Very poor.	---	---	Good	Fair	Very poor.	Good	Very poor.
Hb----------------- Hackberry	Good	Good	Good	Fair	Poor	Fair	Poor	Very poor.	Good	Poor	Fair.
Hm*:											
Hackberry---------	Good	Good	Good	Fair	Poor	Fair	Poor	Very poor.	Good	Poor	Fair.
Mermentau---------	Very poor.	Poor	Fair	---	---	Fair	Fair	Fair	Very poor.	Fair	Fair.
Ju----------------- Judice	Fair	Fair	Fair	Good	---	Good	Good	Good	Poor	Good	---
Kd----------------- Kaplan	Good	Good	Good	Fair	---	Fair	Poor	Very poor.	Good	Poor	Fair.
LE----------------- Larose	Very poor.	Very poor.	Very poor.	Very poor.	---	---	Good	Good	Very poor.	Good	Very poor.
Lt----------------- Leton	Poor	Fair	Fair	Good	---	Good	Good	Good	Fair	Good	---
ME----------------- Mermentau	Very poor.	Poor	Fair	---	---	Fair	Fair	Fair	Poor	Fair	Fair.
Mn----------------- Midland	Poor	Fair	Fair	Fair	---	Good	Good	Good	Fair	Good	---

See footnote at end of table.

TABLE 11.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Wetland wildlife	Rangeland wildlife
Mr------------------ Morey	Fair	Fair	Fair	Fair	Fair	Good	Good	Good	Fair	Good	---
Mt*:											
Mowata------------	Poor	Fair	Good	Fair	Fair	Good	Good	Good	Fair	Good	---
Vidrine-----------	Fair	Good	Good	---	Good	Good	Fair	Fair	Good	Fair	---
Pe------------------ Peveto	Fair	Good	Good	Fair	Fair	Fair	Very poor.	Very poor.	Good	Very poor.	---
SC------------------ Scatlake	Very poor.	Very poor.	Very poor.	Very poor.	---	---	Good	Good	Very poor.	Good	Very poor.
UD*. Udifluvents											

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AE: Allemands	Severe: excess humus, ponding.	Severe: flooding, ponding, subsides.	Severe: flooding, ponding, subsides.	Severe: flooding, ponding, subsides.	Severe: flooding, ponding, excess humus.
AN*. Aquents					
BA: Bancker	Severe: excess humus, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding, excess humus.
Be*. Beaches					
CO: Clovelly	Severe: excess humus, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding.	Severe: flooding, ponding, excess humus.
CR: Creole	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding.	Severe: excess salt, ponding, flooding.
Cw*: Crowley	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.	Severe: wetness.
Vidrine	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
GB: Ged	Severe: ponding.	Severe: flooding, shrink-swell, ponding.	Severe: flooding, shrink-swell, ponding.	Severe: ponding, low strength, flooding.	Severe: ponding, flooding, too clayey.
GC: Gentilly	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding, excess humus.
Hb: Hackberry	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Moderate: wetness, flooding.	Moderate: wetness, droughty.
Hm*: Hackberry	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Moderate: wetness, flooding.	Moderate: wetness, droughty.

See footnote at end of table.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Hm*:					
Mermentau	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: excess salt, wetness, flooding.
Ju: Judice	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.	Severe: wetness, too clayey.
Kd: Kaplan	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Moderate: wetness, flooding.	Moderate: wetness.
LE: Larose	Severe: excess humus, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: flooding, ponding, excess humus.
Lt: Leton	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, low strength.	Severe: wetness.
ME: Mermentau	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: excess salt, wetness, flooding.
Mn: Midland	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.	Severe: wetness.
Mr: Morey	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: wetness.
Mt*:					
Mowata	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.	Severe: wetness.
Vidrine	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
Pe: Peveto	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Severe: droughty.
SC: Scatlake	Severe: excess humus, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: excess salt, ponding, flooding.
Ud*. Udifluvents					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "poor," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AE------------------ Allemands	Severe: flooding, ponding, percs slowly.	Severe: flooding, seepage, excess humus.	Severe: flooding, ponding, excess humus.	Severe: flooding, seepage, ponding.	Poor: ponding, excess humus.
AN*. Aquents					
BA------------------ Bancker	Severe: flooding, wetness, percs slowly.	Severe: flooding, excess humus.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
Be*. Beaches					
CO------------------ Clovelly	Severe: flooding, ponding, percs slowly.	Severe: flooding, seepage, excess humus.	Severe: ponding, flooding, excess humus.	Severe: flooding, seepage, ponding.	Poor: ponding, excess humus.
CR------------------ Creole	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
Cw*:					
Crowley------------	Severe: wetness, percs slowly.	Slight-----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Vidrine------------	Severe: wetness, percs slowly.	Slight-----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
GB------------------ Ged	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: ponding, too clayey, hard to pack.
GC------------------ Gentilly	Severe: flooding, ponding, percs slowly.	Severe: flooding, excess humus, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
Hb------------------ Hackberry	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, wetness, seepage.

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Hm*:					
Hackberry	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, wetness, seepage.
Mermentau	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Ju: Judice	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Kd: Kaplan	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, wetness, seepage.
LE: Larose	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding, excess humus.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, ponding, hard to pack.
Lt: Leton	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
ME: Mermentau	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Mn: Midland	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Mr: Morey	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
Mt*:					
Mowata	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Vidrine	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Pe: Peveto	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
SC------------------ Scatlake	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
UD*. Udifluvents					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Topsoil
AE: Allemands	Poor: wetness.	Improbable: excess humus.	Poor: excess humus, wetness.
AN*. Aquents			
BA: Bancker	Poor: low strength, wetness.	Improbable: excess fines.	Poor: too clayey, wetness.
Be*. Beaches			
CO: Clovelly	Poor: wetness.	Improbable: excess fines.	Poor: excess humus, wetness.
CR: Creole	Poor: low strength, wetness.	Improbable: excess fines.	Poor: too clayey, excess salt, wetness.
Cw*:			
Crowley	Poor: low strength, wetness.	Improbable: excess fines.	Poor: thin layer, wetness.
Vidrine	Poor: low strength.	Improbable: excess fines.	Poor: thin layer.
GB: Ged	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Poor: too clayey, wetness.
GC: Gentilly	Poor: low strength, wetness.	Improbable: excess fines.	Poor: excess humus, wetness.
Hb: Hackberry	Fair: wetness.	Probable	Poor: small stones, too sandy.
Hm*:			
Hackberry	Fair: wetness.	Probable	Poor: small stones, too sandy.
Mermentau	Poor: wetness.	Improbable: excess fines.	Poor: excess salt, wetness.

See footnote at end of table.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Topsoil
Ju: Judice	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Poor: too clayey, wetness.
Kd: Kaplan	Fair: wetness.	Probable	Poor: too clayey.
LE: Larose	Poor: low strength, wetness.	Improbable: excess fines.	Poor: excess humus, wetness.
Lt: Leton	Poor: low strength, wetness.	Improbable: excess fines.	Poor: wetness.
ME: Mermentau	Poor: wetness.	Improbable: excess fines.	Poor: excess salt, wetness.
Mn: Midland	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Poor: thin layer, wetness.
Mr: Morey	Poor: low strength, wetness.	Improbable: excess fines.	Poor: wetness.
Mt*:			
Mowata	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Poor: thin layer, wetness.
Vidrine	Poor: low strength.	Improbable: excess fines.	Poor: thin layer.
Pe: Peveto	Good	Probable	Poor: too sandy.
SC: Scatlake	Poor: low strength, wetness.	Improbable: excess fines.	Poor: too clayey, excess salt, wetness.
UD*. Udifluvents			

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Grassed waterways
AE: Allemands	Severe: excess humus, ponding.	Slight	Flooding, percs slowly, ponding.	Flooding, ponding, percs slowly.	Wetness, percs slowly.
AN*. Aquents					
BA: Bancker	Severe: excess humus, hard to pack, wetness.	Slight	Percs slowly, flooding, subsides.	Percs slowly, wetness, flooding.	Wetness, percs slowly, excess salt.
Be*. Beaches					
CO: Clovelly	Severe: ponding, excess humus.	Slight	Flooding, percs slowly, subsides.	Flooding, ponding, percs slowly.	Wetness, percs slowly, excess salt.
CR: Creole	Severe: hard to pack, ponding.	Severe: cutbanks cave.	Ponding, percs slowly, flooding.	Ponding, slow intake, percs slowly.	Wetness, excess salt, percs slowly.
Cw*:					
Crowley	Severe: wetness.	Severe: no water.	Percs slowly	Wetness, percs slowly.	Wetness, erodes easily.
Vidrine	Moderate: hard to pack, wetness.	Severe: no water.	Percs slowly	Wetness, percs slowly.	Wetness, erodes easily, percs slowly.
GB: Ged	Severe: ponding, hard to pack.	Severe: slow refill.	Percs slowly, flooding, ponding.	Ponding, slow intake, percs slowly.	Wetness, percs slowly.
GC: Gentilly	Severe: hard to pack, ponding.	Slight	Ponding, percs slowly, flooding.	Ponding, percs slowly, flooding.	Wetness, erodes easily, percs slowly.
Hb: Hackberry	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, droughty.
Hm*:					
Hackberry	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty.	Wetness, droughty.
Mermentau	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, flooding, excess salt.	Wetness, droughty, slow intake.	Wetness, excess salt, erodes easily.

See footnote at end of table.

TABLE 15.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--		Features affecting--		
	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
Ju---------------- Judice	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly---	Wetness, slow intake, percs slowly.	Wetness, percs slowly.
Kd---------------- Kaplan	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Percs slowly---	Wetness, percs slowly, erodes easily.	Wetness, droughty, rooting depth.
LE---------------- Larose	Severe: excess humus, hard to pack, ponding.	Severe: slow refill.	Ponding, percs slowly, flooding.	Ponding, percs slowly, flooding.	Wetness, percs slowly.
Lt---------------- Leton	Severe: wetness.	Severe: slow refill.	Percs slowly---	Wetness, percs slowly.	Wetness, erodes easily, percs slowly.
ME---------------- Mermentau	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, flooding, excess salt.	Wetness, droughty, slow intake.	Wetness, excess salt, erodes easily.
Mn---------------- Midland	Severe: wetness.	Severe: slow refill.	Percs slowly---	Wetness, percs slowly, erodes easily.	Wetness, erodes easily, percs slowly.
Mr---------------- Morey	Severe: wetness.	Severe: slow refill.	Percs slowly---	Wetness, percs slowly, erodes easily.	Wetness, erodes easily, percs slowly.
Mt*:					
Mowata-----------	Severe: wetness.	Severe: slow refill.	Percs slowly---	Wetness, percs slowly, erodes easily.	Wetness, erodes easily, percs slowly.
Vidrine----------	Moderate: hard to pack, wetness.	Severe: no water.	Percs slowly---	Wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Pe---------------- Peveto	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake.	Droughty.
SC---------------- Scatlake	Severe: excess humus, hard to pack, ponding.	Slight---------	Ponding, percs slowly, flooding.	Ponding, percs slowly, slow intake.	Wetness, excess salt.
UD* Udifluvents					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
AE--------------- Allemands	0-30	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	30-51	Clay, mucky clay	MH, OH	A-7-5	0	100	100	95-100	80-100	65-90	30-50
	51-66	Clay, very fine sandy loam, silty clay loam.	CH, CL, ML, MH	A-7-6, A-6, A-4	0	100	100	85-95	75-95	30-75	6-45
AN* Aquents											
BA--------------- Bancker	0-6	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	6-18	Clay, silty clay, mucky clay.	OH, MH	A-7-5	0	100	100	100	90-100	55-90	15-45
	18-88	Clay, silty clay, mucky clay.	OH, MH	A-7-5	0	100	100	90-100	70-95	55-90	15-45
Be* Beaches											
CO--------------- Clovelly	0-24	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	24-82	Clay, silty clay, mucky clay.	CH, CL, MH, ML	A-7-6, A-7-5	0	100	100	95-100	85-95	47-87	25-45
CR--------------- Creole	0-3	Mucky clay-------	CH	A-7-6	0	100	100	90-100	75-95	50-81	27-55
	3-17	Clay-------------	CH	A-7-6	0	100	100	90-100	75-95	50-81	27-55
	17-48	Clay, silty clay	CH	A-7-6	0	100	100	90-100	75-95	50-81	27-55
	48-52	Loamy fine sand, sandy loam, very fine sandy loam.	SM, ML	A-2-4, A-4	0	100	100	60-95	30-60	---	NP
	52-96	Clay, silty clay, clay loam.	CH, CL	A-7-6	0	100	100	90-100	70-95	42-74	20-52
Cw*:											
Crowley---------	0-22	Silt loam--------	ML, CL-ML, CL	A-4	0	100	100	95-100	80-100	<30	NP-10
	22-44	Silty clay, silty clay loam.	CH, CL	A-7-6	0	100	100	95-100	85-100	41-60	20-35
	44-62	Silty clay loam, silty clay.	CL, CH	A-7-6, A-6	0	100	100	95-100	85-100	38-60	18-35
Vidrine---------	0-19	Silt loam--------	ML, CL-ML	A-4	0	100	100	100	90-100	<27	NP-7
	19-22	Silty clay, silty clay loam.	CH, CL	A-7-6	0	100	100	100	90-100	41-60	19-32
	22-60	Silty clay loam, silty clay.	CL, CH	A-7-6, A-6	0	90-100	85-100	85-100	75-100	33-55	12-28
	60-80	Silt loam, silty clay loam, silty clay.	CL, CH	A-4, A-6, A-7-6	0	90-100	85-100	85-100	70-100	28-55	8-28
GB--------------- Ged	0-4	Mucky clay-------	CH	A-7-5, A-7-6	0	100	100	100	80-95	50-75	23-43
	4-14	Clay-------------	CH	A-7-5, A-7-6	0	100	100	100	80-95	50-75	23-43
	14-44	Clay, mucky clay, silty clay.	CH	A-7-5, A-7-6	0	100	100	98-100	80-95	53-85	30-52
	44-60	Clay, silty clay	CH	A-7-5, A-7-6	0	100	100	98-100	85-95	55-85	30-52

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
GC--------------- Gentilly	0-8	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	8-43	Clay, silty clay	MH	A-7-5	0	100	100	100	95-100	70-90	35-45
	43-82	Clay, silty clay	MH, CH	A-7-5	0	100	100	100	95-100	60-90	30-45
Hb--------------- Hackberry	0-6	Loamy fine sand	SM, SP-SM	A-2, A-4	0-2	85-98	75-98	65-98	10-40	<24	NP
	6-28	Sand, loamy fine sand, very fine sandy loam.	SM, SC, SP-SM, SM-SC	A-2, A-4	0-2	85-98	75-98	65-98	10-40	<24	NP-8
	28-61	Fine sand, loamy fine sand, fine sandy loam.	SM, SC, SP-SM, SM-SC	A-2	0-2	85-98	75-98	65-98	10-35	<24	NP-8
Hm*: Hackberry-------	0-5	Fine sandy loam	SM, SP-SM	A-2, A-4	0-2	85-98	75-98	65-98	10-40	<24	NP
	5-27	Fine sand, loamy fine sand, very fine sandy loam.	SM, SC, SP-SM, SM-SC	A-2, A-4	0-2	85-98	75-98	65-98	10-40	<24	NP-8
	27-60	Fine sand, loamy fine sand, fine sandy loam.	SM, SC, SP-SM, SM-SC	A-2	0-2	85-98	75-98	65-98	10-35	<24	NP-8
Mermentau-------	0-15	Clay-------------	CH	A-7-6	0	100	100	90-100	75-95	50-80	27-54
	15-29	Sandy clay, silty clay, clay.	CH, CL	A-7-6	0	100	100	85-100	51-95	45-70	24-46
	29-60	Very fine sandy loam, loam, clay loam.	ML, CL-ML, CL, SM	A-4, A-6	0	100	100	75-95	35-90	<40	NP-22
Ju--------------- Judice	0-10		CL, CH	A-7-6	0	100	100	100	95-100	47-58	22-30
	10-80	Silty clay, silty clay loam, clay loam.	CH, CL	A-7-6, A-7-5	0	95-100	95-100	90-100	75-100	47-80	32-48
Kd--------------- Kaplan	0-10	Silt loam--------	SM, SP-SM	A-2, A-4	0-2	85-98	75-98	65-98	10-40	<24	NP
	10-16	Sand, loamy fine sand, very fine sandy loam.	SM, SC, SP-SM, SM-SC	A-2, A-4	0-2	85-98	75-98	65-98	10-40	<24	NP-8
	16-65	Sand, loamy fine sand, sandy loam.	SM, SC, SP-SM, SM-SC	A-2	0-2	85-98	75-98	65-98	10-35	<24	NP-8
LE--------------- Larose	0-6	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	6-88	Clay, silty clay, mucky clay.	CH	A-7-5	0	100	100	100	90-100	60-87	30-52
Lt--------------- Leton	0-19	Silt loam--------	CL, CL-ML, SM-SC, SC	A-4, A-6	0	100	98-100	95-100	45-98	21-30	5-12
	19-60	Clay loam, silty clay loam, sandy clay loam.	CL	A-6, A-7-6	0	100	98-100	95-100	51-98	30-43	14-26
ME--------------- Mermentau	0-19	Clay-------------	CH	A-7-6	0	100	100	90-100	75-95	50-80	27-54
	19-59	Very fine sandy loam, loam, clay loam.	ML, CL-ML, CL, SM	A-4, A-6	0	100	100	75-95	35-90	<40	NP-22
	59-69	Sandy clay, silty clay, clay.	CH, CL	A-7-6	0	100	100	85-100	51-95	45-70	24-46

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
Mn---------------Midland	0-7	Silty clay loam	CL	A-6, A-7-6	0	100	100	90-100	75-100	30-42	12-22
	7-71	Silty clay, clay, silty clay loam.	CH, CL	A-7-6	0	100	100	100	95-100	41-65	20-40
Mr---------------Morey	0-10	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	75-95	23-40	5-18
	10-32	Silty clay loam, clay loam.	CL	A-6, A-7	0	100	95-100	90-100	85-95	34-50	14-30
	32-72	Silty clay loam, silty clay, clay.	CL, CH	A-6, A-7	0	98-100	95-100	90-100	85-95	35-60	15-36
Mt*:											
Mowata-----------	0-18	Silt loam--------	ML, CL-ML, CL	A-4	0	100	100	95-100	90-100	22-30	5-10
	18-34	Silty clay loam, silty clay, clay loam.	CL, CH	A-7-6	0	100	100	95-100	75-95	41-60	22-37
	34-60	Silty clay loam, silty clay, clay loam.	CL	A-7-6, A-6	0	100	100	95-100	75-95	37-49	18-29
Vidrine---------	0-15	Silt loam--------	ML, CL-ML	A-4	0	100	100	100	90-100	<27	NP-7
	15-50	Silty clay, silty clay loam.	CH, CL	A-7-6	0	100	100	100	90-100	41-60	19-32
	50-74	Silty clay loam, silty clay.	CL, CH	A-7-6, A-6	0	90-100	85-100	85-100	75-100	33-55	12-28
Pe---------------Peveto	0-15	Fine sand--------	SP-SM, SM	A-3, A-2-4	0-5	90-100	85-100	60-90	5-25	---	NP
	15-31	Fine sand, sand, loamy fine sand.	SP-SM, SM, SP	A-3, A-2-4, A-1-b	0-5	80-100	65-100	40-90	2-15	---	NP
	31-46	Loamy fine sand, sand, fine sand.	SP-SM, SM	A-3, A-2-4	0-5	90-100	85-100	60-90	5-25	---	NP
	46-75	Fine sand, sand, loamy sand.	SP-SM, SM, SP	A-3, A-2-4, A-1-b	0-5	80-100	65-100	40-90	2-15	---	NP
SC---------------Scatlake	0-10	Mucky clay-------	OH, MH	A-7-5	0	100	100	100	95-100	55-90	15-45
	10-30	Mucky clay, clay, mucky silty clay loam.	OH, MH	A-7-5	0	100	100	100	95-100	55-90	15-45
	30-60	Clay-------------	MH, OH	A-7-5	0	100	100	100	95-100	70-90	35-45
UD* Udifluvents											

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--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 "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm				Pct
AE---------------- Allemands	0-30	---	0.05-0.25	>2.0	0.20-0.50	5.1-7.3	<4	Low--------	----	---	30-85
	30-51	60-95	0.15-1.00	<0.06	0.14-0.18	5.6-8.4	<4	Low--------	0.32		
	51-66	20-95	0.25-1.00	<0.6	0.12-0.18	5.6-8.4	<4	Low--------	0.37		
AN*. Aquents											
BA---------------- Bancker	0-6	---	0.10-0.40	>2.0	0.20-0.50	5.1-7.8	3-8	Low--------	----	---	30-70
	6-18	50-80	0.20-1.00	<0.06	0.14-0.18	5.6-8.4	3-8	Low--------	0.28		
	18-88	60-85	0.20-1.00	<0.06	0.14-0.18	5.6-8.4	3-8	Low--------	0.28		
Be*. Beaches											
CO---------------- Clovelly	0-24	---	0.05-0.25	>2.0	0.10-0.45	6.1-8.4	4-8	Low--------	----	---	30-60
	24-82	50-90	0.15-1.00	<0.06	0.11-0.18	6.6-8.4	4-8	Low--------	0.28		
CR---------------- Creole	0-3	40-78	0.15-1.00	<0.06	0.18.0.24	4.5-7.8	5-19	Low--------	0.29	5	6-25
	3-17	40-78	0.25-1.20	<0.06	0.12-0.17	4.5-7.8	4-16	Low--------	0.28		
	17-48	40-78	0.25-1.20	<0.06	0.10-0.15	6.1-8.4	4-16	Low--------	0.32		
	48-52	7-16	0.25-1.00	0.2-2.0	0.02-0.05	6.6-8.4	4-16	Low--------	0.37		
	52-96	30-74	0.25-1.00	<0.06	0.10-0.15	6.6-8.4	4-16	Low--------	0.32		
Cw*:											
Crowley----------	0-22	10-27	1.30-1.65	0.2-0.6	0.20-0.23	4.5-6.0	<2	Low--------	0.49	5	2-4
	22-44	35-50	1.20-1.70	<0.06	0.19-0.21	4.5-6.5	<2	High-------	0.32		
	44-62	27-55	1.20-1.70	0.06-0.2	0.20-0.22	5.6-8.4	<2	Moderate	0.32		
Vidrine----------	0-19	10-27	1.30-1.65	0.6-2.0	0.20-0.23	4.5-6.0	<2	Low--------	0.49	5	2-4
	19-22	27-50	1.18-1.70	0.06-0.2	0.18-0.20	4.5-6.0	<2	High-------	0.32		
	22-60	27-50	1.20-1.70	0.06-0.2	0.18-0.20	4.5-6.0	<2	High-------	0.32		
	60-80	20-50	1.20-1.70	0.06-0.2	0.18-0.22	6.1-8.4	<2	Moderate	0.32		
GB---------------- Ged	0-4	35-55	0.15-1.00	<0.06	0.18-0.50	4.5-7.8	<2	Low--------	0.28	5	8-20
	4-14	35-55	0.60-1.35	<0.06	0.14-0.18	4.5-7.8	<2	High-------	0.28		
	14-44	45-75	1.15-1.35	<0.06	0.14-0.18	6.1-8.4	<2	High-------	0.24		
	44-60	60-80	1.20-1.50	<0.06	0.14-0.18	6.1-8.4	<2	High-------	0.24		
GC---------------- Gentilly	0-8	45-90	0.15-0.60	>2.0	0.20-0.50	5.6-7.8	2-8	Low--------	----	---	30-80
	8-43	60-95	0.25-1.20	<0.06	0.12-0.15	6.6-7.8	2-8	Low--------	0.37		
	43-82	60-95	1.18-1.35	<0.06	0.12-0.15	6.6-7.8	2-8	Very high	0.37		
Hb---------------- Hackberry	0-6	5-10	1.40-1.65	6.0-20.0	0.10-0.15	6.1-8.4	2-4	Low--------	0.15	5	.5-3
	6-28	5-18	1.40-1.70	6.0-20.0	0.08-0.13	6.6-9.0	2-4	Low--------	0.15		
	28-61	5-18	1.40-1.70	6.0-20.0	0.08-0.11	6.6-9.4	2-4	Low--------	0.15		
Hm*:											
Hackberry--------	0-5	5-10	1.40-1.65	6.0-20.0	0.10-0.15	6.1-8.4	2-4	Low--------	0.15	5	.5-3
	5-27	5-18	1.40-1.70	6.0-20.0	0.08-0.13	6.6-9.0	2-4	Low--------	0.15		
	27-60	5-18	1.40-1.70	6.0-20.0	0.08-0.11	6.6-9.4	2-4	Low--------	0.15		
Mermentau--------	0-15	40-76	1.25-1.70	<0.06	0.12-0.17	6.6-8.4	7-23	High-------	0.28	5	4-14
	15-29	35-65	1.00-1.50	<0.06	0.10-0.15	6.6-8.4	7-23	High-------	0.32		
	29-60	10-32	1.25-1.70	0.06-2.0	0.03-0.15	6.6-8.4	7-23	Low--------	0.37		

See footnote at end of table.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors		Organic matter
									K	T	
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm				Pct
Ju---------------	0-10	27-50	1.20-1.70	0.06-0.2	0.17-0.22	5.1-7.3	<2	High------	0.32	5	2-6
Judice	10-80	27-50	1.20-1.70	<0.06	0.15-0.19	5.6-8.4	<2	High------	0.32		
Kd---------------	0-10	5-10	1.40-1.65	6.0-20.0	0.10-0.15	6.1-7.3	0-4	Low-------	0.15	5	.5-2
Kaplan	10-16	5-18	1.40-1.80	6.0-20.0	0.08-0.13	6.6-8.4	0-4	Low-------	0.15		
	16-65	5-18	1.40-1.80	6.0-20.0	0.08-0.11	6.6-8.4	0-4	Low-------	0.15		
LE---------------	0-6	---	0.05-0.25	>2.0	0.20-0.50	5.6-7.8	<4	Low-------	----	---	30-80
Larose	6-88	50-80	0.15-1.00	<0.06	0.14-0.18	5.6-8.4	<4	Low-------	0.28		
Lt---------------	0-19	10-25	1.20-1.50	0.6-2.0	0.15-0.20	5.1-7.3	<2	Low-------	0.43	5	1-3
Leton	19-60	20-35	1.30-1.60	0.06-0.2	0.15-0.20	5.6-7.8	<2	Moderate	0.37		
ME---------------	0-19	40-76	1.25-1.70	<0.06	0.12-0.17	6.6-8.4	7-23	High------	0.28	5	4-14
Mermentau	19-59	10-32	1.25-1.70	0.06-2.0	0.03-0.15	6.6-8.4	7-23	High------	0.37		
	59-69	35-65	0.20-1.20	<0.06	0.10-0.15	6.6-8.4	7-23	Low-------	0.32		
Mn---------------	0-7	27-39	1.30-1.65	0.06-0.2	0.20-0.22	5.1-6.5	<2	Moderate	0.37	5	1-4
Midland	7-71	35-55	1.19-1.65	<0.06	0.18-0.20	5.6-8.4	<2	High------	0.32		
Mr---------------	0-10	15-30	1.25-1.50	0.6-2.0	0.16-0.24	4.5-7.3	<2	Low-------	0.37	5	2-6
Morey	10-32	25-35	1.25-1.50	0.06-0.2	0.18-0.22	5.6-7.8	<2	Moderate	0.37		
	32-72	30-45	1.40-1.65	0.06-0.2	0.18-0.22	5.6-8.4	<2	High------	0.37		
Mt*:											
Mowata----------	0-18	8-24	1.35-1.65	0.2-0.6	0.21-0.23	5.1-7.3	<2	Low-------	0.49	5	1-4
	18-34	35-50	1.20-1.70	<0.06	0.18-0.20	5.1-8.4	<2	High------	0.37		
	34-60	30-50	1.20-1.65	<0.06	0.18-0.20	7.4-8.4	<2	High------	0.43		
Vidrine---------	0-15	10-27	1.30-1.65	0.6-2.0	0.20-0.23	4.5-6.0	<2	Low-------	0.49	5	2-4
	15-50	27-50	1.20-1.70	0.06-0.2	0.18-0.20	4.5-6.0	<2	High------	0.32		
	50-74	27-50	1.20-1.70	0.06-0.2	0.18-0.20	6.1-8.4	<2	High------	0.32		
Pe---------------	0-15	3-14	1.50-1.70	6.0-20.0	0.06-0.11	6.6-8.4	<2	Low-------	0.15	5	.5-2
Peveto	15-31	1-8	1.50-1.70	6.0-20.0	0.02-0.06	6.6-8.4	<2	Low-------	0.15		
	31-46	3-14	1.50-1.70	6.0-20.0	0.06-0.11	6.6-8.4	<2	Low-------	0.15		
	46-75	1-8	1.50-1.70	6.0-20.0	0.02-0.06	6.6-8.4	<2	Low-------	0.15		
SC---------------	0-10	35-60	0.25-1.00	<0.2	0.05-0.15	3.6-8.4	7-16	Low-------	0.24	5	5-25
Scatlake	10-30	35-60	0.25-1.00	<0.2	0.05-0.15	6.6-8.4	7-16	Low-------	0.24		
	30-60	60-85	0.25-1.00	<0.06	0.05-0.15	5.1-8.4	7-16	Low-------	0.28		
UD*.											
Udifluvents											

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Initial	Total	Uncoated steel	Concrete
					Ft			In	In		
AE: Allemands	D	Frequent	Very long.	Jan-Dec	+1-0.5	Apparent	Jan-Dec	8-25	16-51	High	Moderate.
AN*: Aquents											
BA: Bancker	D	Frequent	Very long.	Jan-Dec	+1-0.5	Apparent	Jan-Dec	2-4	5-15	High	Moderate.
Be*: Beaches											
CO: Clovelly	D	Frequent	Very long.	Jan-Dec	+1-0.5	Apparent	Jan-Dec	8-20	16-51	High	Low.
CR: Creole	D	Frequent	Very long.	Jan-Dec	+1-1.0	Apparent	Jan-Dec	1-3	3-7	High	Moderate.
Cw*:											
Crowley	D	None	---	---	0.5-1.5	Perched	Dec-Apr	---	---	High	Moderate.
Vidrine	D	None	---	---	1.0-2.0	Perched	Dec-Apr	---	---	High	Moderate.
GB: Ged	D	Frequent	Long	Jan-Dec	+1-0	Apparent	Jan-Dec	---	---	High	Moderate.
GC: Gentilly	D	Frequent	Very long.	Jan-Dec	+1-0.5	Apparent	Jan-Dec	3-6	10-15	High	Low.
Hb: Hackberry	B	Rare	---	---	1.0-4.0	Apparent	Jan-Dec	---	---	Moderate	Low.
Hm*:											
Hackberry	B	Rare	---	---	1.0-4.0	Apparent	Jan-Dec	---	---	Moderate	Low.
Mermentau	D	Frequent	Brief	Jan-Dec	0-3.5	Apparent	Jan-Dec	---	---	High	Moderate.
Ju: Judice	D	Rare	---	---	0-1.5	Apparent	Dec-Apr	---	---	High	Low.
Kd: Kaplan	B	None	---	---	1.0-4.0	Apparent	Jan-Dec	---	---	Moderate	Low.
LE: Larose	D	Frequent	Very long.	Jan-Dec	+2-0.5	Apparent	Jan-Dec	2-8	5-15	High	Moderate.
Lt: Leton	D	Rare	---	---	0-1.5	Apparent	Dec-Apr	---	---	High	Moderate.
ME: Mermentau	D	Frequent	Brief	Jan-Dec	0-3.5	Apparent	Jan-Dec	---	---	High	Moderate.
Mn: Midland	D	Rare	---	---	0.5-1.5	Apparent	Dec-Apr	---	---	High	Moderate.

See footnote at end of table.

TABLE 18.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Initial	Total	Uncoated steel	Concrete
					Ft			In	In		
Mr-------------Morey	D	Rare-------	---	---	0-2.0	Apparent	Dec-Apr	---	---	High-----	Low.
Mt*											
Mowata--------	D	Rare-------	---	---	0-2.0	Apparent	Dec-Apr	---	---	High-----	Low.
Vidrine-------	D	None-------	---	---	1.0-2.0	Perched	Dec-Apr	---	---	High-----	Moderate.
Pe-------------Peveto	A	Rare-------	---	---	>6.0	---	---	---	---	Moderate	Low.
SC-------------Scatlake	D	Frequent---	Very long.	Jan-Dec	+1-0.5	Apparent	Jan-Dec	---	6-12	High-----	Moderate.
UD* Udifluvents											

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 19.--FERTILITY TEST DATA FOR SELECTED SOILS

(Analyses by the Soil Fertility Laboratory, Louisiana Agricultural Experiment Station. Values reported as 0.0 indicate that measurable quantities were not detected or were less than 0.055)

Soil name and sample number	Depth	Horizon	pH 1:1 H_2O	Organic carbon	Extractable phosphorus[1]	Exchangeable cations: Ca	Mg	K	Na	Al	H	Total acidity	Cation-exchange capacity (sum)	Base saturation (sum)	Effective cation-exchange capacity saturated with Al	Sum of cation-exchange capacity saturated with Na
	In			Pct	Ppm	---Milliequivalents/100 grams of soil----								Pct	Pct	Pct
Crowley silt loam:[2] (S84LA-23-10)	0-6	Ap	4.6	1.07	8	2.1	0.9	0.1	0.2	0.8	0.6	7.0	10.3	32.0	17.0	1.9
	6-16	A	4.7	0.63	5	2.0	1.0	0.1	0.2	0.9	0.5	5.7	9.0	36.7	19.1	2.2
	16-22	Eg	4.6	0.41	5	2.3	1.3	0.1	0.3	0.9	0.5	5.3	9.3	43.0	16.7	3.2
	22-35	Btg1	5.0	0.50	5	7.4	4.9	0.3	1.3	1.2	0.5	9.7	23.6	58.9	7.7	5.5
	35-44	Btg2	5.1	0.37	5	9.5	6.0	0.3	1.3	0.9	0.5	8.8	25.9	66.0	4.9	5.0
	44-62	BCg	6.6	0.02	5	14.2	7.4	0.4	0.2	0.0	0.0	3.7	25.9	85.7	0.0	0.8
Ged mucky clay:[2] (S85LA-23-5)	0-4	A1	4.9	---	5	9.3	6.1	0.3	2.0	0.0	0.0	4.2	21.9	80.8	0.0	9.1
	4-14	A2	5.5	---	5	10.8	4.9	0.2	0.9	0.0	0.0	1.6	18.4	91.3	0.0	4.9
	14-44	Btg1, Btg2	6.1	---	5	11.2	4.5	0.2	0.9	0.0	0.0	1.2	18.0	93.3	0.0	5.0
	44-54	Btkg	6.4	---	5	10.5	3.8	0.2	0.7	0.0	0.0	2.1	17.3	87.9	0.0	4.0
	54-60	Btkg	7.5	---	6	34.6	5.1	0.3	0.5	0.0	0.0	1.6	42.1	96.2	0.0	1.2
Hackberry loamy fine sand:[3] (S85LA-23-3)	0-3	A	6.3	1.56	33	3.9	1.6	0.2	0.1	0.0	0.0	2.4	8.2	70.7	0.0	1.2
	3-12	Bg	7.4	0.06	22	2.8	0.4	0.1	0.1	0.0	0.0	0.6	4.0	85.0	0.0	2.5
	12-20	Cg1	7.8	0.01	25	1.9	0.6	0.1	0.1	0.0	0.0	0.6	3.3	81.8	0.0	4.3
	20-34	Cg2	8.3	0.01	16	14.9	0.9	0.1	0.3	0.0	0.0	0.6	16.8	96.4	0.0	1.8
Hackberry loamy fine sand:[4] (S85LA-23-1)	0-6	A	6.8	1.56	185	9.0	2.0	0.1	0.1	0.0	0.0	2.4	13.6	82.4	0.0	0.7
	6-12	Bg1	7.3	0.54	42	6.7	1.5	0.1	0.1	0.0	0.0	1.2	9.6	87.5	0.0	1.0
	12-17	Bg2	7.4	0.19	7	6.7	2.5	0.1	0.1	0.0	0.0	1.2	10.6	88.7	0.0	0.9
	17-24	Bg3	7.6	0.06	35	8.0	3.9	0.1	0.3	0.0	0.0	1.6	13.9	88.5	0.0	2.2
	24-32	Cg1	7.8	0.01	49	19.2	2.0	0.1	0.3	0.0	0.0	1.2	22.8	94.7	0.0	1.3
	32-60	Cg2	8.0	0.01	48	23.3	1.9	0.1	0.3	0.0	0.0	0.6	26.2	97.7	0.0	1.1
Judice silty clay:[2] (S84LA-23-16)	0-4	Ap	5.8	3.20	13	28.4	8.3	0.6	1.0	0.0	0.0	12.6	50.9	75.2	0.0	2.0
	4-10	A	6.2	2.62	7	29.8	9.0	0.5	1.3	0.0	0.0	11.4	52.0	78.1	0.0	2.5
	10-15	Bg1	7.1	0.54	5	36.4	13.6	0.5	3.0	0.0	0.0	12.3	65.8	81.3	0.0	4.6
	15-26	Bg2	7.1	0.06	5	25.1	9.8	0.2	2.0	0.0	0.0	7.8	44.9	82.6	0.0	4.5
	26-42	Bg3	7.2	0.10	5	28.7	10.9	0.3	1.9	0.0	0.0	8.4	50.2	83.3	0.0	3.8
	42-54	BCg1	7.3	0.10	5	30.7	11.2	0.3	1.7	0.0	0.0	9.6	53.5	82.1	0.0	3.2
	54-80	BCg2	7.4	0.01	12	29.7	10.5	0.3	1.1	0.0	0.0	8.7	50.3	82.7	0.0	2.2

See footnotes at end of table.

TABLE 19.--FERTILITY TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	pH 1:1 H_2O	Organic carbon	Extractable phosphorus[1]	Exchangeable cations: Ca	Mg	K	Na	Al	H	Total acidity	Cation-exchange capacity (sum)	Base saturation (sum)	Effective cation-exchange capacity saturated with Al	Sum of cation-exchange capacity saturated with Na
	In			Pct	Ppm	---Milliequivalents/100 grams of soil----								Pct	Pct	Pct
Leton silt loam:[2]																
(S85LA-23-2)	0-3	Ap1	5.4	1.17	5	3.9	1.2	0.1	0.2	0.0	0.6	3.6	9.0	60.0	0.0	2.2
	3-6	Ap2	5.7	0.85	5	4.2	1.6	0.1	0.3	0.0	0.3	2.4	8.0	72.1	0.0	3.5
	6-13	Eg1	6.5	0.37	5	5.8	2.4	0.1	0.6	0.0	0.0	2.4	11.3	78.8	0.0	5.3
	13-19	Eg2	6.5	0.32	5	6.4	3.1	0.1	0.8	0.0	0.0	1.8	12.2	85.2	0.0	6.6
	19-24	B/E	6.9	0.28	5	7.5	3.4	0.1	1.2	0.0	0.0	2.4	14.6	83.6	0.0	8.2
	24-36	Btg1	8.6	0.24	5	7.2	3.6	0.1	1.4	0.0	0.0	2.4	14.7	83.7	0.0	9.5
	36-46	Btg2	6.7	0.10	5	9.5	5.5	0.1	2.2	0.0	0.0	2.4	19.7	87.8	0.0	11.2
	46-60	BCg	6.8	0.10	5	11.0	6.3	0.1	2.5	0.0	0.0	2.4	22.3	88.2	0.0	11.2
Midland silty clay loam:[2]																
(S84LA-23-18)	0-3	Ap1	4.9	2.36	9	9.0	3.9	0.3	0.3	0.0	0.0	8.4	21.9	61.6	0.0	1.4
	3-7	Ap2	5.1	1.47	5	10.1	4.6	0.4	0.4	0.0	0.0	5.4	20.6	73.8	0.0	1.9
	7-17	Btg1	5.4	1.38	5	13.1	6.5	0.8	0.8	0.0	0.0	7.8	28.6	72.4	0.0	2.8
	17-27	Btg2	6.1	0.72	5	18.4	9.2	1.8	1.8	0.0	0.0	6.9	36.5	81.1	0.0	4.9
	27-37	Btg3	7.1	0.19	5	18.3	8.7	2.3	2.3	0.0	0.0	4.2	33.7	87.5	0.0	6.8
	37-43	Btg4	7.3	0.01	5	19.5	10.6	3.6	3.6	0.0	0.0	3.9	37.8	89.7	0.0	9.5
	43-53	Btkg	7.9	0.01	5	41.6	8.6	2.3	2.3	0.0	0.0	2.1	54.8	96.2	0.0	4.2
	53-61	BCg1	7.4	0.01	8	28.1	11.2	2.6	2.6	0.0	0.0	4.5	46.7	90.4	0.0	5.6
	61-71	BCg2	7.2	0.01	32	20.0	11.2	2.2	2.2	0.0	0.0	4.2	37.9	88.9	0.0	5.8
Morey silt loam:[2]																
(S84LA-23-12)	0-4	Ap1	5.0	1.38	5	4.3	1.5	0.1	0.3	0.0	0.0	6.8	13.0	47.7	0.0	2.3
	4-10	Ap2	5.7	0.81	5	4.8	1.6	0.0	0.6	0.0	0.0	2.9	9.9	70.7	0.0	6.1
	10-15	BA	6.3	0.54	5	8.5	3.9	0.1	2.3	0.0	0.0	3.1	17.9	82.7	0.0	12.8
	15-32	Btg1	7.1	0.28	5	11.9	5.5	0.3	3.5	0.0	0.0	2.6	23.8	89.1	0.0	14.7
	32-42	Btg2	7.3	0.19	5	12.9	5.6	0.3	3.2	0.0	0.0	3.5	25.5	86.3	0.0	12.5
	42-62	Btg3	7.3	0.06	5	14.5	6.2	0.4	3.2	0.0	0.0	2.2	26.5	91.7	0.0	12.1
	62-72	BCg	7.4	0.01	5	12.8	5.8	0.3	2.3	0.0	0.0	2.0	23.2	91.4	0.0	9.9
Mowata silt loam:[2]																
(S84LA-23-13)	0-4	Ap1	5.1	1.38	16	4.4	1.3	0.1	0.2	0.0	0.0	4.8	10.8	55.6	0.0	1.9
	4-8	Ap2	5.3	0.94	7	4.8	1.2	0.1	0.2	0.0	0.0	4.0	10.3	61.2	0.0	1.9
	8-18	Eg	6.8	0.28	5	7.4	2.3	0.1	0.6	0.0	0.0	4.0	14.4	72.2	0.0	4.2
	18-34	Btg1	7.1	0.19	5	9.4	2.3	0.2	0.9	0.0	0.0	2.0	14.8	86.5	0.0	6.1
	34-60	Btg2	7.1	0.02	5	13.9	4.6	0.3	1.2	0.0	0.0	3.1	23.1	86.6	0.0	5.2

See footnotes at end of table.

TABLE 19.--FERTILITY TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	pH 1:1 H_2O	Organic carbon	Extractable phosphorus[1]	Exchangeable cations: Ca	Mg	K	Na	Al	H	Total acidity	Cation-exchange capacity (sum)	Base saturation (sum)	Effective cation-exchange capacity saturated with Al	Sum of cation-exchange capacity saturated with Na
	In			Pct	Ppm	---Milliequivalents/100 grams of soil----								Pct	Pct	Pct
Vidrine silt loam:[2]																
(S84LA-23-11)	0-6	Ap	4.5	1.21	28	1.7	0.4	0.3	0.1	0.5	0.4	6.3	8.8	28.4	14.7	1.1
	6-12	A	4.5	1.03	12	1.5	0.4	0.0	0.1	0.4	0.2	7.8	9.8	20.4	15.4	1.0
	12-19	BA	4.8	0.19	5	1.3	0.5	0.0	0.1	0.5	0.3	4.8	6.7	28.4	18.5	1.5
	19-22	B/E	4.7	0.41	5	3.8	2.7	0.1	0.6	2.0	0.4	8.7	15.9	45.3	20.8	3.8
	22-35	Btg1	4.9	0.32	5	8.4	8.0	0.3	1.2	4.3	0.6	11.4	29.3	61.1	18.9	4.1
	35-60	Btg2	5.0	0.06	5	9.4	6.6	0.2	1.2	0.5	0.8	8.1	25.5	68.2	2.7	4.7
	60-80	BCg	6.1	0.01	5	14.2	11.6	0.4	1.0	0.0	0.6	6.3	33.5	81.2	0.0	3.0

[1] Phosphorus values of 5 indicate a phosphorus content equal to or less than 5 ppm.
[2] This is the pedon described as typical for the series in Cameron Parish.
[3] The location of this pedon is 2.6 miles east of Holly Beach, 250 feet south of Louisiana State Highway 27, T. 15 S., R. 10 W.
[4] The location of this pedon is 6.75 miles east of Cameron, 9.75 miles west of St. Hubert Church, 100 feet west of Front Ridge Road, 850 feet north of a field road, SE1/4NE1/4 sec. 6, T. 15 S., R. 8 W.

TABLE 20.--PHYSICAL TEST DATA FOR SELECTED SOILS

(The symbol < means less than. Dashes indicate that analyses were not made)

Soil name and sample number	Horizon	Depth	Particle-size distribution: Sand: Very coarse (2-1 mm)	Coarse (1.0-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Water content at tension: 1/3 bar	15 bar	Water retention difference	Bulk density: Air-dry	Oven-dry	Field moisture
		In	Pct								Pct			g/cm^3	g/cm^3	g/cm^3
Allemands muck:* (S80LA-23-9)	Oa1	0-14	0.00	0.00	0.00	0.37	1.07	1.44	9.21	89.35	---	---	---	---	---	---
	Oa2	14-30	0.00	0.00	0.00	1.54	4.83	6.37	22.93	70.69	---	---	---	---	---	---
	Abg	30-37	0.00	0.00	0.01	0.19	3.20	3.39	14.94	81.67	---	---	---	---	---	---
	Cg1	37-51	0.00	0.00	0.03	0.16	2.13	2.82	4.73	92.46	---	---	---	---	---	---
	Cg2	51-66	0.01	0.21	0.51	2.04	21.24	24.0	36.10	39.90	---	---	---	---	---	---
Hackberry loamy fine sand:** (S84LA-23-1)	Ap	0-6	0.00	1.00	1.50	31.2	46.3	80.0	17.90	2.10	10.2	7.6	2.6	1.38	1.39	1.37
	Bw1	6-13	0.00	0.40	0.80	29.7	41.9	72.8	18.20	9.00	18.5	13.1	5.4	1.65	1.66	1.59
	Bw2	13-17	0.00	0.20	1.00	16.3	48.4	65.9	21.80	12.30	26.7	16.9	9.8	1.72	1.75	1.56
	Bw3	17-28	0.00	0.30	5.40	34.3	43.7	83.7	11.90	4.40	10.4	7.8	2.6	1.61	1.62	1.55
	C	28-37	0.00	2.20	30.30	53.3	4.2	90.0	9.40	0.60	4.1	3.5	0.6	1.66	1.67	1.59
	Cg	37-40	0.00	0.10	8.50	65.0	2.0	75.6	12.80	11.60	15.8	10.1	5.7	1.69	1.73	1.54
	C'	40-61	0.00	0.30	3.20	94.8	1.1	99.4	0.10	0.50	2.4	2.3	0.1	---	---	---
Kaplan silt loam:*** (S85LA-23-4)	Ap	0-7	0.4	1.0	1.0	2.4	19.5	24.3	64.70	11.00	29.9	6.8	23.1	1.62	1.63	1.54
	Btg1	7-13	0.3	0.4	0.6	0.9	12.3	14.5	39.40	46.10	47.1	22.6	24.5	1.97	2.00	1.46
	Btg2	13-27	0.3	0.3	0.3	0.7	11.2	12.8	43.30	43.90	42.1	20.9	21.2	1.98	2.00	1.45
	Btkg1	27-44	0.2	0.1	0.1	0.9	11.7	13.0	45.90	41.10	35.5	17.4	18.1	1.99	2.03	1.56
	Btkg2	44-54	0.2	0.1	0.3	1.1	16.8	18.5	45.20	36.30	37.2	17.8	19.4	1.99	2.03	1.54
	Btkg3	54-66	0.1	0.3	0.2	0.6	8.9	10.1	53.40	36.50	36.9	17.7	19.2	1.98	1.99	1.54
	BCg	66.73	0.1	0.0	0.4	0.7	17.4	18.6	49.80	31.60	36.6	16.3	20.3	1.83	1.85	1.56
Mermentau clay:** (S81LA-23-1)	A	0-6	---	---	---	---	---	13.95	21.50	64.56	---	---	---	---	---	---
	Bg	6-19	---	---	---	---	---	28.78	8.45	62.77	---	---	---	---	---	---
	2Cg1	19-42	---	---	---	---	---	75.97	7.11	16.92	---	---	---	---	---	---
	2Cg2	42-48	---	---	---	---	---	75.67	4.46	19.87	---	---	---	---	---	---
	2Cg3	48-59	---	---	---	---	---	74.58	6.84	18.58	---	---	---	---	---	---
	3Cg4	59-69	---	---	---	---	---	50.51	5.04	44.44	---	---	---	---	---	---

See footnotes at end of table.

TABLE 20.--PHYSICAL TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Particle-size distribution: Sand: Very coarse (2-1 mm)	Coarse (1.0-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Water content at tension: 1/3 bar	15 bar	Water retention difference	Bulk density: Air-dry	Oven-dry	Field moisture
		In	Pct								Pct			g/cm^3	g/cm^3	g/cm^3
Peveto fine sand:**	A1	0-9	0.12	0.98	28.16	60.56	1.72	91.54	5.34	3.12	6.14	2.15	---	---	---	---
(S81LA-23-2)	A2	9-15	0.03	0.63	23.46	68.15	2.25	91.99	1.25	6.76	2.63	1.27	---	---	---	---
	C	15-31	0.03	0.77	23.34	64.86	2.28	91.28	7.50	1.22	2.41	1.79	---	---	---	---
	Ab1	31-38	0.00	0.13	6.24	71.23	9.16	86.76	4.76	8.48	7.91	3.52	---	---	---	---
	Ab2	38-46	0.03	0.25	5.16	59.31	15.08	79.83	6.85	13.32	12.55	5.69	---	---	---	---
	C'1	46-59	8.71	12.99	18.29	43.24	4.67	87.90	5.31	6.79	3.82	2.25	---	---	---	---
	C'2	59-75	0.11	0.11	0.82	72.75	15.62	89.47	5.18	5.35	6.26	2.87	---	---	---	---
Scatlake mucky clay:*	Ag	0-10	---	---	1.39	2.68	4.68	8.75	37.24	54.01	---	---	---	---	---	---
(S80LA-23-1)	Cg1	10-30	---	---	0.04	0.13	0.92	1.09	2.82	96.09	---	---	---	---	---	---
	Cg2	30-42	---	---	0.04	0.11	0.95	1.10	2.76	96.14	---	---	---	---	---	---
	Cg3	42-60	---	---	0.34	10.07	3.17	13.59	6.98	79.44	---	---	---	---	---	---

* This is the pedon described as typical for the series in Cameron Parish.

** This is the pedon described as typical for the official series and for the series in Cameron Parish.

*** The location of this pedon is 2.25 miles south of the intersection of Louisiana State Highways 14 and 99 and 250 feet east of a gravel road, T. 12 S., R. 5 W.

TABLE 21.--CHEMICAL TEST DATA FOR SELECTED SOILS

(The symbol < means less than. Dashes indicate that analyses were not made)

Soil name and sample number	Horizon	Depth	Extractable cations: Ca	Mg	K	Na	Extractable acidity	Cation-exchange capacity (NH_4OAc)	Base saturation (NH_4OAc)	Organic carbon	pH 1:1 H_2O	pH 1:1 KCl	pH 1:2 $CaCl_2$	Extractable iron	Extractable aluminum	Extractable hydrogen	Extractable phosphorus: Bray 1	Bray 2
		In	Meq/100g				Pct	Pct		Pct				Pct	Meq/100g		Ppm	
Allemands muck:* (S80LA-23-9)	Oa1	0-14	---	---	---	---	---	74.3	---	---	5.4	6.0	5.3	---	---	0.14	---	---
	Oa2	14-30	---	---	---	---	---	94.0	---	---	5.3	6.3	5.3	---	---	0.18	---	---
	Abg	30-37	---	---	---	---	---	55.9	---	---	5.6	6.1	5.5	---	---	0.06	---	---
	Cg1	37-51	---	---	---	---	---	39.6	---	---	5.8	6.2	6.0	---	---	0.12	---	---
	Cg2	51-66	---	---	---	---	---	21.0	---	---	7.5	7.4	7.4	---	0.23	2.00	---	---
Hackberry loamy fine sand:** (S84LA-23-1)	Ap	0-6	5.0	1.8	0.3	0.3	4.0	9.1	80.8	1.02	6.7	5.5	6.4	0.61	0.0	0.0	13	51
	Bw1	6-13	6.3	4.0	0.2	1.6	2.5	13.2	91.7	0.41	8.2	6.2	7.0	0.54	0.0	0.0	3	48
	Bw2	13-17	11.4	4.0	0.3	3.2	1.8	17.6	107.3	0.17	8.6	6.8	7.6	0.46	0.0	0.0	5	104
	Bw3	17-28	2.4	2.6	0.1	1.7	1.4	4.5	147.8	0.04	8.9	7.1	7.9	0.44	0.0	0.0	5	117
	C	28-37	10.7	1.5	0.1	2.2	0.5	4.4	327.2	0.08	9.5	7.8	8.0	0.16	0.0	0.0	9	31
	Cg	37-40	11.3	6.0	0.3	2.8	1.4	12.4	164.5	0.06	9.0	7.4	8.2	0.24	0.0	0.0	5	70
	C'	40-61	19.5	1.3	0.2	1.2	0.7	2.9	756.6	0.03	9.2	8.0	8.0	0.11	0.0	0.0	6	31
Kaplan silt loam:*** (S85LA-23-4)	Ap	0-7	5.5	1.3	0.3	0.1	3.6	9.5	75.8	0.76	6.4	5.2	5.8	2.2	0.0	0.0	32	32
	Btg1	7-13	16.0	6.0	0.2	0.8	7.0	29.9	76.9	0.60	7.0	5.9	6.6	3.8	0.0	0.0	<1	<1
	Btg2	13-27	19.8	6.4	0.2	1.6	2.8	27.3	102.6	0.16	7.7	6.8	7.4	3.4	0.0	0.0	<1	<1
	Btkg1	27-44	18.6	5.2	0.2	1.7	2.0	24.5	104.9	0.11	7.8	6.9	7.7	2.4	0.0	0.0	<1	<1
	Btkg2	44-54	18.6	4.9	0.2	1.9	1.8	26.1	98.1	0.12	8.0	6.7	7.6	1.6	0.0	0.0	<1	<1
	Btkg3	54-66	42.6	5.0	0.2	1.5	1.3	25.7	191.8	0.05	8.0	6.9	7.7	1.4	0.0	0.0	<1	<1
	BCg	66-73	23.4	4.1	0.3	1.1	1.8	25.5	113.3	0.03	8.1	7.0	7.6	1.4	0.0	0.0	<1	<1
Mermentau clay:** (S81LA-23-1)	A	0-6	2.19	3.55	0.34	1.74	---	22.08	---	3.3	7.8	7.4	7.9	---	79.01	0.27	---	85
	Bg	6-19	1.51	2.42	0.24	1.79	---	33.40	---	1.1	8.1	7.6	8.2	---	80.18	0.17	---	99
	2Cg1	19-42	4.35	8.28	0.69	1.47	---	10.28	---	0.1	8.0	7.6	8.3	---	94.06	0.18	---	249
	2Cg2	42-48	2.50	1.26	0.10	0.44	---	18.45	---	0.2	8.2	7.8	8.3	---	83.39	0.22	---	260
	2Cg3	48-59	9.04	12.55	0.79	3.69	---	14.35	---	0.1	8.2	7.8	8.3	---	88.15	0.15	---	250
	3Cg4	59-69	7.48	16.59	1.44	7.62	---	21.92	---	0.2	8.3	7.8	8.3	---	75.64	0.20	---	184

See footnotes at end of table.

TABLE 21.--CHEMICAL TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Extractable cations: Ca	Extractable cations: Mg	Extractable cations: K	Extractable cations: Na	Extractable acidity	Cation-exchange capacity (NH_4OAc)	Base saturation (NH_4OAc)	Organic carbon	pH 1:1 H_2O	pH 1:1 KCl	pH 1:2 $CaCl_2$	Extractable iron	Extractable aluminum	Extractable hydrogen	Extractable phosphorus Bray 1	Extractable phosphorus Bray 2
		In	Meq/100g				Pct	Pct		Pct				Pct	Meq/100g		Ppm	
Peveto loamy fine sand:** (S81LA-23-2)																		
	A1	0-9	10.78	0.29	0.29	0.01	0.71	6.3	---	0.69	7.3	6.9	6.8	0.1	0.13	0.06	52	114
	A2	9-15	8.23	0.20	0.23	0.02	1.52	3.5	---	0.19	7.5	7.1	6.8	0.1	0.07	0.03	25	77
	C	15-31	11.43	0.21	0.03	0.04	0.50	2.0	---	0.13	7.9	7.5	7.2	0.1	0.12	0.00	18	52
	Ab1	31-38	6.61	0.61	0.00	0.00	0.50	7.0	---	0.24	7.6	6.8	6.8	0.2	0.05	0.00	29	100
	Ab2	38-46	10.18	1.02	0.10	0.10	0.81	9.4	---	0.33	7.4	6.5	6.9	0.3	0.07	0.00	11	83
	C'1	46-59	16.89	0.28	0.13	0.05	1.32	2.8	---	0.05	8.1	7.5	7.3	0.1	0.00	0.00	0	0
	C'2	59-75	11.16	0.57	0.29	0.02	1.52	5.9	---	0.05	7.9	7.1	7.3	0.2	0.05	0.00	55	105

* This is the pedon described as typical for the series in Cameron Parish.

** This is the pedon described as typical for the official series and for the series in Cameron Parish.

*** The location of this pedon is 2.25 miles south of the intersection of Louisiana Highways 14 and 99 and 250 feet east of a gravel road, T. 12. S., R. 5 W.

TABLE 22.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Allemands	Clayey, montmorillonitic, euic, thermic Terric Medisaprists
Bancker	Very fine, montmorillonitic, nonacid, thermic Typic Hydraquents
Clovelly	Clayey, montmorillonitic, euic, thermic Terric Medisaprists
Creole	Fine, montmorillonitic, nonacid, thermic Typic Hydraquents
Crowley	Fine, montmorillonitic, thermic Typic Albaqualfs
Ged	Very fine, mixed, thermic Typic Ochraqualfs
Gentilly	Very fine, montmorillonitic, nonacid, thermic Typic Hydraquents
Hackberry	Sandy, mixed, thermic Aeric Haplaquepts
Judice	Fine, montmorillonitic, thermic Vertic Haplaquolls
Kaplan	Fine, mixed, thermic Aeric Ochraqualfs
Larose	Very fine, montmorillonitic, nonacid, thermic Typic Hydraquents
Leton	Fine-silty, mixed, thermic Typic Glossaqualfs
Mermentau	Clayey over loamy, montmorillonitic, nonacid, thermic Typic Haplaquepts
Midland	Fine, montmorillonitic, thermic Typic Ochraqualfs
Morey	Fine-silty, mixed, thermic Typic Argiaquolls
Mowata	Fine, montmorillonitic, thermic Typic Glossaqualfs
Peveto	Mixed, thermic Typic Udipsamments
*Scatlake	Very fine, montmorillonitic, nonacid, thermic Typic Hydraquents
Vidrine	Coarse-silty over clayey, mixed, thermic Glossaquic Hapludalfs

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