United States Department of Agriculture

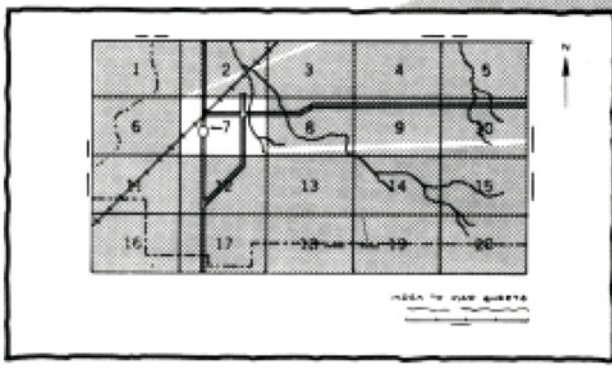
Soil Conservation Service

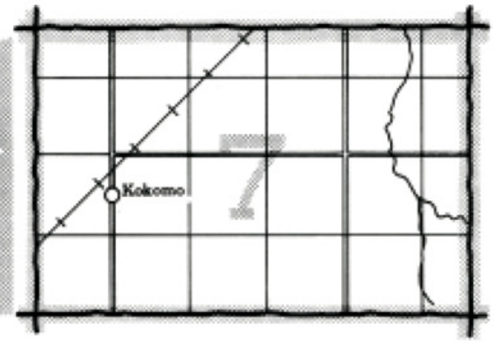
In cooperation with Louisiana Agricultural Experiment Station and the Louisiana Soil and Water Conservation Committee

Soil Survey of Calcasieu Parish, Louisiana

HOW TO USE

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





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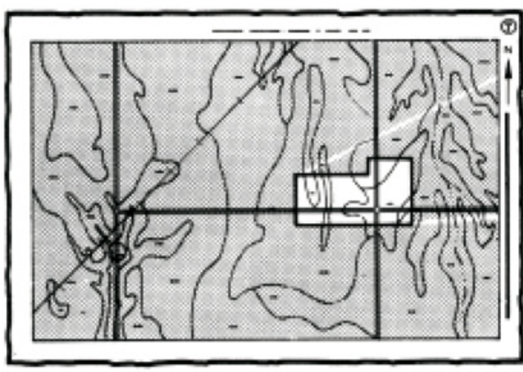

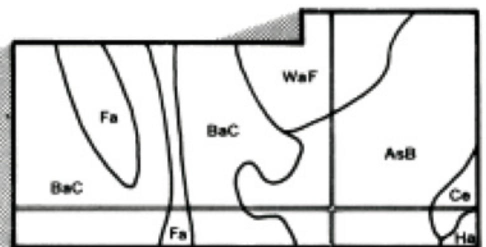

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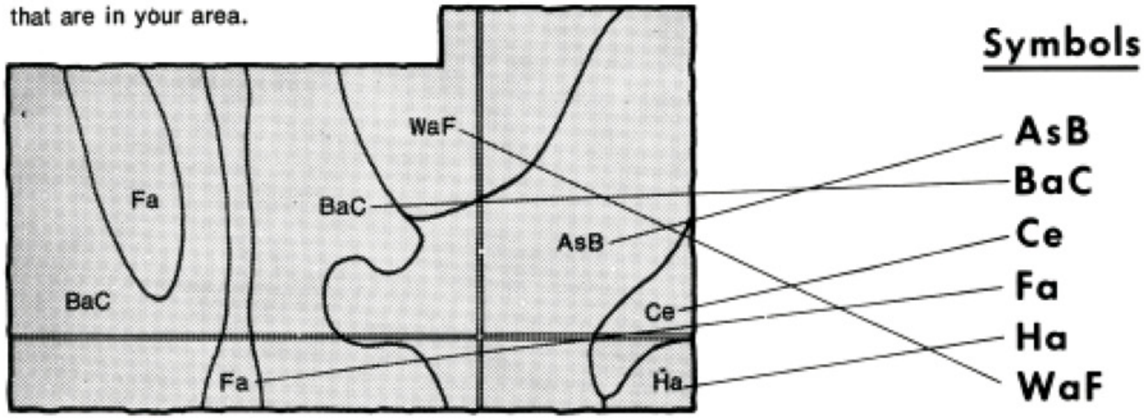
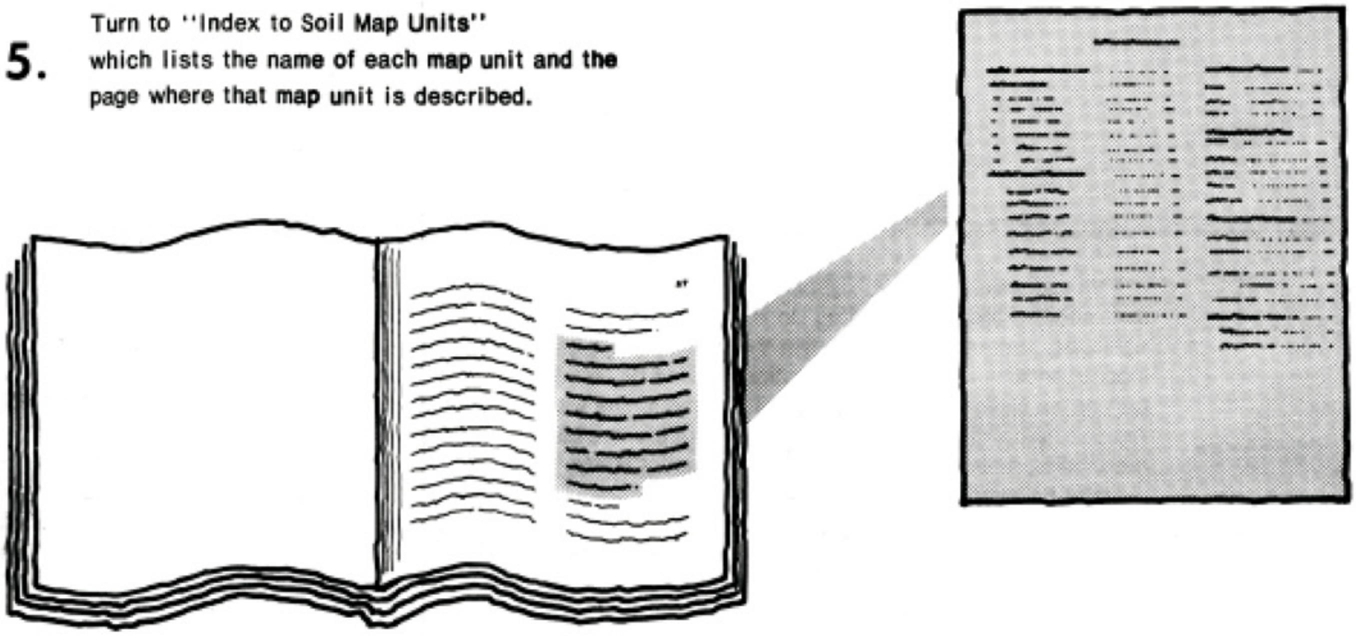
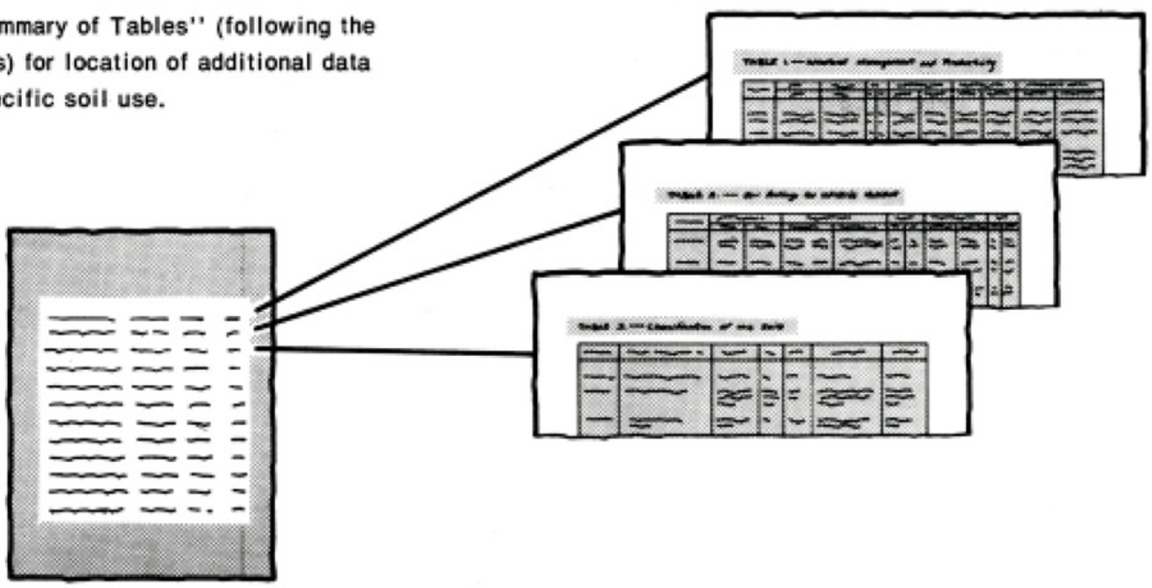


THIS SOIL SURVEY

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



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



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

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, handicap, or age.

Major fieldwork for this soil survey was completed in 1982. Soil names and descriptions were approved in 1982. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1982. 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.

Cover: Rice, which is a major crop in Calcasieu Parish, is being harvested in an area of Midland silty clay loam.

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Issued June 1988

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Foreword

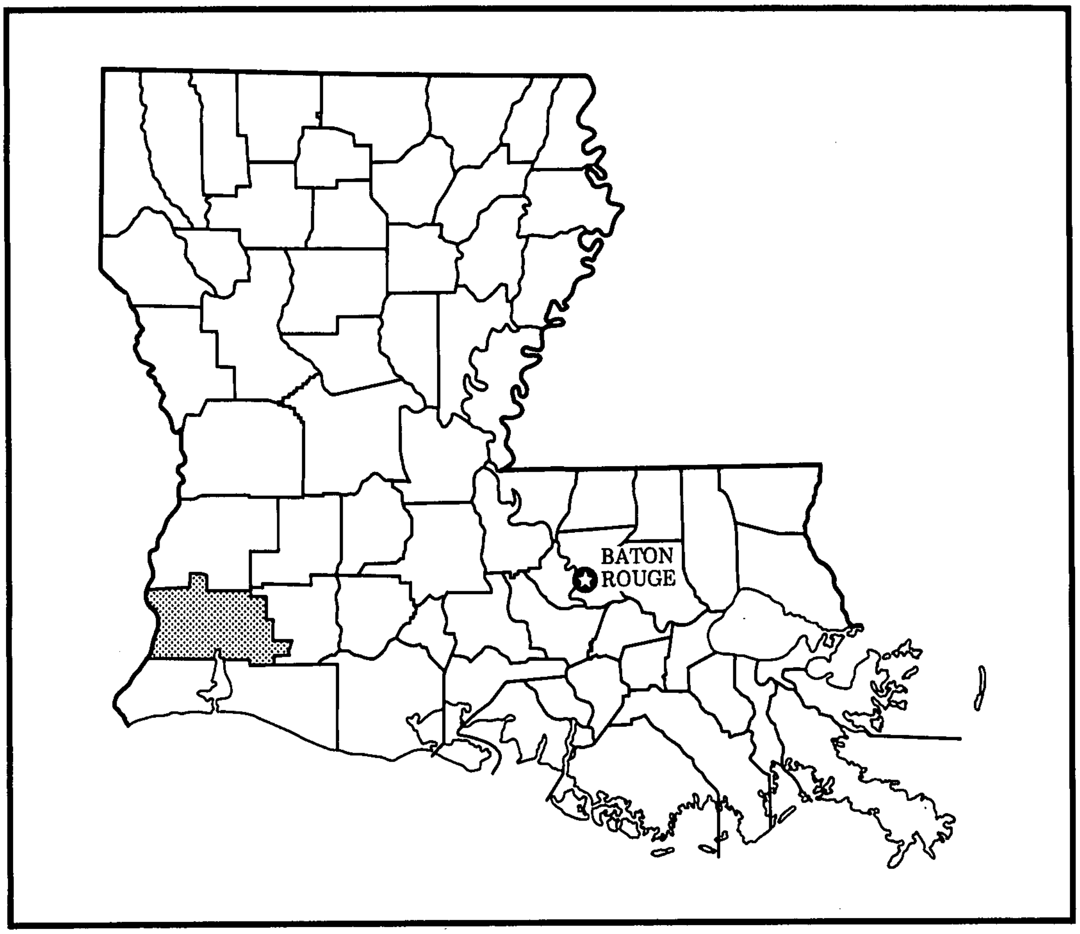
This soil survey contains information that can be used in land-planning programs in Calcasieu Parish. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact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

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

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

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

Horace J. Austin
State Conservationist
Soil Conservation Service



Location of Calcasieu Parish in Louisiana.

Soil Survey of Calcasieu Parish, Louisiana

By A.J. Roy and Clay T. Midkiff, Soil Conservation Service

Fieldwork by A.J. Roy, Clay T. Midkiff, Donald R. McDaniel, Carl Guillory, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service
In cooperation with Louisiana Agricultural Experiment Station

CALCASIEU PARISH is in southwestern Louisiana. The total area is 699,916 acres, or 1,094 square miles. Elevation ranges from sea level to 95 feet above sea level. In 1980, the population of the parish was about 167,223, according to the Bureau of the Census. Lake Charles is the parish seat.

Land use is primarily agriculture. About 46 percent of the land is used as cultivated cropland and pastureland. Another 23 percent is used as woodland. Most of the remaining acreage is used as urban land, marshland, or swampland.

The parish consists generally of three major physiographic areas. They are the forested terrace uplands in the northern part of the parish, the Gulf Coast Prairies in the central and southeast parts of the parish, and the Gulf Coast Marsh lying mostly in the southwest corner of the parish.

The terrace uplands make up about 44 percent of the parish. The soils are mainly loamy. They are generally low in natural fertility, but crops respond well to fertilizer and lime. These soils are used mainly as woodland or cropland. Some areas are used as pasture or homesites. Wetness is a limitation on many of these soils. Erosion is a hazard on the sloping soils.

The Gulf Coast Prairies make up about 45 percent of the parish. The soils range from loamy to clayey. They are generally medium in natural fertility. These soils are used mainly for cultivated crops. Some areas are used for urban development or as pasture. Wetness is a limitation on most of these soils.

The Gulf Coast Marsh (including the swamps) makes up most of the remaining 11 percent of the parish. These soils range from soft organic soils to firm mineral clayey soils. They are all very poorly drained and subject to flooding. These soils are used mainly as habitat for wildlife and for recreation. Some of the firmer marsh areas are used as rangeland for cattle.

General Nature of the Parish

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

Climate

Prepared by the National Climatic Data Center, Asheville, North Carolina.

In Calcasieu Parish the long summers are hot and humid. Winters are warm and only occasionally interrupted by incursions of cool air from the north. Rains occur throughout the year, and precipitation is adequate for all crops.

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, 29 inches, or 60 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, and most occur in summer.

The average seasonal snowfall is less than 1 inch and 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.

Every few years a hurricane crosses the area.

History

Calcasieu Parish was established as "Imperial Calcasieu" in 1840. It was formed from the western part of St. Landry Parish, and consisted of the area within the boundaries of present day Calcasieu, Cameron, Jefferson Davis, Allen, and Beauregard Parishes. Calcasieu Parish was reduced to its present size by 1912.

When the Spanish adventurers settled this territory in the middle 1700's, it was inhabited by Attakapa Indians. The Indians named this area after their chief "Calcasieu," which meant "crying eagle." French settlers soon moved in, setting the stage for a lingering border dispute between France and Spain. After the United States acquired Louisiana from France, Anglo-Saxons quickly began a westward migration and joined the settlement.

The parish began to prosper when Texas cattle drovers used the Old Spanish Trail to move their herds to New Orleans. Around 1855 the parish boomed into a thriving community with the introduction of sawmills. Rice became a chief industry after establishment of rice milling facilities in 1891. Industrial growth began with commercial sulphur production in 1894. In 1926, development of a deep water ship channel brought about a period of rapid growth and urban development. The ship channel turned the parish into a busy seaport, boosted oil production, and paved the way for development of the large petroleum-related industries present here today.

Agriculture

Calcasieu Parish has the natural resources to support a large agricultural economy. In 1981, there were 692 farms in the parish according to the Louisiana State Planning Office. The average size was about 589 acres.

There were 246,000 acres of cropland, 60,000 acres of pasture, and 18,000 acres of marsh rangeland in 1982. About 165,400 acres were in woodland in 1978, according to the Louisiana Office of Forestry. In recent years, the acreage planted to rice has decreased substantially and the acreage of soybeans has increased. Based on the Agricultural Stabilization and Conservation Service's certified acres report, about 37,000 acres of rice and 80,000 acres of soybeans were planted in 1982. In addition, small acreages of wheat and sorghum were planted.

Agricultural marketing is aided by the presence of numerous grain elevators and rice mills, and the efficiency of water transportation services, which transport large quantities of rice and wood products.

Industry

Industry in Calcasieu Parish can be grouped into 11 major categories: oil and natural gas exploration, mining and refining; petrochemicals; chemicals; lumber and wood processing; retail merchandising; raw and calcinated coke; construction; utilities; synthetic rubber; aluminum; and garment manufacturing.

Several inducements assure the continued presence and growth of industry in Calcasieu Parish. Raw materials, primarily oil and wood, are readily available. Plentiful supplies of energy, such as natural gas and coal, are close and affordable. Ample surface and ground water is readily obtained. Good transportation routes exist both on land and water. A large force of skilled labor is present and facilities are available to train more workers in industrial skills. The parish also has a good variety of suitable industrial sites.

Transportation

Calcasieu Parish is served by three major railroads that connect to every major railroad system in the United States. There are two United States highways, one interstate highway, and numerous other paved state and parish roads.

The parish is served by two commercial airlines providing freight and passenger service. A large municipal airport is near Lake Charles. Several aircraft charter companies provide services at three smaller airports in the parish.

Calcasieu Parish is served by more than twenty motor freight carriers located at numerous terminals. Two major bus lines serve the area.

Water transportation has been significant to industrial development in this parish. The Port of Lake Charles and many of the industrial complexes have access to the Calcasieu River Ship Channel. Barge traffic makes extensive use of the Intracoastal Waterway, and barges can navigate the Calcasieu River up to a point north of Lake Charles. The Sabine River also has a ship channel and facilities are available at the Port of Vinton and at the West Calcasieu Harlan and Terminal District. Many smaller waterways provide transportation routes for smaller craft.

Water Resources

Industrial facilities are the largest users of water in Calcasieu Parish. In 1980, a total of 607 million gallons per day was withdrawn for industrial uses. About 70 percent was taken from surface water and the other 30 percent from ground water. Industrial usage is expected to increase slightly by the year 2020.

Large volumes of water are also used for rice irrigation and public supply. In 1980, about 146 million gallons per day was used for rice irrigation and 22.6 million gallons per day was obtained for public supply. About 70 percent of the agricultural water was obtained from surface water and the other 30 percent from ground water. Agricultural usage is expected to increase to 216 million gallons per day by the year 2020 *(30)*. Public supply is from ground water and is projected to increase to 46.5 million gallons per day by the year 2020.

The Calcasieu River flows southwest across the eastern and central parts of the parish. This stream is a major source of surface water in Calcasieu Parish. The average annual discharge of the Calcasieu River is 1,860,500 acre feet of water per year (1923-24, 1939-57, and 1962-83) near Kinder *(9)*. The West Fork of the Calcasieu River is also a major source of surface water. It drains most of the northern part of the parish and flows into the Calcasieu River northwest of Lake Charles. The West Fork of the Calcasieu River discharges water from Bear Head Creek, Houston River, Buxton Creek, Little River, Beckwith Creek, Hickory Branch, and Indian Bayou. Bear Head Creek discharged an average of 172,400 acre feet of water per year (1957-83) near DeQuincy. Beckwith Creek near DeQuincy has an average annual discharge of 144,200 acre feet per year (1946-83). Bayou Serpent, Bayou Arceneaux, and English Bayou are also major tributaries of the Calcasieu River. These three streams drain the northeast part of the parish and provide surface water for irrigation. Water-quality data for the Calcasieu River near Oberlin show that the water is typically low in dissolved solids, moderate to high in dissolved oxygen, and relatively high in color *(9)*.

Currently, low flows in the Calcasieu River are being augmented by diversions from the Sabine River. The Sabine Diversion Canal has a maximum capacity of 240,000 gallons per minute. The Sabine River and its numerous small tributaries are significant sources of surface water in the parish. Its average annual discharge is 5,375,000 acre feet of water per year (1967-81) near Ruliff, Texas.

Other sources of surface water in the parish include: Bayou Lacassine, Bayou Choupique, the Intracoastal Canal, and the Vinton Drainage Canal.

Historical daily discharge data are not available for streams in central and southern Calcasieu Parish mainly because these areas are affected by tides. Until recently, instrument technology has been inadequate to measure streamflow under tidal influence. Currently, there are plans to determine daily discharge for the lower Calcasieu River, Bayou Lacassine, and Bayou Choupique using some of the new instrumentation.

The Chicot and Evangeline aquifers *(9)* are two sources of fresh ground water. The Chicot aquifer provides nearly 100 percent of the ground water in Calcasieu Parish. The sand and gravel deposits of Pleistocene age that make up the Chicot aquifer are a source of large quantities of ground water. The aquifer provides about 185 million gallons of water per day for industrial, public, domestic, and livestock use. It ranges from about 400 feet thick in northern Calcasieu Parish to about 900 feet thick in the southern part.

Since virtually all of the major users in Calcasieu Parish depend on the Chicot aquifer, the Calcasieu River, or both, concerns for purity and sustained supply from the Chicot aquifer are extremely important to the parish.

Three major water-bearing strata are in the Lake Charles area. One stratum is approximately 200 feet and another stratum is approximately 500 feet below the surface. The third stratum lies approximately 700 feet beneath the surface and has an interface of fresh and salt water. Irrigation wells screened in these deposits generally yield between 1,500 and 2,000 gallons per minute. Some wells have pumped as much as 5,000 gallons per minute. Water in this aquifer is hard. Some treatment is recommended for domestic water use. Concentration of iron is moderately high with contents ranging from about 0.5 part per million to about 5 parts per million.

The Evangeline aquifer provides some water for domestic and public supply use in the DeQuincy area. This aquifer is sand and gravel deposits of Plicone-Miocene age. It provides soft water with low concentrations of iron. The Evangeline aquifer, however, is at depths of more than 400 feet, and yields much less water than the Chicot aquifer.

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 difficult, helicopters provided transportation to the sample sites.

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

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

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

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

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

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

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond 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 general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

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

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

The soils in the survey area vary widely in their potential for major land uses. Table 4 shows the extent of the map units shown on the general soil map. It lists the suitability of each, in relation to that of the other map units, for major land uses and shows soil properties that limit use. Soil suitability ratings are based on the practices commonly used in the survey area to overcome soil limitations. These ratings reflect the ease of overcoming the limitations. They also reflect the problems that will persist even if such practices are used.

Each map unit is rated for *cultivated crops, pastureland, woodland, urban uses,* and *intensive recreation areas*. Cultivated crops are those grown extensively in the survey area. Pastureland refers to land that is producing either native grasses or tame grasses and legumes for livestock grazing. Woodland refers to areas of native or introduced trees. Urban uses include residential, commercial, and industrial developments. Intensive recreation areas are campsites, picnic areas, ballfields, and other areas that are subject to heavy foot traffic.

In this survey, the general soil map units are grouped into five general landscapes. Descriptions of each of the broad groups and the map units in each group follow.

Poorly Drained and Moderately Well Drained Soils; on Terrace Uplands

The three map units of this group consist of poorly drained and moderately well drained, loamy soils.

These three map units make up about 34 percent of the land area of the parish. Most acreage is in woodland or cropland. Seasonal wetness and susceptibility to erosion are the main limitations for most uses.

1. Caddo-Glenmora-Messer

Level to moderately sloping, poorly drained and moderately well drained soils that are loamy throughout

This map unit consists of soils on broad flats, mounds, ridges, and side slopes on terrace uplands. Slopes range from 0 to 8 percent.

This map unit makes up about 11 percent of the land area of the parish. It is about 34 percent Caddo soils, 34 percent Glenmora soils, 16 percent Messer soils, and 16 percent soils of minor extent.

Caddo soils are level and poorly drained. They are on broad flats. These soils have a grayish brown silt loam surface layer and a light brownish gray silt loam subsurface layer. The subsoil is light brownish gray silt loam.

Glenmora soils are very gently sloping and moderately well drained. They are on ridges and side slopes. These soils have a dark grayish brown silt loam surface layer and a yellowish brown or strong brown silt loam and silty clay loam subsoil.

Messer soils are very gently sloping to moderately sloping and moderately well drained. They are on ridges, side slopes, and mounds. These soils have a dark grayish brown silt loam surface layer. The subsoil is light yellowish brown silt loam in the upper part and yellowish brown silty clay loam in the lower part.

Of minor extent are the somewhat poorly drained Acadia soils on side slopes, the poorly drained Brimstone and Guyton soils on broad flats and in swales, and the Malbis soils on ridges and side slopes. The very gently sloping Acadia soils make up the largest acreage of the minor soils. These soils have a dark grayish brown silt loam surface layer and a light brownish gray silty clay subsoil.

Most of the soils in this map unit are used as woodland, mainly pine trees. Small acreages are used for crops and pasture.

The soils in this map unit are well suited to woodland. The potential production of loblolly pine, slash pine, and longleaf pine is high. Wetness limits the use of equipment in most places. Seedling mortality is moderate in areas of the Caddo soils because of wetness.

The soils are moderately well suited to crops and pasture. Wetness is the main limitation for these uses in level areas, and erosion is a hazard in sloping areas. A surface drainage system is needed for crops and pasture in level areas. In sloping areas, soil losses from erosion can be minimized by minimum tillage, contour farming, and grassed waterways. Fertilizer and lime are needed in all areas.

The soils in this map unit are poorly suited to urban development. Wetness, slow permeability, and moderate shrink-swell potential are the main limitations.

2. Brimstone-Kinder

Level, poorly drained soils that are loamy throughout

This map unit consists of soils on broad flats on terrace uplands. Slopes range from 0 to 1 percent.

This map unit makes up about 5 percent of the land area of the parish. It is about 78 percent Brimstone soils, 20 percent Kinder soils, and 2 percent soils of minor extent.

Brimstone soils are poorly drained. They are on broad flats. These soils have a dark grayish brown silt loam surface layer and a grayish brown silt loam and silty clay loam subsoil. This soil contains high concentrations of sodium salts in the subsurface and subsoil layers.

Kinder soils are poorly drained. They are on slightly higher positions on the landscape than Brimstone soils. Kinder soils have a dark grayish brown silt loam surface layer and a light brownish gray loamy subsoil.

Of minor extent are the moderately well drained Messer soils on mounds, the poorly drained Guyton soils in low positions along drains, and the somewhat poorly drained Acadia soils on side slopes.

The soils in this map unit are mainly used for crops or woodland. A small acreage is in pasture. Soybeans and rice are the main crops.

The soils are moderately well suited to crops and pasture. Wetness and low fertility in the Brimstone and Kinder soils and the high concentrations of sodium salts in the Brimstone soils are the main limitations. A good drainage system and fertilizer are needed for crops and pasture.

The soils in this map unit are moderately well suited to woodland. The potential for production of slash pine and loblolly pine is moderately high to high. The high amount of sodium in the Brimstone soils restricts root development and growth and causes moderate seedling mortality. Wetness limits the use of equipment.

This unit is poorly suited to urban development. Wetness and slow permeability are the main limitations. Flooding is a hazard.

3. Kinder-Messer-Guyton

Level to moderately sloping, poorly drained and moderately well drained soils that are loamy throughout

This map unit consists of soils on broad flats, mounds, ridges, side slopes, and in depressional areas. Some soils in depressional areas are subject to flooding. Slopes range from 0 to 5 percent.

This map unit makes up about 18 percent of the land area of the parish. It is about 28 percent Kinder soils, 27 percent Messer soils, 27 percent Guyton soils, and 18 percent soils of minor extent.

Kinder soils are level and poorly drained. They are on broad flats. These soils have a dark grayish brown silt loam surface layer and a light brownish gray clay loam or loam subsoil.

Messer soils are very gently sloping to moderately sloping and moderately well drained. They are on low circular mounds, side slopes, and narrow ridges. These soils have a dark grayish brown silt loam surface layer. The subsoil is light yellowish brown silt loam in the upper part and yellowish brown silty clay loam in the lower part.

Guyton soils are level and poorly drained. They are on broad flats and in depressional areas. They have a grayish brown silt loam surface layer and a light brownish gray silt loam subsurface layer. The subsoil is light brownish gray silt loam and silty clay loam.

Of minor extent are the somewhat poorly drained Acadia soils, the moderately well drained Gore and Glenmora soils on side slopes, and the poorly drained Brimstone soils on broad flats. The very gently sloping to moderately sloping Acadia soils make up the largest acreage of the minor soils.

Most of the soils in this map unit are used as woodland and cropland. A significant acreage is used as urban land. A small acreage is in pasture. Soybeans and rice are the main crops.

The soils are well suited to woodland. The potential for production of slash pine, loblolly pine, and longleaf pine is high. The main concern in producing and harvesting timber is wetness, which restricts use of equipment and causes seedling mortality.

The soils in this map unit are moderately well suited to cultivated crops and pasture. Wetness and low fertility are the main limitations. Flooding is a hazard in some depressional areas and erosion is a hazard on slopes. A good drainage system is needed for most cultivated crops and pasture plants. Most crops and pasture plants respond well to additions of lime and fertilizer.

The soils in this map unit are poorly suited for urban development. Wetness and slow permeability are the main limitations. Flooding is a hazard.

Somewhat Excessively Drained, Well Drained, and Poorly Drained Soils; on Stream Terraces

The map unit of this group consists of sandy and loamy soils on stream terraces.

This map unit makes up about 2 percent of the land area of the parish. Most of the acreage is in woodland.

4. Bienville-Cahaba-Guyton

Level to gently undulating, somewhat excessively drained, well drained, and poorly drained soils that are sandy or loamy throughout

This map unit consists of soils on low ridges and in depressional areas. Slopes range from 0 to 3 percent.

This map unit makes up about 2 percent of the land area of the parish. It is about 42 percent Bienville soils, 21 percent Cahaba soils, 20 percent Guyton soils, and 17 percent soils of minor extent.

Bienville soils are very gently sloping and gently undulating, and somewhat excessively drained. They are on convex ridges. These soils have a dark grayish brown loamy fine sand surface layer and a strong brown loamy fine sand subsoil.

Cahaba soils are very gently sloping and gently undulating, and well drained. They are on convex ridges. These soils have a brown fine sandy loam surface layer, a pale brown fine sandy loam subsurface layer, and a yellowish red clay loam subsoil.

Guyton soils are level and poorly drained. They are on broad flats and in depressional areas. These soils have a grayish brown silt loam surface layer and a light brownish gray silt loam subsurface layer. The subsoil is light brownish gray silt loam and silty clay loam.

Of minor extent are the poorly drained Kinder soils on broad flats and the somewhat poorly drained Urbo soils on flood plains. The somewhat poorly drained Acadia soils and the moderately well drained Gore soils are on the side slopes of the adjacent terrace uplands.

The soils in this map unit are mainly used as woodland. Small acreages are in pasture or cropland. Soybeans and vegetables are the main crops.

The soils are well suited to woodland. The potential for production of loblolly pine and slash pine is high. The main concerns in producing and harvesting timber are wetness and droughtiness, which cause seedling mortality. Wetness also restricts equipment use.

The soils in this map unit are moderately well suited to pasture and cultivated crops. Wetness in the Guyton soils, droughtiness in the Bienville soils, and low fertility in all of the soils are the main limitations. Erosion is a hazard in sloping areas. Surface drainage is needed in areas of the Guyton soils. Fertilizer and lime are needed for crops and pasture.

The soils in this map unit are moderately well suited to urban development. Wetness is the main limitation. Flooding is an additional hazard in areas of the Guyton soils.

Poorly Drained Soils; on Flood Plains

The map unit of this group consists of poorly drained, loamy soils on the flood plains. The soils are frequently flooded.

This map unit makes up about 8 percent of the land area of the parish. Most of the acreage is in woodland. Wetness caused by flooding and a seasonal high water table is the main limitation for most uses.

5. Guyton-Una-Basile

Level, poorly drained soils that are loamy throughout

This map unit consists of soils on narrow flood plains. These soils are subject to frequent flooding. Slope is less than 1 percent.

This map unit makes up about 8 percent of the land area of the parish. It is about 65 percent Guyton soils, 13 percent Una soils, 8 percent Basile soils, and 14 percent soils of minor extent.

Guyton soils have a grayish brown silt loam surface layer and a light brownish gray silt loam subsurface layer. The subsoil is light brownish gray silty clay loam and silt loam.

Una soils have a dark grayish brown silty clay loam surface layer and a light brownish gray and gray clay loam and silty clay loam subsoil.

Basile soils have a dark grayish brown silt loam surface layer, a light brownish gray or light gray silt loam subsurface layer, and a grayish brown silt loam and silty clay loam subsoil.

Of minor extent are the somewhat excessively drained Bienville soils on ridges and the very poorly drained Arat and Barbary soils in low positions.

Most of the soils in this map unit are used as woodland. A small acreage is in pasture.

The soils are moderately well suited to woodland. The potential for production of water oak, southern red oak, sweetgum, green ash, and loblolly pine is low to high. The main concerns in producing and harvesting timber are wetness and flooding, which severely restrict equipment use and cause seedling mortality.

The soils in this map unit are poorly suited to crops and pasture. Flooding is the main hazard and wetness is the main limitation.

The soils in this map unit are generally not suited to urban development. Wetness and flooding are too severe for this use.

Poorly Drained and Somewhat Poorly Drained Soils; on the Gulf Coast Prairies

The two map units of this group consist of poorly drained and somewhat poorly drained soils that have a loamy surface layer and a loamy or loamy and clayey subsoil. These soils are on the Gulf Coast Prairies.

The map units of this group make up about 45 percent of the land area of the parish. Most acreage is in cropland. Seasonal wetness is the main limitation for most uses.

6. Mowata-Vidrine-Crowley

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

This map unit consists of soils on broad flats, low mounds, side slopes, and convex ridges on the Gulf Coast Prairies. Slopes range from 0 to 3 percent.

This map unit makes up about 25 percent of the land area of the parish. It is about 35 percent Mowata soils, 28 percent Vidrine soils, 15 percent Crowley soils, and 22 percent soils of minor extent.

Mowata soils are level and poorly drained. They are on broad flats. These soils have a dark grayish brown silt loam surface layer and a gray silt loam subsurface layer. The subsoil is gray silty clay and light brownish gray silty clay loam.

Vidrine soils are level and very gently sloping, and somewhat poorly drained. They are on low mounds or smoothed mound areas and on side slopes. These soils have a dark grayish brown silt loam surface layer. The subsoil is yellowish brown silt loam and brown silty clay loam in the upper part and grayish brown and light brownish gray silty clay and silty clay loam in the lower part.

Crowley soils are level and somewhat poorly drained. They are on convex ridges. These soils have a dark grayish brown silt loam surface layer and a grayish brown silt loam subsurface layer. The subsoil is grayish brown and gray silty clay and clay loam.

Of minor extent are the poorly drained Judice, Leton, Midland, and Morey soils on broad flats and in depressional areas. The Judice and Midland soils make up the largest acreage of the minor soils.

Most of the soils in this map unit are used as cropland. A significant acreage is used as city and industrial sites. Small acreages are in pasture or woodland. Soybeans and rice are the main crops.

The soils are moderately well suited to cultivated crops and pasture. Wetness and low fertility are the main limitations. Surface drainage and additions of lime and fertilizer are needed for most cultivated crops and pasture plants.

The soils in this map unit are well suited to woodland. The potential production of slash pine and loblolly pine is high. Wetness limits the use of equipment and causes slight to moderate seedling mortality.

The soils in this map unit are poorly suited to urban development. Wetness, high shrink-swell potential, and very slow and slow permeability are the main limitations.

7. Morey-Leton-Mowata

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

This map unit consists of soils on broad flats and along drainageways on the Gulf Coast Prairies. Slopes are less than 1 percent.

This map unit makes up about 20 percent of the land area of the parish. It is about 48 percent Morey soils, 28 percent Leton soils, 11 percent Mowata soils, and 13 percent soils of minor extent.

Morey soils are on broad flats. These soils have a very dark gray loam surface layer and a dark gray and gray clay loam subsoil.

Leton soils are on broad flats and along drainageways. These soils have a grayish brown silt loam and loam surface layer and a gray or light brownish gray loam subsurface layer. The subsoil is gray loam.

Mowata soils are on broad flats and along drainageways. These soils have a dark grayish brown silt loam surface layer and a gray silt loam subsurface layer. The subsoil is gray silty clay and light brownish gray silty clay loam.

Of minor extent are the somewhat poorly drained Crowley soils on ridges, the poorly drained Judice and Midland soils in depressional areas, and the somewhat poorly drained Vidrine soils on low mounds and side slopes. The Judice and Midland soils make up the largest acreage of the minor soils.

The soils in this map unit are mainly used as cropland. Small acreages are in pasture or woodland. Soybeans and rice are the main crops.

The soils are moderately well suited to cultivated crops and pasture. Wetness is the main limitation. Surface drainage and additions of lime and fertilizer are needed for most cultivated crops and pasture plants.

The soils in this map unit are well suited to woodland. The potential production of slash pine and loblolly pine is high. Wetness limits the use of equipment and causes moderate to severe seedling mortality.

The soils in this map unit are poorly suited to urban development. Wetness, flooding, slow and very slow permeability, and high shrink-swell potential are the main limitations.

Very Poorly Drained Soils; In Marshes and Swamps

The three map units of this group consist mainly of level, very poorly drained, loamy, mucky, and clayey soils in marshes and swamps. These soils are ponded and flooded most of the time.

These map units make up about 11 percent of the land area of the parish. Most acreage is in native vegetation and is used for recreation and as habitat for wetland wildlife.

8. Arat-Barbary

Level, very poorly drained soils that are very fluid and loamy or clayey throughout; in swamps

This map unit consists of soils in swamps that are ponded and flooded most of the time. Slope is less than 1 percent.

This map unit makes up about 4 percent of the land area of the parish. It is about 52 percent Arat soils, 31 percent Barbary soils, and 17 percent soils of minor extent.

Arat soils have a very dark grayish brown, mucky silt loam surface layer that is very fluid. The underlying material is dark grayish brown, silty clay loam that is very fluid. It contains many logs and partially decomposed wood fragments.

Barbary soils have a very fluid, dark gray mucky clay surface layer, and an underlying material of very fluid gray clay. It contains many logs and wood fragments.

Of minor extent are the poorly drained Basile, Guyton, and Una soils in higher positions.

Most of the soils in this map unit are in woodland and used as habitat for wetland wildlife and for recreation. A small acreage is used as industrial sites.

The soils in this map unit are well suited to use as habitat for wetland wildlife and for recreation. They provide habitat for waterfowl, furbearers, alligators, squirrels, crawfish, and nongame birds. Hunting and other outdoor activities are important in areas of this map unit.

The soils in this map unit are poorly suited to woodland. The potential production of baldcypress and water tupelo is low. Special equipment is needed to harvest trees because of wetness, ponding, flooding, and the low capacity of the soils to support a load.

The soils in this map unit are not suited to cropland, pasture, or to urban development. Wetness, ponding, flooding, and low strength are too severe for these uses.

9. Gentilly-Clovelly

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

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

This map unit makes up about 4 percent of the land area of the parish. It is about 49 percent Gentilly soils, 27 percent Clovelly soils, and 24 percent soils of minor extent.

Gentilly soils have a surface layer that is very fluid, very dark gray muck in the upper part and very fluid black clay in the lower part. The underlying material is very fluid gray clay loam in the upper part and firm greenish gray silty clay loam and clay in the lower part.

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

Of minor extent are the Aquents and Udifluvents along waterways, the very poorly drained Ged soils, and the very poorly drained Larose soils. The Udifluvents make up the largest acreage of the minor soils. These soils consist of sandy to clayey materials that were deposited during the construction and maintenance of waterways.

Most of the soils in this map unit are in native vegetation and used as habitat for wetland wildlife and for recreation. The soils provide suitable habitat for waterfowl, furbearers, and alligators. They also provide areas for hunting, fishing, and other outdoor activities. This map unit is part of the estuary that helps to support marine life in the Gulf of Mexico.

The soils in this map unit are not suited to cropland, pasture, woodland, or to urban development. Wetness, ponding, flooding, salinity, and low strength are too severe for these uses.

10. Ged-Larose-Allemands

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

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

This map unit makes up about 3 percent of the land area of the parish. It is about 43 percent Ged soils, 33 percent Larose soils, 6 percent Allemands soils, and 18 percent soils of minor extent.

Ged soils have a surface layer of dark gray clay that is very fluid, and a gray, firm clay subsoil.

Larose soils have a dark gray, very fluid mucky clay surface layer. The underlying material is very dark gray and black muck, very fluid clay, and mucky clay.

Allemands soils have a surface layer that is dark brown peat and black, very fluid muck in the upper part and black, very fluid mucky clay in the lower part. The underlying material is dark gray and gray clay that is very fluid.

Of minor extent are the Udifluvents along waterways, the very poorly drained Gentilly soils in marshes, and the very poorly drained Barbary soils in nearby swamps.

Most of the soils in this unit are in native vegetation and used as habitat for wetland wildlife and for recreation. A few areas of the Ged soils are used for range.

The soils in this map unit are well suited to use as habitat for wetland wildlife. They provide habitat for many species of wetland wildlife and provide areas for hunting, fishing, and other outdoor activities.

The soils in this map unit are not suited to cropland, pasture, woodland, or to urban development. Wetness, ponding, flooding, and low strength are too severe for these uses. Drainage and protection from flooding are possible only by constructing an extensive system of levees and by installing water pumps.

Detailed Soil Map Units

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

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

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

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

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

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

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. Bienville-Cahaba-Guyton complex, gently undulating is an example.

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

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

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

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.

All of the soils in Calcasieu Parish, except for those in marshes, swamps, and flood plains that are frequently flooded, were mapped at the same level of detail. Flooding or ponding limit the use and management of these soils, and separating all of the soils in these areas would be of little importance to the land user.

Ac—Acadia silt loam, 1 to 3 percent slopes. This soil is very gently sloping and somewhat poorly drained. The soil is on side slopes on the terrace uplands. The areas are irregular in shape and range from 40 to 350 acres.

Typically, the surface layer is dark grayish brown, extremely acid silt loam about 5 inches thick. The subsurface layer is light yellowish brown, very strongly acid silt loam about 9 inches thick. The subsoil extends to a depth of 63 inches. It is yellowish brown, mottled, very strongly acid silt loam in the upper part and light brownish gray, mottled, strongly acid silty clay in the middle and lower parts.

Included with this soil in mapping are a few small areas of Gore and Kinder soils. The Gore soils are on steeper side slopes than the Acadia soil and have a reddish subsoil. The Kinder soils are in higher positions on the landscape and they are gray and loamy throughout. The included soils make up about 10 percent of the map unit.

This soil is low in fertility and moderately high in exchangeable aluminum that is potentially toxic to some crops. Water and air move through this soil very slowly. Water runs off the surface slowly. A seasonal high water table is perched upon the clayey subsoil at a depth of 0.5 foot to 1.5 feet during December through April. This soil is wet in the upper part of the subsoil for much of the winter and spring. The shrink-swell potential is high.

In most areas, this soil is in woodland. In a few areas, it is used as cropland, pastureland, or homesites.

The Acadia soil is well suited to loblolly pine and slash pine. Wetness restricts the use of equipment somewhat and is the main concern in producing and harvesting timber.

The Acadia soil is moderately well suited to cultivated crops. Low fertility, wetness, and potentially toxic levels of aluminum in the rooting zone are the main limitations. Erosion is a hazard. Soybeans, rice, and corn are suitable crops. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. A tillage pan can form as a result of excessive cultivation, but it can be broken by subsoiling when the soil is dry. Crop residue left on or near the surface reduces runoff and helps to maintain soil tilth and organic matter content. Runoff and erosion can be controlled by plowing in fall, fertilizing, and seeding to a cover crop. Tillage should be on the contour or across the slope. Crops respond well to additions of fertilizer and lime, formulated and systematically applied to overcome the low fertility and moderately high levels of exchangeable aluminum.

This unit is well suited to pasture. The main hazard is erosion and the main limitations are low fertility and wetness. Suitable pasture plants are Pensacola bahiagrass, common bermudagrass, ryegrass, ball clover, and crimson clover. If practical, seedbed preparation should be on the contour or across the slope. Grazing when the soil is wet compacts the surface layer. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is poorly suited to recreational development. Wetness and very slow permeability are the main limitations. Susceptibility to erosion is also a hazard. Adequate plant cover can control erosion and sedimentation and enhance the beauty of the area. Plant cover can be maintained by controlling traffic.

This soil is poorly suited to urban development. The main limitations are wetness, very slow permeability, and high shrink-swell potential. Low strength is an additional limitation for local roads and streets. Preserving the existing plant cover during construction helps to control erosion. Drainage should be provided around homesites. Septic tank absorption fields do not function properly during rainy periods because of wetness and very slow permeability. Plant cover can be established and maintained by fertilizing, seeding, mulching, and shaping the slopes. Designs for buildings and roads can offset the effects of shrinking and swelling. Designs for roads should also offset the limited ability of the soil to support a load.

This soil produces habitat for rabbits, quail, squirrels, and deer. Habitat for wildlife can be improved by selectively harvesting timber so that large den and mast-producing trees are left.

This Acadia soil is in capability subclass IIIe and woodland group 2W.

AE—Allemands peat. This organic soil is level and very poorly drained. It is in freshwater marshes that are ponded and flooded most of the time. The observations were fewer than in most other areas because of poor accessibility. The detail in mapping, however, is adequate for the expected use of the soil. This soil is in one large area of several hundred acres. Slope is less than 1 percent.

Typically, the organic material is about 29 inches thick. It is dark brown, strongly acid peat in the upper part and black, strongly acid, very fluid muck in the lower part. The underlying mineral material to a depth of about 44 inches is black, very strongly acid, very fluid mucky clay. Below that to a depth of about 80 inches it is dark gray or gray, strongly acid or medium acid, very fluid clay.

Included with this soil in mapping are a few large areas of Ged and Larose soils. The Ged and Larose soils are in positions similar to those of the Allemands soil. The Ged soils are clayey throughout and the Larose soils have an organic layer that is less than 16 inches thick. The included soils make up about 20 percent of the map unit.

This Allemands soil is ponded or flooded with several inches of fresh water most of the time. During storms, floodwater is as much as 2 feet deep. When the soil is not flooded, the high water table ranges from 1 foot above the surface to 0.5 foot below the surface. This soil has low strength and poor trafficability. 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 in the organic surface layer and very high in the clayey underlying material.

The natural vegetation consists mainly of bulltongue and alligatorweed. Other common plants are rattlebox, cattail, maidencane, pickerelweed, and common buttonbush.

Most of the acreage is used as habitat for wetland wildlife or for extensive forms of recreation, such as hunting and fishing.

This Allemands soil is well suited to use as habitat for wetland wildlife. Roosting and feeding areas are available for ducks, geese, and many other species of waterfowl. This soil also provides habitat for American alligators, and furbearers such as nutria, mink, muskrat, and raccoons. Water control structures, designed to manage habitat, are difficult to construct and maintain because of the instability of the organic material. Hunting of waterfowl is important in areas of this map unit.

This soil is not suited to crops, pasture, or woodland. Wetness, flooding, and low strength are too severe for these uses. The soil is generally too soft and boggy to support livestock grazing. Trees suitable for timber production generally do not grow on this soil. Drainage and protection from flooding are possible, but extensive water-control structures, such as levees and water pumps, are required. Extreme acidity, subsidence, and low strength are continuing limitations after drainage.

This Allemands soil is not suited to urban uses because of wetness, flooding, and low strength. Drainage is feasible only with an extensive system of levees and water pumps. The soil is poorly suited to the construction of levees because it shrinks and cracks as it dries, causing the levees to fail.

This Allemands soil is in capability subclass VIIw.

AN—Aquents, frequently flooded. These soils are loamy and clayey. They are in areas where spoil has been deposited during the construction and maintenance of navigable waterways. The soils are within areas of marsh and are slightly higher than the surrounding soils. Areas are irregular in shape and about 10 to 250 acres. The observations were fewer than in most other areas because of poor accessibility. The detail in mapping, however, is adequate for the expected use of the soil. Slope generally is less than 1 percent.

These soils are mostly gray and consistence ranges from firm to very fluid. The soils are mainly silty clay loam or clay throughout, or they are stratified.

Included with these soils in mapping are a few large areas of Clovelly and Udifluvents soils. Clovelly soils are organic and in lower positions than the Aquents soils. Udifluvents are in higher positions and are less saline. The included soils make up less than 10 percent of the map unit.

These Aquents soils are poorly drained and subject to frequent flooding. Salinity is moderate. Water and air move through these soils very slowly. Water runs off the surface very slowly.

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

The acreage is used mainly as habitat for wetland wildlife. Some areas are used as dump sites for soil material dredged from nearby shipping channels.

This map unit is moderately well suited to wetland wildlife habitat. It provides roosting and feeding areas for ducks, geese, and other waterfowl. This map unit also provides habitat for American alligators, and furbearers such as nutria, mink, muskrat, and raccoons.

This map unit is not suited to cultivated crops, pasture, or woodland. Wetness and flooding are generally too severe for these uses. Salinity and poor accessibility are also limitations.

This map unit is not suited to urban uses or intensive forms of recreation. Flooding and wetness are too severe for these uses. Other limitations are very high shrink-swell potential, salinity, and low strength for roads.

This unit is in capability subclass VIIw.

AR—Arat mucky silt loam. This very fluid mineral soil is level and very poorly drained. The soil is in swamps that are ponded and flooded most of the time. Areas are irregular in shape and of several hundred acres. The observations were fewer than in most other areas because of poor accessibility. The detail in mapping, however, is adequate for the expected use of the soils. Slope is less than 0.5 percent.

Typically, the surface layer is about 3 inches thick. It is medium acid, partly decomposed wood and moss fiber. The next layer is about 6 inches thick. It is very dark grayish brown, slightly acid, very fluid, mucky silt loam. The underlying material extends to 60 inches or more. It is dark grayish brown, slightly acid, very fluid silty clay loam in the upper part. The lower part is about 90 percent logs and partly decomposed wood fragments.

Included with this soil in mapping are a few small areas of Basile and Guyton soils. These poorly drained soils are in higher positions than Arat soil, and are firm mineral soils. Also included are a few large areas of soils that are similar to Arat soil, except that they have an organic surface layer about 10 to 24 inches thick. The included soils make up about 10 percent of the map unit.

The Arat soil is nearly continuously ponded or flooded. Floodwater ranges from 3 to 7 feet deep. When the soil is not flooded, the high water table ranges from 0.5 foot below the surface to 3 feet above the surface. The soil is saturated with water and is very fluid throughout. Permeability is slow. The total subsidence potential is medium.

The natural vegetation consists mainly of baldcypress and water tupelo. In places, most of the trees have been harvested and the vegetation consists of alligatorweed, water hyacinth, bulltongue, arrowhead, and pickerelweed. Natural regeneration of baldcypress and water tupelo is very slow.

Most areas of this soil are in woodland and are used as habitat for wetland wildlife or for extensive forms of recreation, such as hunting and fishing.

This map unit is well suited to use as habitat for wetland wildlife (fig. 1). Roosting areas for migratory ducks, and both food and nesting sites are available for wood ducks, squirrels, alligators, and many species of nongame birds. This map unit also provides suitable habitat for crawfish, and furbearers such as raccoons, nutria, and otters. Water-control structures, designed to manage habitat, are difficult to construct because of the instability and very fluid nature of the soil. Hunting of waterfowl is a popular sport in areas of this map unit.

Figure 1.—This cutover cypress swamp is in an area of Arat mucky silt loam, a soil that provides habitat for wetland wildlife.

This Arat soil is poorly suited to baldcypress and water tupelo. These trees generally regrow only on rotting logs, stumps, and root mats. Seedling mortality and equipment use limitations are severe because of wetness and flooding. Trafficability is very poor. Timber can be harvested only with the use of special equipment. This soil will not support the load of most harvesting equipment.

This soil is not suited to cultivated crops and pasture. Wetness and flooding are generally too severe for these uses. The unit is too soft and boggy for grazing by livestock.

This soil is not suited to urban uses. Wetness, flooding, and low strength are too severe. In addition, shallow excavation is very difficult because of buried logs and stumps.

This Arat soil is in capability subclass VIIIw and woodland group 5W.

BA—Barbary mucky clay. This very fluid soil is level and very poorly drained. It is in swamps and is ponded most of the time and frequently flooded. Areas are irregular in shape and of several hundred acres. Observations were fewer than in most other areas because of poor accessibility. The detail in mapping, however, is adequate for the expected use of the soil. Slope is less than 1 percent.

Typically, the surface layer is dark gray, strongly acid, very fluid mucky clay about 5 inches thick. The underlying material extends to 80 inches. It is gray, slightly acid, very fluid clay. Many logs and fragments of wood are in the lower part.

Included with this soil in mapping are a few large areas of Arat and Guyton soils and a few small areas of Larose and Una soils. The Arat soils are very poorly drained and are in positions similar to those of the Barbary soil. They are loamy throughout. The Guyton and Una soils are poorly drained and are in higher positions. They are firm mineral soils. The Larose soils are very poorly drained. They are in nearby marshes and do not have logs in the lower layers. Also included are a few large areas of soils that are similar to Barbary soils, except that they have a firmer surface layer. These similar soils are in slightly higher positions along river banks. The included soils make up about 15 percent of the map unit.

The Barbary soil is subject to frequent flooding. Floodwater ranges from 1 foot to 5 feet deep. When the soil is not flooded, the high water table fluctuates between a depth of 0.5 foot below the surface and 1 foot above the surface. This soil has low strength and very high shrink-swell potential. Permeability is very slow. The total subsidence potential is medium.

The natural vegetation consists of water-tolerant trees and understory plants. Water tupelo and baldcypress are the main trees. Water oak, white oak, red maple, elm, and water hickory grow on included similar soils along river banks. Lizard tail, spiderlily, and buttonbush are the main understory plants.

This soil is mostly in woodland and is used as habitat for wetland wildlife or for extensive forms of recreation, such as hunting.

This soil is well suited to use as habitat for wetland wildlife. It provides roosting areas for migratory ducks and both food and nesting sites for wood ducks, squirrels, alligators, and nongame birds. This soil also provides suitable habitat for crawfish, and furbearers, such as raccoons, nutria, and otters. Water-control structures, designed to manage habitat, are difficult to construct because of the instability and very fluid nature of the soil.

This soil is poorly suited to baldcypress and water tupelo. Wetness and poor trafficability are the main limitations. Flooding is a hazard. Timber can be harvested only with the use of special equipment. This soil will not support the load of most harvesting equipment.

This soil is not suited to cultivated crops and pasture. Wetness, flooding, and low strength are generally too severe for these uses. The soil is too soft and boggy for grazing by livestock.

This map unit is not suited to urban uses. Wetness, flooding, and the very high shrink-swell potential are too severe. In addition, shallow excavations are very difficult because of buried logs and stumps.

This map unit is in capability subclass VIIw and woodland group 4W.

BB—Basile and Guyton silt loams, frequently flooded. These soils are level and poorly drained. They are on the flood plains of narrow streams that drain the terrace uplands. Areas are long and narrow and range from 30 to over 2,500 acres. Most mapped areas contain both soils in varying proportions, but some areas contain only one of the soils. In areas that contain both soils the Guyton soil is in slightly higher positions than the Basile soil. Floodwater frequently covers these soils to a depth of 1 foot to 6 feet for periods up to 10 days, mostly in winter and spring. The mapped areas contain about 55 percent Basile soil and about 25 percent Guyton soil.

The Basile soil has a surface layer of dark grayish brown, very strongly acid silt loam about 4 inches thick. The subsurface layer is 26 inches thick. It is light brownish gray, mottled, strongly acid silt loam in the upper part and light gray, mottled, slightly acid silt loam in the lower part. The subsoil extends to a depth of 70 inches. It is light brownish gray, mottled, neutral silt loam in the upper part; grayish brown, mottled, neutral silty clay loam in the middle part; and light olive gray, mottled, neutral silt loam in the lower part.

This Basile soil is low in fertility. Water and air move through it slowly. Water runs off the surface very slowly and stands in low places for long periods after heavy rain. A seasonal high water table fluctuates between a depth of about 1.5 feet and the soil surface during December through May. The surface layer remains wet for long periods after heavy rain. The shrink-swell potential is moderate.

The Guyton soil has a surface layer of dark grayish brown, strongly acid silt loam about 4 inches thick. The subsurface layer is light brownish gray, mottled, very strongly acid silt loam about 25 inches thick. The subsoil to a depth of about 62 inches is light brownish gray, mottled, strongly acid silt loam in the upper part and light brownish gray, mottled, strongly acid silty clay loam in the lower part.

This Guyton soil is low in fertility and high in exchangeable aluminum levels that are potentially toxic to most crops. Water and air move through this soil slowly. Water runs off the surface slowly and stands in low places for long periods after heavy rain. A seasonal high water table fluctuates between a depth of about 1.5 feet and the soil surface during December through May. The surface layer remains wet for long periods after heavy rain. The shrink-swell potential is low.

Included in this map unit are a few small areas of Acadia, Bienville, Gore, and Kinder soils. The Acadia and Gore soils are on side slopes and have a clayey subsoil. The Bienville soils are on narrow ridges and are sandy throughout. The Kinder soils are in higher positions than the Basile and Guyton soils and have red mottles in the subsoil.

Most areas of this map unit are used as woodland and as habitat for woodland wildlife. A few areas are used as pastureland.

These soils are moderately well suited to green ash, laurel oak, overcup oak, southern red oak, sweetgum, water oak, and baldcypress. The main concerns in producing and harvesting timber are wetness and flooding, which limit the use of equipment and cause severe seedling mortality. Trees should be water-tolerant, and they should be planted and harvested during dry periods. Conventional methods of harvesting timber can be used except sometimes during rainy periods, generally from December to May.

This map unit is well suited to use as habitat for woodland wildlife. Habitat can be improved by leaving large mast-producing trees when harvesting timber.

This map unit is poorly suited to use as recreation areas. Wetness is the main limitation and flooding is a hazard. Drainage and protection from flooding are needed for most recreational uses.

This map unit is poorly suited to pasture. Wetness is the main limitation and flooding is a hazard. Common bermudagrass and native grasses are suitable pasture plants.

These soils are poorly suited to cultivated crops because of wetness and the flooding hazard. Drainage and protection from flooding are needed.

This map unit is not suited to urban development. Wetness and flooding are generally too severe for this use.

This unit is in capability subclass Vw. The Basile soil is in woodland group 5w and the Guyton soil is in 2W.

Bh—Bienville loamy fine sand, 1 to 3 percent slopes. This soil is very gently sloping and somewhat excessively drained. It is on low ridges on stream terraces. Areas are irregular in shape and range from 15 to 80 acres.

Typically, the surface layer is dark grayish brown, very strongly acid loamy fine sand about 4 inches thick. The subsurface layer is yellowish brown, strongly acid loamy fine sand about 12 inches thick. The subsoil to a depth of about 75 inches is strong brown, strongly acid, loamy fine sand.

Included with this soil in mapping are a few small areas of Guyton and Cahaba soils. The Guyton soils are in lower positions than the Bienville soil and are gray and loamy throughout. The Cahaba soils are in lower positions and have more clay in the subsoil.

This Bienville soil is low in fertility. Water and air move through it at a moderately rapid rate. Water runs off the surface slowly. A seasonal high water table is at a depth of 4 to 6 feet during December through April. Plants are damaged from a lack of water during dry periods in summer and fall of most years. This soil dries quickly after heavy rain. The shrink-swell potential is low.

This soil is mostly in pine woodland. In a few areas, it is used as pastureland, cropland, or homesites.

This soil is well suited to loblolly pine, slash pine, shortleaf pine, and longleaf pine. Trafficability can be a problem when this sandy soil is dry. Seedling mortality is moderate because of droughtiness and the damage caused by the Texas leaf-cutting ant, which is especially well adapted to this soil.

This soil is moderately well suited to pasture. Droughtiness and low fertility are the main limitations. The main suitable pasture plants are improved bermudagrass, weeping lovegrass, crimson clover, Pensacola bahiagrass, and ryegrass. Pasture is difficult to establish because of droughtiness. Proper grazing practices, weed control, and fertilizer are needed for maximum quality of forage.

This soil is moderately well suited to most cultivated crops, including some truck and garden crops. Droughtiness and low fertility are the main limitations. The main suitable crops are soybeans, corn, and locally adapted truck and garden crops. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. Erosion can be a problem when the soil is left bare. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. All tillage should be on the contour or across the slope. Most crops and pasture plants respond well to additions of lime and fertilizer.

This soil is moderately well suited to urban development. The main limitations are wetness and low strength for roads. Cutbanks cave easily, making shallow excavations difficult. Because of wetness, septic tank absorption fields do not function properly during rainy periods. Designs for roads can offset the limited ability of the soil to support a load. Lawn grasses may require irrigation because of soil droughtiness.

This soil is moderately well suited to recreational uses such as playgrounds and picnic areas. The main limitation is the sandy surface layer. A vegetative cover can be somewhat difficult to establish and maintain because of soil droughtiness.

This soil produces habitat for rabbits, squirrels, quail, and deer. Habitat for woodland wildlife can be improved by selectively harvesting timber so that the large den and mast-producing trees are left.

This Bienville soil is in capability subclass IIs and woodland group 2S.

Bn—Bienville-Cahaba-Guyton complex, gently undulating. These soils are somewhat excessively drained, well drained, and poorly drained. They are on low parallel ridges and in depressional areas on stream terraces. The somewhat excessively drained Bienville soil and the well drained Cahaba soils are on the low ridges and the poorly drained Guyton soil is in depressional areas. The mapped areas range from about 40 to 1,500 acres and are about 40 percent Bienville soil, 25 percent Cahaba soil, and 25 percent Guyton soil. A few of the mapped areas south of the Houston River do not contain any Cahaba soil. The soils in this map unit are so intricately intermingled that it was not practical to map them separately at the scale used. Slopes range from 0 to 3 percent.

The Bienville soil has a surface layer of dark grayish brown, slightly acid loamy fine sand about 6 inches thick. The subsurface layer is light yellowish brown, medium acid loamy fine sand about 21 inches thick. The subsoil to a depth of about 64 inches is strong brown, strongly acid loamy fine sand.

This soil is low in fertility. Water and air move through it at a moderately rapid rate. Water runs off the surface slowly. A seasonal high water table fluctuates between depths of about 4 feet and 6 feet during December through April. Adequate water is generally not available to plants during dry periods in summer and fall of most years. This soil dries quickly after heavy rain.

The Cahaba soil has a surface layer of brown, medium acid fine sandy loam about 6 inches thick. The subsurface layer is light yellowish brown, strongly acid fine sandy loam about 10 inches thick. The subsoil is very strongly acid clay loam. It is red in the upper part and yellowish red in the lower part. The underlying material to a depth of about 60 inches is stratified yellowish brown and yellowish red, mottled, very strongly acid sandy loam.

This soil is low in fertility and high in exchangeable aluminum levels that are potentially toxic to most crops. Water and air move through this soil at a moderate rate. Water runs off the surface at a medium rate. Adequate water is generally not available to plants during dry periods in summer and fall of some years. This soil dries quickly after heavy rain.

The Guyton soil has a surface layer of dark grayish brown, medium acid very fine sandy loam about 6 inches thick. The subsurface layer is grayish brown, mottled, strongly acid very fine sandy loam about 12 inches thick. The subsoil extends to a depth of about 62 inches. It is grayish brown and light brownish gray, mottled, strongly acid clay loam in the upper part; grayish brown, mottled, strongly acid clay loam in the middle part; and light brownish gray, mottled, strongly acid sandy clay loam in the lower part.

This soil is low in fertility and high in exchangeable aluminum levels that are potentially toxic to most crops. Water and air move through this soil slowly. Water runs off the surface slowly and stands in low places for short periods after heavy rain. A seasonal high water table fluctuates between a depth of about 1.5 feet and the soil surface during December through May. Poor aeration and wetness restrict the root development of many plants. This soil dries out more slowly than the adjoining soils that are in higher positions. It is subject to rare flooding for brief periods mostly in the winter and spring.

Included in this map unit are a few small areas of Acadia, Gore, Kinder, and Messer soils. These soils are in higher positions on the nearby terrace uplands. Acadia and Gore soils have a clayey subsoil. Acadia soils are somewhat poorly drained and Gore soils are moderately well drained. Kinder and Messer soils are similar to the Guyton soils, except that Kinder soils have red mottles in the subsoil and Messer soils have a browner subsoil. Kinder soils are poorly drained and Messer soils are moderately well drained. Also included are a few small areas of frequently flooded Guyton soils in deep depressional areas and channel scars. The included soils make up about 20 percent of the map unit.

Most areas of this complex are in woodland. A few areas are used as pastureland or cropland.

This map unit is well suited to loblolly pine and slash pine. The Cahaba and Guyton soils are also suited to sweetgum, southern red oak, and water oak. The main concerns in producing and harvesting timber in areas of Guyton soil are severe equipment use limitations and moderate seedling mortality caused by wetness. The Bienville soil has moderate seedling mortality caused by droughtiness. Trafficability is poor in areas of the Bienville soil when the sandy surface layer is dry. The Cahaba soil has few limitations to the production of timber; however, reforestation must be carefully managed to reduce competition from undesirable understory plants.

This complex is moderately well suited to pasture. Wetness is a limitation in areas of the Guyton soil and droughtiness is a limitation in areas of the Bienville soil. All the soils have low fertility. The main suitable pasture plants are common bermudagrass, improved bermudagrass, Pensacola bahiagrass, crimson clover, and ryegrass. Proper grazing practices, weed control, and additions of lime and fertilizer are needed for maximum quality of forage.

This map unit is moderately well suited to cultivated crops. It is limited mainly by low fertility and short, choppy slopes. Wetness is a limitation in areas of the Guyton soil, and the sandy Bienville soil is droughty. In addition, the Cahaba and Guyton soils contain potentially toxic levels of exchangeable aluminum in the rooting zone. Erosion is a hazard on the Cahaba soil. Soybeans and truck crops are the main crops. Artificial drainage is needed in areas of the Guyton soil. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to control erosion and maintain fertility and tilth. Crops respond to additions of fertilizer and lime, formulated and systematically applied to overcome the low fertility and high levels of exchangeable aluminum.

This complex is moderately well suited to urban development. Wetness is the main limitation in areas of the Bienville and Guyton soils. Droughtiness is a limitation to lawn establishment in areas of the Bienville soil. The Cahaba soil has few limitations to these uses; therefore, areas of these soils should be selected for urban and recreational development where possible. In areas of Bienville and Guyton soils, septic tank absorption fields do not function properly during rainy periods because of wetness. If homes are constructed in areas of the Guyton soil, drainage and protection from flooding should be provided.

This complex is moderately well suited to recreational development. The Cahaba soil in this complex has few limitations for this use. The Bienville soil is sandy and droughty to plants. Wetness and rare flooding limit the use of the Guyton soil. Good drainage should be provided for intensively used areas such as playgrounds and camp areas. Plant cover can be maintained by adding fertilizer and by controlling traffic. Irrigating the Bienville soil areas will also ensure good plant growth.

This complex is moderately well suited to use as habitat for woodland and openland wildlife. Habitat for woodland wildlife can be improved by propagating oaks and other mast-producing trees.

This complex is in capability subclass IIIw. The Bienville soil is in woodland group 2S; the Cahaba soil is in 2O; and the Guyton soil is in 2W.

Bo—Brimstone silt loam. This soil is level and poorly drained. It is on broad flats on the terrace uplands. Areas are irregular in shape and range from 10 to 1,500 acres. Slopes range from 0 to 1 percent.

Typically, the surface layer is dark grayish brown, very strongly acid silt loam about 6 inches thick. The subsurface layer is grayish brown, medium acid silt loam about 10 inches thick. The subsoil extends to a depth of about 70 inches. It is light brownish gray and grayish brown, mottled, neutral silt loam in the upper part; grayish brown, mottled, mildly alkaline silty clay loam in the middle part; and light olive gray, mottled, moderately alkaline silty clay loam in the lower part.

Included in this map unit are a few small areas of Caddo, Guyton, Kinder, Messer, and Vidrine soils. These soils contain less sodium salts in the subsoil than the Brimstone soil. The Caddo and Kinder soils are in slightly higher positions than Brimstone soil and have red mottles in the subsoil. The Guyton soils are in lower positions and are more acid in the subsurface and subsoil layers. The Messer and Vidrine soils are on low mounds and have a subsoil that is browner in the upper part than that of the Brimstone soil. The included soils make up about 15 percent of the map unit.

This soil is low in fertility. Water and air move through it slowly. Water runs off the surface slowly and stands in low places for short periods after heavy rain. A seasonal high water table fluctuates between a depth of about 1.5 feet and the soil surface during December through April. This soil is subject to flooding for short periods during unusually heavy rainstorms. The surface layer remains wet for long periods after heavy rain. The concentration of sodium in the subsoil restricts root development and limits the amount of water available to plants. Plants generally are damaged from a lack of water during dry periods in summer and fall of most years. This soil has moderate shrink-swell potential.

This soil is used mostly as woodland or for crops. In a few areas, it is used as pastureland or homesites.

This soil is moderately well suited to slash pine and loblolly pine. The main concerns in producing and harvesting timber are severe equipment use limitations and moderate seedling mortality caused by wetness. In addition, the high concentrations of sodium in this soil restrict root development and growth, especially in younger trees. Conventional methods of harvesting timber can be used except sometimes during rainy periods, generally from December to May.

The Brimstone soil is moderately well suited to cultivated crops, mainly rice and soybeans. Wetness and excessive sodium in the subsoil are the main limitations. A drainage system is needed for most cultivated crops and pasture plants. Land grading and smoothing improves surface drainage, allows more uniform application of irrigation water, and permits more efficient use of farm equipment. The subsoil is high in sodium content and should not be exposed by deep cuts during land grading and smoothing. Pipe or other drop structures installed in drainage ditches control the water level in rice fields and prevent excessive erosion of ditches. A tillage pan can form as the result of excessive cultivation but it can be broken by subsoiling when the soil is dry. The organic matter content can be maintained by using all crop residue, plowing under cover crops, and using a suitable cropping system. Most crops and pasture plants respond well to additions of lime and fertilizer.

This soil is moderately well suited to pasture. Wetness and low fertility are the main limitations. The main suitable pasture plants are common bermudagrass, Pensacola bahiagrass, ryegrass, white clover, winter peas, and vetch. Grazing when the soil is wet compacts the surface layer. Proper grazing practices, weed control, and fertilizer are needed for maximum quality of forage.

This unit is poorly suited to recreational development. It is limited mainly by wetness and flooding. Intensively used areas need good drainage. Cuts and fills should be seeded or mulched. Plant cover can be maintained by controlling traffic and applying fertilizer.

The Brimstone soil is poorly suited to urban development. The main limitations are wetness, flooding, and slow permeability. Excess water can be removed by using shallow ditches and providing the proper grade. Selection of adapted vegetation is critical for the establishment of lawns, shrubs, trees, and vegetable gardens. Slow permeability and the high water table increase the possibility that septic tank absorption fields will fail.

This soil has fair potential as habitat for openland and woodland wildlife, mainly squirrels, rabbits, deer, and numerous small furbearing animals. Habitat for wildlife can be improved by selectively harvesting timber so that large den and mast-producing trees are left.

This Brimstone soil is in capability subclass IIIs and woodland group 3T.

Cd—Caddo-Messer silt loams. These soils are level and gently sloping, poorly drained and moderately well drained. They are on broad flats on the terrace uplands. This complex consists of small areas of Caddo and Messer soils that are so intermingled that they cannot be mapped separately at the scale selected. Areas are irregular in shape and range from 30 to 1,500 acres. The landscape consists of a broad flat that contains many small, convex mounds. The mounds are generally circular and range from 30 to 150 feet in diameter and from 1 foot to 6 feet in height. Some mounds have been smoothed. Slopes range from about 0 to 1 percent on the intermound areas and from about 1 to 5 percent on the mounds.

The mapped areas are about 60 percent Caddo soil and 30 percent Messer soil. The Caddo soil is on the intermound areas and the Messer soil is on mounds or smoothed mound areas.

The Caddo soil is poorly drained and has a surface layer of grayish brown, very strongly acid silt loam about 5 inches thick. The subsurface layer is light brownish gray, mottled, very strongly acid silt loam about 24 inches thick. The subsoil to a depth of about 74 inches is light brownish gray, mottled, strongly acid silty clay loam or silt loam.

This Caddo soil is low in natural fertility and high in exchangeable aluminum levels that are potentially toxic to most crops. Water and air move through this soil slowly. Water runs off the surface at a slow rate and stands in low places for short periods after heavy rain. A seasonal high water table fluctuates between a depth of 2 feet and the soil surface during December through April. Plants are damaged by lack of water during dry periods in summer and fall of some years.

The Messer soil is moderately well drained and has a surface layer of dark grayish brown, extremely acid silt loam about 3 inches thick. The subsurface layer is pale brown, very strongly acid silt loam about 3 inches thick. The subsoil extends to a depth of about 62 inches. It is light yellowish brown, very strongly acid silt loam in the upper part and yellowish brown, mottled, very strongly acid silty clay loam in the middle and lower parts.

This Messer soil is low in natural fertility and high in exchangeable aluminum levels that are potentially toxic to most crops. Water and air move through this soil slowly. Water runs off the surface at a medium rate. A seasonal high water table fluctuates between depths of 2 and 4 feet during December through May. Plant roots penetrate this soil easily. Plants are damaged by lack of water during dry periods in summer and fall of some years.

Included in mapping are a few small areas of Brimstone, Glenmora, and Guyton soils. The Brimstone soils are poorly drained and are in lower positions than the Caddo-Messer soils. They are alkaline in the subsurface and subsoil layers. The Glenmora soils are moderately well drained and are mainly on side slopes. They are similar to the Messer soil, except that they have more clay in the subsoil. The Guyton soils are poorly drained and are in low positions. They are similar to the Caddo soils, except that they do not have red mottles. The included soils make up about 10 percent of the map unit.

Most areas of this complex are used as woodland. A few areas are used as pasture, cropland, or homesites.

This map unit is well suited to loblolly pine, slash pine, and longleaf pine. The main concern in producing and harvesting timber is wetness, which limits the use of equipment on both the Caddo and Messer soils. Wetness also causes moderate seedling mortality in areas of the Caddo soils. Reforestation must be carefully managed to reduce competition from undesirable understory plants.

These Caddo and Messer soils are moderately well suited to pasture. The main limitation is wetness. The main suitable pasture plants are common bermudagrass, Pensacola bahiagrass, white clover, winter peas, and ryegrass. Grazing when the soil is wet compacts the surface layer. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

These soils are moderately well suited to cultivated crops, mainly soybeans and rice. Wetness and potentially toxic levels of exchangeable aluminum within the rooting zone are the main limitations. The small mounds interfere with cultivation. A drainage system is needed for most cultivated crops and pasture plants. Land grading and smoothing improves surface drainage and permits more efficient use of farm equipment. The soils are fairly easy to work and keep in good tilth but a crust can form when clean tilled. The organic matter content can be maintained by using all crop residue, plowing under cover crops, and using a suitable cropping system. Most crops and pasture plants respond well to additions of fertilizer and lime, formulated and systematically applied to overcome the low fertility and high levels of exchangeable aluminum.

These soils are poorly suited to recreational development. The main limitation is wetness. Intensively used areas, such as playgrounds, need good drainage. Plant cover can be maintained by controlling traffic.

These soils are poorly suited to urban development. The main limitations are wetness, slow permeability, and low strength for roads. Excess water can be removed by using shallow ditches and providing the proper grade. Slow permeability and the high water table increase the possibility that septic tank absorption fields will fail. Designs for roads should offset the limited ability of the soil to support a load.

These Caddo and Messer soils are moderately well suited to use as habitat for rabbits, quail, squirrels, and deer. Habitat for wildlife can be improved by selectively harvesting timber so that large den and mast-producing trees are left.

This complex is in capability subclass IIIw and woodland group 2W.

Ch—Cahaba fine sandy loam, 1 to 3 percent slopes. This soil is very gently sloping and is well drained. It is on ridges on stream terraces. Areas are irregular in shape and range from 20 to 100 acres.

The surface layer is brown, extremely acid fine sandy loam about 4 inches thick. The subsurface layer is 15 inches thick. It is pale brown, very strongly acid fine sandy loam in the upper part and pale brown and yellowish red, strongly acid fine sandy loam in the lower part. The subsoil is yellowish red, very strongly acid clay loam. The underlying material to a depth of about 64 inches is yellowish red and pale brown, very strongly acid sandy loam.

Included in mapping are a few small areas of Bienville and Guyton soils. The Bienville soils are somewhat excessively drained and are in slightly higher positions than the Cahaba soil. They are sandy throughout. The Guyton soils are poorly drained and are in lower-lying positions. They are gray throughout. The included soils make up about 10 percent of the map unit.

This soil is low in fertility and high in exchangeable aluminum levels that are potentially toxic to most crops. Water and air move through this soil at a moderate rate. Water runs off the surface at a medium rate. Plants are damaged by lack of water during dry periods in summer and fall of some years. The seasonal high water table is at a depth greater than six feet. Plant roots penetrate this soil easily. This soil dries quickly after rains.

This soil is used mostly as woodland. In a few areas, it is used as pastureland or cropland.

This soil is well suited to loblolly pine, slash pine, and longleaf pine and has few major limitations to the production and harvest of timber.

The Cahaba soil is well suited to pasture. Low fertility is the main limitation. Suitable pasture plants are common bermudagrass, improved bermudagrass, Pensacola bahiagrass, ryegrass, and crimson clover. Proper grazing, weed control, and fertilizer are needed for maximum quality of forage.

This soil is well suited to cultivated crops. The main limitations are low fertility and potentially toxic levels of exchangeable aluminum within the rooting zone. Erosion is a hazard. The main suitable crops are corn, soybeans, and truck and garden crops. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Crops respond to additions of lime and fertilizer formulated and systematically applied to overcome the low fertility and high levels of exchangeable aluminum.

This soil is well suited to recreational development and urban development. It has few limitations to these uses.

This soil is well suited to use as habitat for rabbits, squirrels, quail, and deer. Habitat for wildlife can be improved by selectively harvesting timber so that large den and mast-producing trees are left.

This Cahaba soil is in capability subclass IIe and woodland group 2O.

CO—Clovelly muck. This very fluid organic soil is level and very poorly drained. It is in brackish marshes along major drainageways and it is ponded and flooded most of the time. Many areas are intermittently submerged and appear as small to large lakes. Areas are irregular in shape and range from 60 to several hundred acres. Slope is less than 0.2 percent.

The observations were fewer than in most other areas because of poor accessibility. The detail in mapping, however, is adequate for the expected use of the soil.

Typically, the organic material is very fluid and extends to a depth of about 36 inches. It is very dark grayish brown, slightly acid muck in the upper part and black, neutral muck in the lower part. The underlying mineral layer to a depth of about 51 inches is black, neutral, very fluid, mucky clay. Below that to a depth of about 80 inches is gray, neutral, very fluid clay.

The Clovelly soil is almost continuously ponded and flooded with several inches of moderately saline water. During storms, it is covered with as much as 3 feet of water. This soil is saturated with water and is very fluid throughout. When it is not flooded, the high water table ranges from about 1 foot above the surface to 0.5 foot below the surface. The soil has low strength and poor trafficability. The underlying clayey material has very high shrink-swell potential. Permeability is rapid in the organic layers and very slow in the clayey layers. The total subsidence potential is high.

Included with this soil in mapping are a few small areas of Gentilly soils and soils that are similar to Gentilly soils, except that they are firmer throughout. These soils are in positions similar to those of the Clovelly soil, and they are mineral soils. Also included are a few large areas of soils that are similar to the Clovelly soil, except that they have more than 51 inches of organic material. The included soils make up about 20 percent of the map unit.

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

This soil is used mostly as wetland wildlife habitat or for extensive forms of recreation such as hunting and fishing. Small acreages are in oil and gas fields.

This soil is well suited to use as habitat for wetland wildlife. It produces habitat for waterfowl, American alligators, and furbearers such as mink, muskrat, and nutria. The soil is part of the estuarine complex that helps support Gulf marine life. Intensive management of wildlife habitat generally is not practical. Water-control structures are difficult to construct and maintain because of the instability and fluid nature of the soil. Saltwater intrusion is a problem in the management of the vegetation for wildlife habitat. The small ponds and streams included in this map unit provide areas for sport and commercial fishing. Hunting of waterfowl is a popular sport.

This soil is not suited to cultivated crops, pasture, and woodland. Wetness, salinity, low strength, and poor accessibility are the main limitations. Flooding is a hazard. Even if the soils are protected from flooding and drained by pumps, extreme acidity, saltwater from storms, subsidence, and low strength are continuing limitations for uses such as cropland, pasture, and woodland.

This soil is not suited for urban and intensive recreational uses because of flooding and wetness. If the soils are drained and protected from flooding for urban uses, they subside several feet below sea level. Then the underlying clays are a problem because of their very high shrink-swell potential.

This map unit is in capability subclass VIIw.

Cr—Crowley-Vidrine silt loams. These soils are level and somewhat poorly drained. They are on broad convex ridges on the Gulf Coast Prairies. This complex consists of small areas of Crowley and Vidrine soils that are so intermingled that they cannot be mapped separately at the scale selected. Areas are irregular shape and range from 20 to 1,000 acres. The landscape consists of broad, convex ridges that contain many small convex mounds or mound areas that have been smoothed. The mounds are circular and range from 50 to 150 feet in diameter and 1 foot to 6 feet in height before leveling. Most areas have been leveled and have a slope of 0 to 1 percent.

The Crowley soil makes up about 55 percent of the mapped areas and the Vidrine soil, about 35 percent. The Crowley soil is in the intermound areas and the Vidrine soil is on the mounds or smoothed mound areas.

The Crowley soil has a surface layer of dark grayish brown, very strongly acid silt loam about 10 inches thick. The subsurface layer is grayish brown, mottled, strongly acid silt loam about 15 inches thick. The subsoil extends to 65 inches. It is grayish brown, mottled, strongly acid silty clay in the upper part; gray, mottled, strongly acid silty clay in the middle part; and gray, mottled, medium acid clay loam in the lower part.

The Crowley soil has medium fertility and is moderately high in exchangeable aluminum levels that are potentially toxic to some crops. Water and air move through this soil very slowly. Water runs off the surface very slowly and the surface layer remains wet for long periods after heavy rains. Plants are damaged by lack of water during dry periods in summer and fall of some years. A seasonal high water table fluctuates between depths of 0.5 foot and 1.5 feet during December through April. This soil has high shrink-swell potential.

The Vidrine soil has a surface layer about 8 inches thick. It is dark grayish brown, strongly acid silt loam. The subsoil extends to about 60 inches. It is yellowish brown, mottled, strongly acid silt loam in the upper part; brown and grayish brown, mottled, medium acid silty clay loam and silty clay in the middle part; and light brownish gray, mottled, slightly acid silty clay and silty clay loam in the lower part.

This Vidrine soil has medium fertility and is high in exchangeable aluminum levels that are potentially toxic to most crops. Water and air move through this soil slowly. Water runs off the surface at a medium rate. A seasonal high water table is 1 foot to 2 feet below the surface during December through April. The shrink-swell potential is high.

Included in this map unit are a few small areas of Leton, Morey, and Mowata soils. The Leton soils are poorly drained and in low positions. They have a less clayey subsoil than either the Crowley or the Vidrine soils. The Morey soils are poorly drained and in low positions. They have a dark surface layer. The Mowata soils are poorly drained and also in low positions. They have a subsurface layer that tongues into the subsoil. Also included are small areas of Vidrine soils on mounds that are not leveled. They have slopes of 1 to 3 percent. The included soils make up about 20 percent of the map unit.

The soils of this map unit are mainly used for cultivated crops. In a few areas, they are used as pastureland, woodland, or homesites.

The soils of this map unit are moderately well suited to cultivated crops, mainly rice and soybeans. The main limitations are wetness and moderately high and high levels of exchangeable aluminum within the rooting zone. Most climatically adapted crops can be grown if artificial drainage is provided. These soils are friable and easily tilled throughout a wide range in moisture content. The surface, however, crusts after heavy rainfall. A tillage pan can form as a result of excessive cultivation, but this pan can be broken by subsoiling when the soil is dry. Land grading and smoothing improves surface drainage and permits more efficient use of farm equipment. The organic matter content can be maintained by using all crop residue, plowing under cover crops, and using a suitable cropping system. Most crops respond well to additions of fertilizer and lime, formulated and systematically applied to overcome the medium fertility and moderately high and high levels of exchangeable aluminum.

These soils are moderately well suited to pasture. The main limitation is wetness. The main suitable pasture plants are common bermudagrass, Pensacola bahiagrass, ryegrass, winter peas, and white clover. Grazing when the soil is wet compacts the surface layer and causes poor tilth and excessive runoff. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The soils of this map unit are well suited to slash pine and loblolly pine. Wetness severely limits the use of equipment and causes slight to moderate seedling mortality.

These soils are poorly suited to recreational development. The main limitations are wetness and slow and very slow permeability. Good drainage should be provided for intensively used areas such as playgrounds. Cuts and fills should be seeded or mulched. Plant cover can be maintained by controlling traffic.

The soils of this map unit are poorly suited to urban development. The main limitations are wetness, slow and very slow permeability, high shrink-swell potential, and low strength for roads. For best results, drainage is needed for most lawn grasses, shade trees, ornamental trees, shrubs, vines, and vegetable gardens. Designs for roads should offset the limited ability of the soils of this map unit to support a load. Slow and very slow permeability and the high water table increase the possibility that septic tank absorption fields will fail. The effects of shrinking and swelling can be minimized by proper design and by backfilling with material that has low shrink-swell potential.

This map unit is in capability subclass IIIw and woodland group 2W.

Dm—Dumps. This map unit consists of sanitary landfills. It is mostly in swamps and low-lying areas. Dumps are nearly level to moderately steep. Areas generally range from 5 acres to 80 acres.

Typically, these areas consist of successive layers of compacted refuse and thin soil layers. The combined thickness of these layers may range from 5 feet to more than 30 feet. The dump areas are covered with a thick final layer of soil when the landfill is completed.

Included with these areas in mapping are a few small areas of Arat and Clovelly soils. Also included are Acadia, Kinder, and Mowata soils and open trenches excavated to obtain geologic material for soil layers. The included soils and open trenches make up about 20 percent of the map unit.

This map unit is used chiefly for the disposal of solid waste. Dumps are not suited to agricultural, forestry, or urban uses.

GB—Ged clay. This firm mineral soil is level and very poorly drained. It is in freshwater marshes that are ponded and flooded most of the time. The observations were fewer than in most other areas because of poor accessibility. The detail in mapping, however, is adequate for the expected use of the soil. Areas are irregular in shape and range from about 40 to several hundred acres.

Typically, the surface layer is dark gray, slightly acid, very fluid clay about 5 inches thick. The next layer is dark gray, mildly alkaline clay about 4 inches thick. The subsoil extends to a depth of about 60 inches. It is gray, mottled, mildly alkaline or neutral clay.

Included with this soil in mapping are a few small areas of Allemands, Gentilly, and Larose soils. These soils are in positions similar to those of the Ged soil. The Allemands soils have moderately thick organic surface layers. The Gentilly soils are more saline. The Larose soils are very fluid throughout. Also included are a few small areas of Ged soils that have been encircled by levees and drained with water pumps. The included soils make up about 15 percent of the map unit.

The Ged soil is ponded and flooded with several inches of water most of the time. During storms, floodwater is as much as 3 feet deep. When the soil is not flooded, the high water table fluctuates between the soil surface and 1 foot above the surface. Permeability is very slow. These marsh soils are firm enough to support livestock grazing. The shrink-swell potential is high.

The natural vegetation consists mainly of bulltongue and alligatorweed (fig. 2). Other common plants are marshhay cordgrass, cattail, California bulrush, and coastal waterhyssop.

This soil is used mostly as habitat for wetland wildlife, as rangeland, or for recreation. A small acreage is protected from flooding and used for crops.

This soil is well suited to use as habitat for wetland wildlife. Ducks, geese, and other waterfowl feed and roost in areas of this soil. This soil also provides habitat for the American alligator, and furbearers such as nutria, muskrat, mink, and raccoons. Hunting of waterfowl is a popular sport.

This soil is moderately well suited to rangeland. The major concerns on marsh rangeland are flooding, wildfires, and poor footing for cattle. Installing cattle walkways can improve grazing distribution.

Unless drained and protected from flooding, these soils are not suited to cropland, pastureland, or woodland.

These soils are not suited to urban uses or intensive forms of recreation. Wetness, very slow permeability, and high shrink-swell potential are the main limitations. Flooding is a hazard.

This map unit is in capability subclass VIIw.

GC—Gentilly muck. This very fluid mineral soil is level and very poorly drained. It is in brackish marshes that are ponded and flooded most of the time. Many areas are intermittently submerged and appear as small to large shallow lakes. Areas are irregular in shape and range from 15 to several hundred acres. The observations were fewer than in most other areas because of poor accessibility. The detail in 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, neutral muck to a depth of about 6 inches and is black, neutral,

Figure 2.—Bulltongue, the dominant plant in many areas of freshwater marsh, is growing in an area of Ged clay.

very fluid clay to a depth of about 19 inches. The underlying material to a depth of about 64 inches is gray, mildly alkaline, very fluid clay loam in the upper part and greenish gray, mildly alkaline, firm silty clay loam and clay in the lower part.

Included with this soil in mapping are a few large areas of Clovelly soils and a few small areas of Ged soils. Clovelly and Ged soils are in positions similar to those of the Gentilly soil. Clovelly soils have a thicker organic surface layer. Ged soils have a thinner, very fluid surface layer and are not so saline. Also included are a few large areas of soils that are similar to the Gentilly soil, except that they have a firmer surface layer and subsoil. The included soils make up about 20 percent of the map unit.

The Gentilly soil is ponded and flooded with several inches of water most of the time. During storms, floodwater is as much as 3 feet deep. When the soil is not flooded, the high water table fluctuates from 1 foot above the soil surface to 0.5 foot below the surface. This soil has low strength and poor trafficability. Permeability is very slow. The total subsidence potential is medium. The shrink-swell potential is very high.

The natural vegetation consists mainly of marshhay cordgrass. Other common plants include California bulrush, deerpea, and seashore saltgrass. Large areas are intermittently submerged and have mainly aquatic vegetation such as widgeongrass and dwarf spikesedge.

This soil is mainly used as habitat for wetland wildlife or for extensive forms of recreation. In a few small areas, it is used as rangeland.

This soil is well suited to use as habitat for wetland wildlife. When flooded, it provides roosting and feeding areas for ducks, geese, and other waterfowl. Hunting of waterfowl is a popular sport. This soil also provides habitat for the American alligator, and furbearers such as nutria, mink, and muskrat. Levees and other structures designed for the intensive management of habitat are difficult to construct and maintain because of the very fluid nature of the upper mineral layers.

This soil is not suited to cultivated crops, pasture, or woodland. Wetness, salinity, and poor accessibility are the major limitations. Flooding is a hazard. This soil generally cannot support the weight of farm machinery or grazing cattle. Small areas of soils that are similar to the Gentilly soils, except that they have a firmer surface layer, are used as rangeland. If this soil is drained and protected from flooding, extreme soil acidity and subsidence are continuing limitations.

This soil is not suited to urban uses and intensive forms of recreation. Wetness, subsidence, very high shrink-swell potential, salinity, and low strength for roads are the main limitations. Flooding is a hazard. If this soil is drained and protected from flooding, it subsides to elevations below sea level.

The Gentilly soil is in capability subclass VIIw.

Ge—Glenmora silt loam, 1 to 3 percent slopes. This soil is very gently sloping and moderately well drained. It is on ridges and side slopes on the terrace uplands. Areas are irregular in shape and range from 10 to 800 acres.

Typically, the surface layer is dark grayish brown, extremely acid silt loam about 4 inches thick. The subsoil to a depth of 56 inches is yellowish brown, mottled, strongly acid silt loam in the upper part; light yellowish brown and yellowish brown, mottled, strongly acid silty clay loam in the middle part; and strong brown, mottled, strongly acid silty clay loam in the lower part. Below this to a depth of 65 inches is light brownish gray, mottled, strongly acid silty clay loam.

Included in this map unit are a few small areas of Caddo, Kinder, Malbis, and Messer soils. The poorly drained Caddo and Kinder soils are on broad flats and are gray throughout. Malbis soils are in higher positions than Glenmora soil and do not have gray mottles within 30 inches of the surface. Messer soils are on low circular mounds and have a less clayey subsoil. The included soils make up about 10 percent of the map unit.

This soil is low in fertility and moderately high in exchangeable aluminum levels that are potentially toxic to some crops. Water and air move through this soil slowly. Water runs off the surface at a medium rate. A seasonal high water table is 2 to 3 feet below the surface during December through April. Plants are damaged by lack of water during dry periods in summer and fall of some years. This soil has moderate shrink-swell potential.

This soil is mainly used as woodland. In a few areas, it is used as cropland, pastureland, or homesites.

This soil is well suited to loblolly pine, slash pine, and longleaf pine. Wetness limits the use of equipment. Reforestation must be carefully managed to reduce competition from undesirable understory plants.

This soil is moderately well suited to cultivated crops. It is limited mainly by the hazard of erosion, low fertility, and moderately high levels of exchangeable aluminum within the rooting zone. Soybeans is the main crop, but corn, wheat, and rice are also suitable. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content, but excessive cultivation can cause a tillage pan to form. This pan can be broken by subsoiling when the soil is dry. Maintaining crop residue on or near the surface reduces runoff and helps to maintain soil tilth and organic matter content. Limiting tillage for seedbed preparation and weed control reduces runoff and erosion. All tillage should be on the contour or across the slope. Crops respond well to additions of fertilizer and lime, formulated and systematically applied to overcome the low fertility and moderately high levels of exchangeable aluminum.

This soil is well suited to pasture. Suitable pasture plants are Pensacola bahiagrass, common bermudagrass, ryegrass, and white clover. Where practical, seedbed preparation should be on the contour or across the slope. Grazing when the soil is wet compacts the surface layer. Proper grazing, weed control, and additions of fertilizer are needed for maximum quality of forage.

This soil is moderately well suited to recreational development. The main limitations are wetness and slow permeability. Cuts and fills should be seeded or mulched. Adequate plant cover can control erosion and sedimentation and enhance the beauty of the area. Plant cover can be maintained by controlling traffic.

This soil is moderately well suited to urban development. The main limitations are wetness, slow permeability, moderate shrink-swell potential, and low strength for roads. Preserving the existing plant cover during construction helps to control erosion. Topsoil can be stockpiled and used to reclaim areas disturbed by cutting and filling. Plant cover can be established and maintained by fertilizing, seeding, mulching, and shaping the slopes. Slow permeability and the seasonal high water table increase the possibility that septic tank absorption fields will fail. Designs for roads should offset the limited ability of the soil to support loads. Drainage should be provided around homesites.

This soil is well suited for use as habitat for rabbits, quail, squirrels, and deer. Habitat can be improved by selectively harvesting timber so that large den and mast-producing trees are left.

This Glenmora soil is in capability subclass IIe and woodland group 2W.

Gg—Gore silt loam, 1 to 5 percent slopes. This soil is gently sloping and moderately well drained. It is on side slopes along drainageways on the terrace uplands. Areas are irregular in shape and range from 40 to 250 acres.

The surface layer is very dark grayish brown, very strongly acid silt loam about 2 inches thick. The subsurface layer is brown, strongly acid silt loam about 3 inches thick. The subsoil extends to a depth of about 60 inches. It is yellowish red, very strongly acid clay in the upper part; light brownish gray, mottled, very strongly acid clay in the middle part; and light brownish gray, mottled, very strongly acid silty clay in the lower part.

Included in mapping are a few small areas of Acadia soils. The somewhat poorly drained Acadia soils are on lower and less sloping parts of the landscape than Gore soil and are browner throughout. Also included are a few small areas of soils that are similar to Gore soil, except that the upper part of the subsoil is a brownish color. The included soils make up about 10 percent of the map unit.

This soil is low in fertility and high in exchangeable aluminum levels that are potentially toxic to most crops. Water and air move through this soil very slowly. Water runs off the surface at a medium rate. The seasonal high water table is at a depth greater than 6 feet. Plant roots penetrate the clayey subsoil with difficulty. This soil has high shrink-swell potential. Plants are damaged by lack of water during dry periods in summer and fall of some years.

This soil is mostly in woodland. A small acreage is in pasture.

This soil is moderately well suited to loblolly pine and slash pine. Moderate equipment use limitations and seedling mortality caused by the clayey subsoil are the main concerns in producing and harvesting timber. The subsoil is very sticky when wet and is difficult for plant roots to penetrate.

This soil is moderately well suited to pasture. The main limitation is low fertility, and erosion is a hazard. Suitable pasture plants are Pensacola bahiagrass, improved bermudagrass, common bermudagrass, crimson clover, and vetch. Where practical, seedbed preparation should be on the contour or across the slope. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is moderately well suited to cultivated crops. The main limitations are low fertility and the high levels of aluminum within the rooting zone. Erosion is a severe hazard. Early fall seeding, conservation tillage, and constructing terraces, diversions, and grassed waterways are practices that control erosion. All tillage should be on the contour or across the slope. Crops respond well to additions of fertilizer and lime, formulated and systematically applied to overcome the low fertility and high levels of exchangeable aluminum.

This soil is moderately well suited for use as habitat for rabbits, quail, squirrels, and deer. Habitat for wildlife can be improved by selectively harvesting timber so that large den and mast-producing trees are left.

This soil is poorly suited to urban development and recreation. The erosion hazard is severe, and this soil has high shrink-swell potential. The very slow permeability is a limitation to septic tank absorption fields. Preserving the existing plant cover during construction helps to control erosion. Plant cover can be established and maintained by proper fertilizing, seeding, mulching, and shaping of the slopes. The very slow permeability can be partly overcome by increasing the size of the absorption field. Designs for buildings and roads should offset the effects of shrinking and swelling.

This Gore soil is in capability subclass IVe and woodland group 3C.

Go—Guyton silt loam, occasionally flooded. This soil is level and poorly drained. It is in broad depressions and along narrow drainageways on the terrace uplands. Areas are irregular in shape and range from 40 to 1,000 acres. Slope is 0 to 1 percent.

Typically, the surface layer is grayish brown, medium acid silt loam about 4 inches thick. The subsurface layer is gray, mottled, strongly acid silt loam about 14 inches thick. The subsoil extends to a depth of about 65 inches. It is light grayish brown and grayish brown, mottled, very strongly acid silty clay loam and silt loam in the upper part; grayish brown, mottled, very strongly acid silty clay loam in the middle part; and light brownish gray, mottled, very strongly acid silty clay loam in the lower part.

Included in this map unit are a few small areas of Brimstone, Caddo, Glenmora, and Messer soils. The Brimstone soils are in higher positions than Guyton soil and are more alkaline in the subsurface and subsoil layers. The Caddo soils are also in higher positions and have red mottles in the subsoil. Glenmora and Messer soils are moderately well drained and have a brownish color subsoil. Glenmora soils are on ridges and in sloping areas and Messer soils are on low mounds. Also included are small areas of frequently flooded Guyton soils in lower positions. The included soils make up about 15 percent of the map unit.

This soil is low in fertility and high in exchangeable aluminum levels that are potentially toxic to most crops. Water and air move through this soil slowly. Wetness restricts root development of many plants. Water runs off the surface very slowly and stands in low places for short periods after heavy rain. A seasonal high water table fluctuates between a depth of 1.5 feet and the soil surface during December through May. This soil is subject to very brief to long periods of flooding. Flooding is occasional and occurs mostly in winter and spring, but it can occur during any season. The surface layer of this soil remains wet for long periods after heavy rain.

This soil is used mostly as woodland. In a few areas, it is used as pasture.

This soil is moderately well suited to loblolly pine, slash pine, sweetgum, southern red oak, and water oak. Restricted use of equipment and seedling mortality caused by wetness and flooding are the main concerns in producing and harvesting timber. Reforestation must be carefully managed to reduce competition from undesirable understory plants.

This soil is moderately well suited to pasture. The main limitation is wetness, and flooding is the main hazard. The main suitable pasture plants are common bermudagrass, Pensacola bahiagrass, and ryegrass. Wetness restricts the use of equipment. Grazing when the soil is wet compacts the surface layer. Stocking rates, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is poorly suited to cultivated crops. Wetness, high levels of exchangeable aluminum, low fertility, and the potential flood hazard restrict its use. Rice and soybeans can be grown if they are planted late and flooding can be controlled. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess water. Crop residue left on the surface helps to maintain soil tilth and the organic matter content. Crops respond well to additions of fertilizer and lime, formulated and systematically applied to overcome the low fertility and high levels of exchangeable aluminum.

This soil is poorly suited for recreational development and urban development. It is limited mainly by wetness and the hazard of flooding. Drainage and protection from flooding are needed if buildings are constructed. Drainage is also needed for best results with most lawn grasses, shade trees, ornamental trees, shrubs, vines, and vegetable gardens. Roads and streets should be located above the expected flood level. Flooding is best controlled by use of major flood-control structures. Cutbanks are not stable and are subject to slumping. Slow permeability and the high water table increase the possibility that septic tank absorption fields will fail.

This soil is moderately well suited for use as habitat for rabbit, quail, squirrels, and deer. Habitat for wildlife can be improved by selective cutting so that large den and mast-producing trees are left.

This Guyton soil is in capability subclass IVw and woodland group 2W.

GU—Guyton silt loam, frequently flooded. This soil is level and poorly drained. It is on flood plains of drainageways on the terrace uplands. Areas are irregular in shape and range from 30 to 2,500 acres. This soil is subject to frequent flooding by stream overflow. The observations were fewer than in most other areas because of poor accessibility. The detail in mapping, however, is adequate for the expected use of the soil. Slope is dominantly less than 1 percent.

Typically, the surface layer is grayish brown, strongly acid silt loam about 7 inches thick. The subsurface layer is light brownish gray, mottled, very strongly acid silt loam about 21 inches thick. The subsoil to a depth of about 62 inches is grayish brown, mottled, very strongly acid silty clay loam and silt loam in the upper part; light brownish gray, mottled, strongly acid silty clay loam in the middle part; and light brownish gray, mottled, strongly acid silt loam in the lower part.

Included in this map unit are a few small areas of Basile, Bienville, and Una soils. The poorly drained Basile soils are in slightly lower positions than Guyton soil and are more alkaline in the subsoil. The somewhat excessively drained Bienville soils are on convex ridges and are sandy throughout. The poorly drained Una soils are in slightly lower positions and do not have a subsurface layer that tongues into the subsoil. Also included on natural levees mainly along Buxton Creek, are soils similar to the Bienville soils, except that they are loamy throughout. The included soils make up about 15 percent of the map unit.

This soil is low in fertility and high in exchangeable aluminum levels that are potentially toxic to most crops. Water and air move through this soil slowly. Water runs off the surface slowly and stands in low places for long periods after heavy rain. This soil is frequently flooded for brief to long periods mostly in winter, spring, and early in summer. The depth of floodwater ranges from 1 foot to 6 feet. A seasonal high water table fluctuates between a depth of about 1.5 feet and the soil surface during December through May.

This soil is used mostly as woodland and wildlife habitat. In a few areas, it is used as pasture or for recreation.

This map unit is moderately well suited to loblolly pine, slash pine, sweetgum, green ash, southern red oak, and water oak. The main concerns in producing and harvesting timber are equipment use limitations and seedling mortality caused by wetness and flooding (fig. 3). Conventional methods of harvesting timber can be used except sometimes during rainy periods, generally from December to May. Only trees that can tolerate seasonal wetness should be planted.

This soil is moderately well suited to use as habitat for squirrels, deer, ducks, rabbits, and many small furbearing animals. Habitat for wildlife can be improved by selectively harvesting timber so that large den and mast-producing trees are left.

This unit is poorly suited to recreational development. The main limitation is wetness, and flooding is a hazard. Protection from flooding is needed. Plant cover can be maintained by controlling traffic.

This unit is poorly suited to improved pasture. The main limitation is wetness, and flooding is a hazard. Common bermudagrass and Pensacola bahiagrass are the main suitable pasture plants.

This soil is not suited to cropland or urban development because of the flood hazard.

This Guyton soil is in capability subclass Vw and woodland group 2W.

Gy—Guyton-Messer silt loams. These soils are level and gently sloping, poorly drained and moderately well drained. They are on the terrace uplands. This complex consists of small areas of Guyton and Messer soils that are so intermingled that they cannot be mapped separately at the scale selected. Areas are irregular in shape and range from 40 to 1,500 acres. The landscape consists of broad flats that have many small, convex mounds. The mounds are circular and range from 50 to 150 feet in diameter and from 1 to 4 feet in height. Slopes range from about 0 to 1 percent on the intermound areas and from about 1 to 5 percent on the mounds.

Most mapped areas have about 55 percent Guyton soil and 35 percent Messer soil. The Guyton soil is on the intermound areas and the Messer soil is on the mounds or smoothed mound areas.

The Guyton soil is poorly drained and has a surface layer of dark grayish brown, medium acid silt loam about

Figure 3.—Flooded stand of hardwoods in a bottom land area of Guyton silt loam, frequently flooded.

6 inches thick. The subsurface layer is light brownish gray, mottled, strongly acid silt loam about 20 inches thick. The subsoil to a depth of about 67 inches is light brownish gray, mottled, very strongly acid silty clay loam and silt loam in the upper part; light brownish gray, mottled, very strongly acid silty clay loam in the middle part; and light brownish gray, mottled, very strongly acid clay loam in the lower part.

This soil has low fertility and high exchangeable aluminum levels that are potentially toxic to most crops. Water and air move through this soil slowly. Wetness restricts root development of many plants. Water runs off the surface slowly and stands in low places for short periods after heavy rain. A seasonal high water table fluctuates between a depth of about 1.5 feet and the soil surface during December through May. This soil is subject to short periods of flooding during unusually severe rainstorms. The surface layer of this soil remains wet for long periods after heavy rain. Plants are damaged by lack of water during dry periods in summer and fall of some years.

The Messer soil is moderately well drained and has a surface layer of dark grayish brown, strongly acid silt loam about 2 inches thick. The subsurface layer is pale brown, strongly acid silt loam about 4 inches thick. The subsoil to a depth of about 60 inches is yellowish brown, very strongly acid silt loam in the upper part; yellowish brown, very strongly acid silty clay loam in the middle part; and pale brown, mottled, very strongly acid silty clay loam in the lower part.

This soil is low in fertility and high in exchangeable aluminum levels that are potentially toxic to most crops. Water and air move through this soil slowly. Water runs off the surface at a medium rate. A seasonal high water table fluctuates between depths of about 2 and 4 feet during December through May. Plant roots penetrate this soil easily. Plants are damaged by lack of water during dry periods in summer and fall of some years.

Included with this soil in mapping are a few small areas of Brimstone, Caddo, and Kinder soils. These soils are in positions similar to those of the Guyton soil. The Brimstone soils contain concentrations of sodium in the subsoil. The Caddo and Kinder soils are on higher positions and have red mottles in the subsoil. Also included are a few small areas of Guyton soils that are subject to occasional or frequent flooding. The included soils make up about 15 percent of the map unit.

Most areas of this complex are used as woodland. A few areas are used as pasture, cropland, or homesites.

This complex is well suited to loblolly pine, slash pine, sweetgum, green ash, southern red oak, and water oak. Wetness restricts the use of equipment and causes seedling mortality. It is the main concern in producing and harvesting timber. Reforestation must be carefully managed to reduce competition from undesirable understory plants. Only trees that can tolerate seasonal wetness should be planted.

This complex is moderately well suited to pasture. The main limitations are wetness and low fertility. The main suitable pasture plants are common bermudagrass, Pensacola bahiagrass, white clover, winter peas, and ryegrass. Wetness limits the choice of plants and the period of grazing. A surface drainage system can remove excess surface water. Grazing when the soil is wet compacts the surface layer. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

These soils are moderately well suited to cultivated crops, mainly rice and soybeans. The main limitations are wetness, low fertility, and the high levels of exchangeable aluminum within the rooting zone. The numerous mounds interfere with cultivation, drainage, and irrigation. Proper irrigation systems should be used for rice production. A drainage system is needed for most cultivated crops and pasture plants. Land grading and smoothing improves surface drainage, allows more uniform application of irrigation water, and permits more efficient use of farm equipment. Crop residue returned to the soil or regular additions of other organic matter improves fertility, reduces crusting, and increases the water intake rate. Most crops and pasture plants respond well to additions of fertilizer and lime formulated and systematically applied to overcome the low fertility and high levels of exchangeable aluminum.

This map unit is poorly suited to recreational development. The main limitation is wetness, and flooding is a hazard. Good drainage should be provided for intensively used areas such as playgrounds. Cuts and fills should be seeded or mulched. Plant cover can be maintained by fertilizing and by controlling traffic.

This map unit is poorly suited to urban development. The main limitations are wetness, slow permeability, and low strength for roads. Flooding is a hazard. Wetness is a severe limitation to homesites in areas of the Guyton soil and a moderate limitation in areas of the Messer soil. Drainage is needed for best results with most lawn grasses, shade trees, ornamental trees, shrubs, vines, and vegetable gardens. Excess water can be removed by using shallow ditches and providing the proper grade. Septic tank absorption fields do not function properly during rainy periods because of wetness and slow permeability. The Messer soil is better suited to building sites than the Guyton soil.

These soils are moderately well suited to use as habitat for rabbits, squirrels, quail, and deer. Habitat for wildlife can be improved by selectively harvesting timber so that the large den and mast-producing trees are left.

This complex is in capability subclass IIIw and woodland group 2W.

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

Typically, the surface layer is about 11 inches thick. It is black, strongly acid silty clay loam in the upper part and black, strongly acid silty clay in the lower part. The subsoil to a depth of about 60 inches is dark gray, mottled, medium acid silty clay loam in the upper part; grayish brown, mottled, slightly acid silty clay loam in the middle part; and light brownish gray, mottled, slightly acid silty clay loam in the lower part.

Included in this map unit are a few small areas of Midland, Morey, and Mowata soils. The Midland soils are in positions similar to those of the Judice soil, and they have a lighter color surface layer. The Morey soils are in higher positions and have a loamy subsoil. The Mowata soils are also in higher positions and have a surface layer that is a lighter color than the surface layer in the Judice soil. The included soils make up about 10 percent of the map unit.

This soil is moderately high in fertility. Water and air move through this soil very slowly. Water runs off the surface very slowly. A seasonal high water table fluctuates between a depth of 1.5 feet and the soil surface during December through April. This soil is subject to flooding for short periods during unusually severe rainstorms. The surface layer is sticky when wet and very hard when dry. It remains wet for long periods after heavy rain. The soil swells and shrinks markedly upon wetting and drying. Plants are damaged by lack of water during dry periods in summer and fall of some years.

This soil is used mainly for cultivated crops. In a few areas, it is used as pastureland or homesites.

This soil is moderately well suited to cultivated crops, mainly rice and soybeans (fig. 4). Wetness and poor tilth are the main limitations. This soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content. It becomes cloddy if tilled when it is too wet or too dry. A drainage system is needed for most cultivated crops and pasture plants. Pipe or other drop structures installed in drainage ditches control the water level in rice fields and prevent excessive erosion of ditches. Maintaining crop residue on or near the surface reduces runoff and helps to maintain soil tilth and organic matter content. Most crops and pasture plants respond well to additions of fertilizer. Lime is generally needed.

This soil is moderately well suited to pasture. The main limitation is wetness, which limits the choice of plants and the period of grazing. Suitable pasture plants are common bermudagrass, improved bermudagrass, dallisgrass, tall fescue, white clover, ryegrass, and winter peas. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is well suited to woodland. Unless drainage is provided, only water-tolerant trees, such as eastern cottonwood and American sycamore, should be planted. Wetness causes severe equipment use limitations and seedling mortality.

This soil is poorly suited to recreational development. The main limitations are wetness and very slow permeability. Flooding is a hazard. Most recreational uses require good drainage. Plant cover can be maintained by controlling traffic.

This soil is poorly suited to urban development. The main limitations are wetness, very slow permeability, high shrink-swell potential, and low strength for roads. Flooding is a hazard. Drainage is needed if roads and building foundations are constructed. Very slow permeability and the high water table increase the possibility that septic tank absorption fields will fail. Designs for roads should offset the limited ability of the soil to support loads. The effects of shrinking and

Figure 4.—Rice on Judice silty clay loam. This soil is moderately well suited to rice.

swelling can be minimized by proper design and by backfilling with material that has low shrink-swell potential.

This Judice soil is in capability subclass IIIw and woodland group 2W.

Kd—Kinder-Messer silt loams. These soils are level and gently sloping, poorly drained and moderately well drained. They are on the terrace uplands. The landscape consists of broad flats that have many low mounds. The mounds are circular and range from 30 to 150 feet in diameter and from 1 to 6 feet in height. In places the mounds have been smoothed by mechanical means. Individual areas of this complex range from 30 to 1,500 acres and contain about 60 percent Kinder soils and about 30 percent Messer soils. The poorly drained Kinder soil is in the intermound areas and the moderately well drained Messer soil is on the mounds or smoothed mound areas. The soils in this map unit are so intricately intermingled that it is not practical to map them separately at the scale used. Slopes range from about 0 to 1 percent on the intermound areas and from 1 to about 5 percent on the mounds.

The Kinder soil has a surface layer of dark grayish brown, medium acid silt loam about 6 inches thick. The subsurface layer is light brownish gray, very strongly acid loam about 11 inches thick. The subsoil to a depth of about 70 inches is light brownish gray, mottled, strongly acid clay loam or loam in the upper and middle parts. The lower part is mottled, light brownish gray, medium acid very fine sandy loam and yellowish red, medium acid loam.

This Kinder soil is low in fertility and high in exchangeable aluminum levels that are potentially toxic to most crops. Water and air move through this soil slowly. Water runs off the surface slowly and stands in low places for short periods after heavy rain. This soil dries slowly after heavy rain. A seasonal high water table fluctuates between a depth of about 2 feet and the soil surface during December through April. Plants are damaged by lack of water during dry periods in summer and fall of some years. This soil has moderate shrink-swell potential.

The Messer soil has a surface layer of dark grayish brown medium acid silt loam about 4 inches thick. The subsurface layer is pale brown, very strongly acid silt loam about 4 inches thick. The subsoil to a depth of about 68 inches is light yellowish brown, very strongly acid silt loam in the upper part; light yellowish brown, mottled, very strongly acid silty clay loam and pale brown silt loam in the middle part; and light brownish gray, mottled, very strongly acid silty clay loam in the lower part.

This Messer soil is low in fertility and high in exchangeable aluminum levels that are potentially toxic to most crops. Water and air move through this soil slowly. Water runs off the surface at a medium rate. A seasonal high water table fluctuates between depths of 2 feet and 4 feet during December through May. Plant roots penetrate this soil easily. Plants are damaged by lack of water during dry periods in summer and fall of some years.

Included in this map unit are a few small areas of Acadia, Brimstone, Crowley, Guyton, and Mowata soils. The Acadia soils are somewhat poorly drained and are on side slopes along drainageways. They have a more clayey subsoil than either the Kinder or Messer soil. The Brimstone soils are in lower positions than both the Kinder and Messer soil and have a subsoil that is more alkaline. The Crowley soils are somewhat poorly drained and are in positions similar to those of the Kinder soil. They have a more clayey subsoil. The Guyton soils are in lower positions than the Kinder soil and do not have red mottles in the subsoil. The Mowata soils are in lower positions than the Kinder soil, and they have a more clayey subsoil. The included soils make up about 15 percent of the map unit.

Most areas of this map unit are used as woodland or cropland. A few areas are used as pasture or homesites.

This map unit is well suited to loblolly pine, slash pine, and longleaf pine. The main concern in producing and harvesting timber is wetness, which limits the use of equipment. Reforestation must be carefully managed to reduce competition from undesirable understory plants.

This map unit is moderately well suited to cultivated crops. Wetness, low fertility, and high levels of exchangeable aluminum within the rooting zone are the main limitations. The small mounds interfere with tillage operations. Soybeans is the main crop, but rice is grown where the small mounds have been smoothed by mechanical means. A drainage system is needed for most cultivated crops and pasture plants. Land grading and smoothing improves surface drainage and permits more efficient use of farm equipment. These soils are easy to work and keep in good tilth, but a crust forms easily on the surface. Pipe or other drop structures installed in drainage ditches control the water level in rice fields and prevent excessive erosion of ditches. The organic matter content can be maintained by using all crop residue, plowing under cover crops, and using a suitable cropping system. Crops respond well to additions of fertilizer and lime, formulated and systematically applied to overcome the low fertility and high levels of exchangeable aluminum.

This map unit is moderately well suited to pasture. The main limitations are wetness and low fertility. The main suitable pasture plants are common bermudagrass, Pensacola bahiagrass, white clover, winter peas, and ryegrass. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This map unit is poorly suited to recreational development. The main limitations are wetness and slow permeability. Most recreational uses require good drainage. Plant cover can be maintained by controlling traffic.

This map unit is poorly suited to urban development. The main limitations are wetness, slow permeability, and low strength for roads. Excess water can be removed by using ditches and providing the proper grade. Slow permeability and the high water table increase the possibility that septic tank absorption fields will fail. Designs for roads should offset the limited ability of the soil to support a load.

This map unit is moderately well suited to use as habitat for rabbits, squirrels, quail, and deer. Habitat for wildlife can be improved by selectively harvesting timber so that large den and mast-producing trees are left.

This complex is in capability subclass IIIw and woodland group 2W.

LE—Larose mucky clay. This soil is level and very poorly drained. It is in freshwater marshes that are ponded and flooded most of the time. Many areas are intermittently submerged and appear as small to large shallow lakes. Areas are irregular in shape and of several hundred acres. The observations were fewer than in most other areas because of poor accessibility. The detail in mapping, however, is adequate for the expected use of the soils. Slope is less than 1 percent.

Typically, the surface layer is dark gray, slightly acid, very fluid mucky clay about 5 inches thick. The next layer is very dark gray, neutral, very fluid muck about 7 inches thick. Below that to a depth of about 80 inches is black and very dark gray, mildly alkaline, 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 Barbary and Gentilly soils. Allemands soils are in positions similar to those of the Larose soil, and they are organic soils. Barbary soils are in swamps and have logs and wood in the underlying material. Gentilly soils are in positions similar to those of the Larose soil, and they are more saline. Also included are a few small areas of soils that are similar to Larose soils, except that they are firm rather than very fluid in the lower part of the soil. Also included in most areas are small ponds and perennial streams. The included soils make up about 20 percent of the map unit.

The Larose soil is ponded and flooded with several inches of fresh water most of the time. During storms, floodwater is as much as 2 feet deep. When the soil is not flooded, the water table ranges from 3 feet above the surface to 0.5 foot below the surface. This soil has low strength and poor trafficability. It is saturated with water and very fluid throughout. It has very high shrink-swell potential. Permeability is very slow. The total subsidence potential is medium.

The natural vegetation consists mainly of bulltongue and alligatorweed. Other common plants are rattlebox, maidencane, cattail, and common buttonbush. Large areas of the soil are intermittently submerged and grow mainly aquatic and floating vegetation, such as common duckweed, water milfoil, and coontail.

The soil is mainly used as habitat for wetland wildlife or for extensive forms of recreation, such as hunting and fishing.

This soil is well suited to use as habitat for wetland wildlife. Roosting and feeding areas are available for ducks, geese, and many other species of waterfowl. The soil also provides habitat for the American alligator, and for furbearers, such as nutria, mink, muskrat, and raccoons. Water-control structures designed for the intensive management of habitat are difficult to construct because of the instability and very fluid nature of the soil materials. The small ponds and perennial streams included in this map unit provide habitat for significant numbers of freshwater fish. Hunting of waterfowl, trapping of furbearers and alligators, and commercial fishing are important.

This soil is not suited to crops, pasture, and woodland. Wetness, flooding, and low strength are too severe for these uses. This soil is generally too soft and boggy to support farm machinery or livestock grazing. Drainage and protection from flooding are possible, but extensive water-control structures, such as levees and water pumps, are required.

This soil is not suited to urban uses unless it has been drained and is protected from flooding. Flooding, wetness, and low strength are generally too severe for urban use. Low strength and very high shrink-swell potential are continuing limitations after drainage. The soil material is poorly suited to the construction of levees because it shrinks and cracks as it dries, causing the levees to fail.

This map unit is in capability subclass VIIw.

Lt—Leton silt loam. This soil is level and poorly drained. It is on broad flats, in long narrow depressions, and along drainageways on the Gulf Coast Prairies. Areas are irregular in shape and range from 20 to 400 acres. Slopes are less than 1 percent.

Typically, the surface layer is about 7 inches thick. It is grayish brown, strongly acid silt loam in the upper part and grayish brown, strongly acid loam in the lower part. The subsurface layer is gray, very strongly acid loam about 19 inches thick. The subsoil to a depth of about 62 inches is light brownish gray and gray, mottled, very strongly acid loam in the upper and middle parts and gray, mottled, strongly acid loam in the lower part.

Included in this map unit are a few small areas of Crowley, Morey, Mowata, and Vidrine soils. The somewhat poorly drained Crowley soils are on convex ridges and have a clayey subsoil. The Morey and Mowata soils are in higher positions than Leton soil. The Morey soils have a darker surface layer and the Mowata soils have a clayey subsoil. The somewhat poorly drained Vidrine soils are on mounds or smoothed mound areas, and they have a subsoil that is clayey in the lower part.

This soil is low in fertility and high in exchangeable aluminum levels that are potentially toxic to most crops. Water and air move through this soil slowly. Water runs off the surface very slowly and stands in low places for short periods after heavy rain. A seasonal high water table fluctuates between a depth of 1.5 feet and the soil surface during December through April. Wetness causes poor aeration and restricts root development. This soil is subject to flooding for short periods during unusually intense rainstorms. The surface layer of this soil remains wet for long periods after heavy rain. Plants are damaged by lack of water during dry periods in summer and fall of some years.

This soil is mainly used as cropland. In a few areas, it is used as pastureland, woodland, or homesites.

This soil is moderately well suited to cultivated crops, mainly rice and soybeans. The main limitations are wetness, low fertility, and high levels of exchangeable aluminum within the rooting zone. A tillage pan forms easily if this soil is tilled when wet. These soils are friable, but they are somewhat difficult to keep in good tilth because of surface crusting. Pipe or other drop structures installed in drainage ditches control the water level in the rice fields and prevent excessive erosion of ditches. The organic matter content can be maintained by using all crop residue, plowing under cover crops, and using a suitable cropping system. Land grading and smoothing improves surface drainage and permits more efficient use of farm equipment. Crops respond well to additions of fertilizer and lime that are formulated and systematically applied to overcome the low fertility and high levels of exchangeable aluminum.

This soil is moderately well suited to pasture. The main limitations are wetness and low fertility. Suitable pasture plants are common bermudagrass, Pensacola bahiagrass, ryegrass, winter peas, and white clover. Grazing when the soil is wet compacts the surface layer. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is well suited to slash pine and loblolly pine. Wetness limits the use of equipment and causes moderate seedling mortality.

This soil is poorly suited to recreational development. The main limitation is wetness, and flooding is a hazard. Good drainage should be provided for intensively used areas such as playgrounds. Plant cover can be maintained by controlling traffic.

This soil is poorly suited to urban development. The main limitations are slow permeability, wetness, and low strength for roads. Flooding is a hazard. Drainage is needed for best results with most lawn grasses, shade trees, ornamental trees, shrubs, vines, and vegetable gardens. Designs for roads should offset the limited ability of the soil to support a load. Slow permeability and the high water table increase the possibility that septic tank absorption fields will fail.

This soil is in capability subclass IIIw and woodland group 2W.

Mb—Malbis fine sandy loam, 1 to 3 percent slopes. This soil is very gently sloping and moderately well drained. It is on ridges and side slopes on the terrace uplands. Areas are irregular in shape and range from 10 to 325 acres.

Typically, the surface layer is dark grayish brown, extremely acid fine sandy loam about 5 inches thick. The subsurface layer is yellowish brown, very strongly acid fine sandy loam about 4 inches thick. The subsoil to a depth of about 65 inches is yellowish brown, very strongly acid clay loam. It contains red nodules in the lower part.

Included with this soil in mapping are a few small areas of Caddo and Glenmora soils. The poorly drained Caddo soils are on broad flats, and they are gray throughout. The moderately well drained Glenmora soils are in slightly lower positions than Malbis soil and have gray mottles in the subsoil. The included soils make up about 5 percent of the map unit.

This soil is low in fertility and high in exchangeable aluminum levels that are potentially toxic to most crops. Water and air move through this soil at a moderately slow rate. Water runs off the surface at a medium rate. A seasonal high water table is 2.5 to 4 feet below the surface during December through March. Plant roots penetrate this soil easily. Plants are damaged by lack of water during dry periods in summer and fall of some years.

This soil is used mainly as woodland. In a few areas, it is used for pasture, cultivated crops, or homesites.

This soil is well suited to loblolly pine, slash pine, and longleaf pine. It has few limitations for use and management; however, reforestation must be carefully managed to reduce competition from undesirable understory plants.

This soil is well suited to pasture. The main limitation is low fertility, and erosion is a hazard. Suitable pasture plants are Pensacola bahiagrass, common bermudagrass, improved bermudagrass, ryegrass, crimson clover, and ball clover. Where practical, seedbed preparation should be on the contour or across the slope. Proper grazing, weed control, and fertilizer are needed for maximum forage quality.

This soil is moderately well suited to cultivated crops. It is limited mainly by the hazard of erosion, low fertility, and the high levels of exchangeable aluminum in the rooting zone. Soybeans, corn, and truck and garden crops are the main suitable crops. The soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. Runoff and erosion can be reduced by plowing in fall, fertilizing, and seeding to a cover crop. All tillage should be on the contour or across the slope. Diversions and grassed waterways may be needed. The organic matter content can be maintained by using all crop residue, plowing under cover crops, and using a suitable cropping system. Crops respond well to additions of fertilizer and lime that are formulated and systematically applied to overcome the low fertility and high levels of exchangeable aluminum.

This soil is well suited to recreational development. It has few limitations to this use.

This soil is moderately well suited to urban development. The main limitations are wetness, moderately slow permeability, and low strength for roads. Preserving the existing plant cover during construction helps to control erosion. Moderately slow permeability and the seasonal high water table increase the possibility that septic tank absorption fields will fail. The moderately slow permeability can be overcome by increasing the size of the absorption field. Designs for roads should offset the limited ability of the soil to support a load.

The soil is well suited to use as habitat for rabbits, quail, squirrels, and deer. Habitat for wildlife can be improved by selectively harvesting timber so that the large den and mast-producing trees are left.

This Malbis soil is in capability subclass IIe and woodland group 2O.

Mg—Messer silt loam, 1 to 8 percent slopes. This soil is gently sloping and moderately sloping, and moderately well drained. It is on ridges and side slopes on the terrace uplands. It is in one irregularly shaped area of about 885 acres.

Typically, the surface layer is dark grayish brown, very strongly acid silt loam about 7 inches thick. The subsurface layer is light yellowish brown, very strongly acid very fine sandy loam about 4 inches thick. The subsoil extends to a depth of about 60 inches. It is yellowish brown, very strongly acid loam in the upper and middle parts; and pale brown, mottled, very strongly acid clay loam in the lower part.

Included in this map unit are a few small areas of Acadia, Glenmora, and Guyton soils. The Acadia soils are somewhat poorly drained and are in positions similar to those of the Messer soil. They have a clayey subsoil. The Glenmora soils are in positions similar to those of the Messer soil, and they have grayish mottles in the subsoil. The Guyton soils are poorly drained, are in lower positions, and are gray throughout. Also included are a few small areas of Messer soils that have slopes of 8 to 10 percent. The included soils make up about 10 percent of the map unit.

This soil is low in fertility and high in exchangeable aluminum levels that are potentially toxic to most crops. Water and air move through this soil slowly. Water runs off the surface at a medium rate. A seasonal high water table fluctuates between depths of about 2 feet and 4 feet during December through May. Plant roots penetrate this soil easily. Plants are damaged by lack of water during dry periods in summer and fall of some years.

This soil is used mostly as homesites or as woodland. In a few areas, it is used as pasture.

This soil is moderately well suited to urban development and homesites. The main limitations are wetness, slope, and low strength for roads. Erosion is a hazard on the steeper slopes. Preserving the existing plant cover during construction helps to control erosion. Slow permeability and the high water table increase the possibility that septic tank absorption fields will fail. Designs for roads should offset the limited ability of the soil to support a load.

This map unit is well suited to loblolly pine, slash pine, and longleaf pine. Wetness, which causes moderate equipment limitations, is the main concern in producing and harvesting timber.

This soil is well suited to pasture. The main limitation is low fertility, and erosion is a hazard. Suitable pasture plants are common bermudagrass, improved bermudagrass, Pensacola bahiagrass, ryegrass, and white clover. Where practical, seedbed preparation should be on the contour or across the slope. Proper grazing, weed control, and fertilizer are needed for maximum quality of forage.

This soil is moderately well suited to cultivated crops. The main limitations are slope, low fertility, and the high levels of exchangeable aluminum within the rooting zone. Early fall seeding; conservation tillage; and constructing terraces, diversions, and grassed waterways help to control erosion. All tillage should be on the contour or across the slope. Crops respond well to additions of fertilizer and lime that are formulated and systematically applied to overcome the low fertility and high levels of exchangeable aluminum.

This soil is moderately well suited to urban and recreational development. The main limitations are slope, slow permeability, and low strength for roads. Erosion is a moderate hazard. Cuts and fills should be seeded or mulched. Adequate plant cover can control erosion and sedimentation and enhance the beauty of the area. The seasonal high water table and moderately slow permeability increase the possibility that septic tank absorption fields will fail. Designs for roads should offset the limited ability of the soil to support a load.

This Messer soil is in capability subclass IIIe and woodland group 2W.

Mh—Messer-Guyton silt loams, gently undulating. These soils are moderately well drained and poorly drained. They are on narrow ridges and in depressional areas on the terrace uplands. This complex consists of small areas of Messer and Guyton soils that are so intermingled that they cannot be mapped separately at the scale selected. Areas are irregular in shape and range from 20 to 1,100 acres. Slopes range from 0 to 1 percent in the swales and from 1 to 5 percent on the ridges.

Most mapped areas have about 60 percent Messer soil and 30 percent Guyton soil. The Messer soil is on the narrow ridges and the Guyton soil is in the swales.

The Messer soil is moderately well drained and has a surface layer of dark grayish brown, very strongly acid silt loam about 4 inches thick. The subsurface layer is light yellowish brown, very strongly acid silt loam about 4 inches thick. The subsoil extends to a depth of about 70 inches. It is strong brown, very strongly acid loam in the upper part; strong brown, very strongly acid loam with pockets of silt loam in the middle part; and pale brown, mottled, very strongly acid clay loam in the lower part.

This Messer soil is low in fertility and high in exchangeable aluminum levels that are potentially toxic to most crops. Water and air move through this soil slowly. Water runs off the surface at a medium rate. A seasonal high water table fluctuates between depths of about 2 feet and 4 feet during December through May. Plant roots penetrate this soil easily. Plants are damaged by lack of water during dry periods in summer and fall of some years.

The Guyton soil is poorly drained and has a surface layer of grayish brown, strongly acid silt loam about 4 inches thick. The subsurface layer is light brownish gray, mottled, strongly acid silt loam about 17 inches thick. The subsoil to a depth of about 70 inches is light brownish gray, mottled, very strongly acid silty clay loam and silt loam in the upper part; light brownish gray, mottled, very strongly acid silty clay loam in the middle part; and light brownish gray, mottled, very strongly acid silt loam in the lower part.

This Guyton soil is low in fertility and high in exchangeable aluminum levels that are potentially toxic to most crops. Water and air move through this soil slowly. Wetness restricts root development of many plants. Water runs off the surface slowly and stands in low places for short periods after heavy rain. A seasonal high water table fluctuates between a depth of about 1.5 feet and the soil surface during December through May. This soil is subject to flooding during unusually severe rainstorms. The surface layer of this soil remains wet for long periods after heavy rain. Plants are damaged by lack of water during dry periods in summer and fall of some years.

Included in this map unit are a few small areas of Acadia and Glenmora soils. The Acadia soils are somewhat poorly drained and are on side slopes. They have a subsoil that is clayey in the lower part. The Glenmora soils are in positions similar to those of the Messer soils, and they have grayish mottles in the subsoil Also included in this map unit are a few small areas of Guyton soils that are subject to occasional or frequent flooding and Messer soils that have slopes greater than 5 percent. The included soils make up about 15 percent of the map unit.

This map unit is mainly in woodland. A small acreage is used as homesites.

This complex is well suited to loblolly pine, slash pine, sweetgum, green ash, southern red oak, and water oak. The main concerns in producing and harvesting timber are the restricted use of equipment and seedling mortality caused by wetness. Reforestation must be carefully managed to reduce competition from undesirable understory plants.

This map unit is poorly suited to urban development. The main limitations are wetness, slow permeability, and low strength for roads. Flooding is a hazard. Drainage is needed for best results with most lawn grasses, shade trees, ornamental trees, shrubs, vines, and vegetable gardens. Excess water can be removed by using shallow ditches and providing the proper grade. Slow permeability and the high water table increase the possibility that septic tank absorption fields will fail. Designs for roads should offset the limited ability of the soil to support a load.

This map unit is moderately well suited to cropland and pasture. The main limitations are wetness, low fertility, and high levels of exchangeable aluminum within the rooting zone. Suitable crops are soybeans and rice. Suitable pasture plants are common bermudagrass, Pensacola bahiagrass, white clover, and winter peas. A drainage system is needed for most crops and pasture plants. Land grading and smoothing are needed if rice is grown. Crops respond to additions of fertilizer and lime, formulated and systematically applied to overcome the low fertility and high levels of exchangeable aluminum.

This map unit is poorly suited to recreational development. The main limitation is wetness, and flooding is a hazard. Intensively used areas, such as playgrounds, require good drainage.

This complex is moderately well suited to use as habitat for rabbits, squirrels, and songbirds. Habitat for wildlife can be improved by leaving large den and mast-producing trees.

This complex is in capability subclass IIIw and woodland group 2W.

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

Typically, the surface layer is 10 inches thick. It is dark gray, medium acid silty clay loam in the upper part and dark gray, neutral silty clay loam in the lower part. The subsoil extends to a depth of about 60 inches. It is dark gray, mottled, mildly alkaline silty clay in the upper part; gray, mottled, mildly alkaline silty clay in the middle part; and gray, mottled, moderately alkaline silty clay loam in the lower part.

Included in this map unit are a few small areas of Judice, Leton, Morey, and Mowata soils. The Judice and Leton soils are in positions similar to those of the Midland soil. The Judice soils have a darker surface layer and the Leton soils are loamy throughout. The Morey and Mowata soils are in higher positions. The Morey soils have a darker surface layer and the Mowata soils have a subsurface layer that tongues into the subsoil.

This soil is medium in natural fertility. Water and air move through this soil very slowly. Water runs off the surface very slowly. A seasonal high water table fluctuates between depths of 0.5 foot and 3 feet during December through April. This soil is subject to flooding during unusually severe rainstorms. The surface layer of this soil is very sticky when wet and very hard when dry. It remains wet for long periods after heavy rain. Plants are damaged by lack of water during dry periods in summer and fall of some years. This soil has high shrink-swell potential.

This soil is mainly used for cultivated crops. In a few areas, it is used as pastureland or homesites.

This soil is moderately well suited to cultivated crops, mainly rice and soybeans (fig. 5). This soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content. It becomes cloddy if tilled when it is too wet or too dry. Wetness is the main limitation. If this soil is used for cultivated crops, wetness can delay the planting and harvesting of crops. A drainage system is needed for most cultivated crops and pasture plants. Land grading and smoothing improves surface drainage and permits more efficient use of farm equipment. Pipe or other drop structures installed in drainage ditches control the water level in rice fields and prevent excessive erosion of ditches. The organic matter content can be maintained by using all crop residue, plowing under cover crops, and using a suitable cropping system. Crops respond to additions of lime and fertilizer.

This soil is moderately well suited to pasture. The main limitation is wetness, which limits the choice of plants and the period of grazing. Suitable pasture plants are common bermudagrass, dallisgrass, ryegrass, tall fescue, and white clover. Grazing when the soil is wet compacts the surface layer. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is well suited to woodland. The potential is high for producing green ash, water oak, sweetgum, and eastern cottonwood. Only water-tolerant trees, such as

Figure 5.—Young rice plantings stand in an area of Midland silty clay loam. The vinyl overflow structure is installed on the levee for the purpose of water control.

eastern cottonwood and American sycamore, should be planted unless drainage is provided. Wetness severely limits equipment use and causes moderate seedling mortality.

This soil is poorly suited to recreational development. The main limitations are wetness and very slow permeability. Flooding is a hazard. Adequate drainage should be provided for most recreational uses. Plant cover can be maintained by controlling traffic.

This soil is poorly suited to urban development. The main limitations are wetness, high shrink-swell potential, very slow permeability, and low strength for roads. Flooding is a hazard. Drainage is needed if roads and building foundations are constructed. Designs for buildings and roads should offset the effects of shrinking and swelling. Very slow permeability and the high water table increase the possibility that septic tank absorption fields will fail.

This Midland soil is in capability subclass IIIw and woodland group 2W.

Mr—Morey loam. This soil is level and poorly drained. It is on broad flats on the Gulf Coast Prairies. Areas are irregular in shape and range from 40 to 1,400 acres. The landscape consists of broad flats that have small, convex mounds that make up from 5 to 25 percent of the areas. In places the mounds have been smoothed by mechanical means. The mounds are circular and range from 50 to 100 feet in diameter and 1 to 3 feet in height before being leveled. Slope is 0 to 1 percent.

Typically, the surface layer is very dark gray, slightly acid loam about 11 inches thick. The subsoil extends to a depth of about 60 inches. It is very dark gray, mottled, medium acid loam in the upper part; dark gray, mottled, medium acid and strongly acid clay loam in the middle part; and gray, mottled, medium acid clay loam in the lower part.

Included in this map unit are a few small areas of Judice, Leton, Midland, and Mowata soils. Judice and Midland soils are in lower positions than the Morey soil and have a more clayey subsoil. The Leton soils are in lower positions and have a lighter color surface layer than the Morey soil. Also included are many small areas of Vidrine soils. The somewhat poorly drained Vidrine soils are on the tops of the mounds and on smoothed mound areas and have a subsoil that is clayey in the lower part. The Vidrine soils make up from 5 to 10 percent of the map unit. The Leton, Midland, and Mowata soils make up about 20 percent of the map unit.

This soil is moderately high in natural fertility. Water and air move through this soil slowly. Water runs off the surface slowly. A seasonal high water table fluctuates between a depth of 2 feet and the soil surface during December through February. The surface layer remains wet for long periods after heavy rain. This soil is subject to flooding during unusually severe rainstorms. Adequate water is available to plants in most years.

This soil is mainly used for cultivated crops. In a few areas, it is used as pastureland, woodland, or homesites.

This soil is moderately well suited to cultivated crops, mainly rice and soybeans. The main limitation is wetness. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content (fig. 6). A tillage pan forms easily if this soil is tilled when wet, but chiseling or subsoiling can be used to break up the tillage pan. Land grading and smoothing improves surface drainage and permits more efficient use of farm equipment. Pipe or other drop structures installed in drainage ditches control the water level in rice fields and prevent excessive erosion of ditches. Maintaining crop residue on or near the surface reduces runoff and helps to maintain soil tilth and organic matter content. Most crops and pasture plants respond well to additions of fertilizer.

This soil is moderately well suited to pasture. Suitable pasture plants are common bermudagrass, Pensacola bahiagrass, ryegrass, winter peas, and white clover. Land grading and smoothing can remove excess surface water. Proper grazing, weed control, and fertilizer are needed for maximum quality of forage.

The soil is well suited to slash pine and loblolly pine. Wetness limits the use of equipment and causes severe seedling mortality.

This soil is poorly suited to recreational development. The main limitation is wetness, and flooding is a hazard. Good drainage should be provided for most recreational uses. Plant cover can be maintained by controlling traffic.

This soil is poorly suited to urban development. Flooding is a hazard, and the main limitations are slow permeability, wetness, and low strength for roads. Drainage is needed if roads and building foundations are constructed. Preserving the existing plant cover during construction helps to control erosion. Designs for roads should offset the limited ability of the soil to support a load. Septic tank absorption fields do not function properly during rainy periods because of wetness and slow permeability.

This Morey soil is in capability subclass IIIw and woodland group 2W.

Mt—Mowata-Vidrine silt loams. These soils are level, and poorly drained and somewhat poorly drained. They are on broad flats on the Gulf Coast Prairies. This complex consists of small areas of Mowata and Vidrine soils that are so intermingled that they cannot be mapped separately at the scale selected. Areas are irregular in shape and most range from 40 to 2,000 acres. A few areas are as large as 5,000 acres. The landscape consists of broad flats that have many small, convex mounds. Many of the mounds have been smoothed. The mounds are circular and range from 50 to 150 feet in diameter and 1 foot to 6 feet in height

Figure 6.—Soybean stubble is in the foreground in this area of Morey loam. A windbreak of slash pine stands in the background.

before leveling. Most areas have been leveled and have a slope of 0 to 1 percent.

The mapped areas have about 60 percent Mowata soil and about 30 percent Vidrine soil. The Mowata soil is in the intermound areas and the Vidrine soil is on the mounds or smoothed mound areas.

The Mowata soil is poorly drained and has a surface layer of dark grayish brown, very strongly acid silt loam about 6 inches thick. The subsurface layer is gray, strongly acid silt loam about 15 inches thick. The subsoil extends to a depth of about 60 inches. It is gray, mottled, strongly acid silty clay and silt loam in the upper part; gray, mottled, strongly acid silty clay in the middle part; and light brownish gray, mottled, slightly acid silty clay loam in the lower part.

This Mowata soil is medium in natural fertility. Water and air move through it very slowly. Water runs off the surface very slowly and stands in low places for short periods after heavy rain. A seasonal high water table fluctuates between a depth of 2 feet and the soil surface during December through April. The surface layer remains wet for long periods after heavy rain. Plants are damaged by lack of water during dry periods in summer and fall of some years. The soil has high shrink-swell potential.

The Vidrine soil is somewhat poorly drained and has a surface layer of dark grayish brown, medium acid silt loam about 6 inches thick. The subsoil extends to a depth of about 74 inches. It is light yellowish brown, very strongly acid silt loam in the upper part; grayish brown, mottled, strongly acid silty clay in the middle part; and light brownish gray, mottled, medium acid to mildly alkaline silty clay loam in the lower part.

This Vidrine soil has medium fertility and is high in exchangeable aluminum levels that are potentially toxic to most crops. Water and air move through this soil slowly. Water runs off the surface at a medium rate. The surface layer remains wet for long periods after heavy rain. A seasonal high water table is 1 foot to 2 feet below the surface during December through April.

Included in this map unit are a few small areas of Crowley, Leton, Midland, and Morey soils. The Crowley soils are somewhat poorly drained and are on convex ridges. They have an abrupt change in texture from the surface layer to the subsoil. The Leton soils are in low positions and are loamy throughout. The Midland soils are in low positions and are similar to the Mowata soil, except that they do not have a subsurface layer that tongues into the subsoil. The Morey soils are in positions similar to those of the Mowata soil, and they have a darker surface layer. Also included are small areas of Vidrine soils on mounds that have slopes of from 1 to 3 percent. The included soils make up about 15 percent of the map unit.

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

This unit is moderately well suited to cultivated crops, mainly rice and soybeans. The main limitation is wetness. These soils are friable, but they are somewhat difficult to keep in good tilth because of surface crusting. A tillage pan forms easily if this soil is tilled when wet, but chiseling or subsoiling can break up the tillage pan. A drainage system is needed for most cultivated crops and pasture plants. Land grading and smoothing improves surface drainage and permits more efficient use of farm equipment. Pipe or other drop structures installed in drainage ditches control the water level in rice fields and prevent excessive erosion of ditches. The organic matter content can be maintained by using all crop residue, plowing under cover crops, and using a suitable cropping system. Most crops and pasture plants respond well to additions of fertilizer and lime that are formulated and systematically applied to overcome the medium fertility and high levels of exchangeable aluminum.

This map unit is moderately well suited to pasture. The main limitation is wetness. Suitable pasture plants are common bermudagrass, Pensacola bahiagrass, ryegrass, winter peas, and white clover. Grazing when the soil is wet compacts the surface layer. Proper grazing, weed control, and fertilizer are needed for maximum quality of forage.

This map unit is well suited to slash pine and loblolly pine. Wetness severely limits the use of equipment and causes slight to moderate seedling mortality.

This map unit is poorly suited to recreational development. The main limitations are wetness and slow and very slow permeability. Good drainage should be provided for most recreational uses. Plant cover can be maintained by controlling traffic.

This map unit is poorly suited to urban development. The main limitations are wetness, high shrink-swell potential, slow and very slow permeability, and low strength for roads. Drainage is needed for best results with most lawn grasses, shade trees, ornamental trees, shrubs, vines, and vegetable gardens. Designs for roads should offset the limited ability of the soil to support a load. Designs for buildings and roads should offset the effects of shrinking and swelling. Very slow and slow permeability and the high water table increase the possibility that septic tank absorption fields will fail.

This map unit is in capability subclass IIIw and woodland group 2W.

Pt—Pits, sand. This map unit consists of excavations from which soil and geologic material have been removed, mainly for use in road construction. Pits generally range from 2 to 60 acres.

Included in mapping with pits are a few small areas of spoil material, mostly mixtures of loamy and clayey material, that have been piled or scattered around the edges of the pits. Also included are small bodies of shallow water. The included areas make up about 10 percent of the map unit.

Pits are generally not suited to agricultural, forestry, or urban uses. Abandoned pits can produce habitat for rabbits and other small game animals when left undisturbed.

UA—Udifluvents, 1 to 20 percent slopes. This map unit consists of sandy to clayey soil material that has been excavated from other places during the construction and maintenance of navigable waterways. These soils have no identifiable soil layers. They are variable in texture and slope. Areas range from irregular in shape to long and narrow and are from 20 to several hundred acres. Relief ranges from about 1 foot to 15 feet. The observations were fewer than in most other areas because of poor accessibility. The detail in mapping, however, is adequate for the expected use of the soil. Slopes are short and choppy and range from 1 to 20 percent.

Included with these soils in mapping are a few large areas of Aquents and a few small areas of Gentilly soils. The poorly drained Aquents and very poorly drained Gentilly soils are in lower positions and are more saline throughout. Also included are a few small areas that contain chemical wastes from industrial plants. The included areas make up about 15 percent of the map unit.

These soils are medium in natural fertility. They are moderately well drained to poorly drained. Water and air move through these soils at a very slow to moderate rate. Water runs off the surface at a slow to rapid rate. The depth to the high water table is variable.

The natural vegetation consists mainly of rattlebox, ragweed, eastern baccharis, and common bermudagrass. Some areas along the intracoastal waterway are wooded. The major trees are hackberry, willow, and Chinese tallow.

Most of the acreage is used as habitat for wildlife and for industrial development. A small acreage is in pasture or woodland.

This soil is moderately well suited to use as habitat for rabbits, deer, and furbearers such as muskrat, nutria, raccoons, and mink.

This soil is poorly suited to urban development. The main limitations are the uneven surface, steep slopes, wetness, variability of the soil material, and poor accessibility.

This map unit is poorly suited to recreational development. The main limitations are the uneven surface, slope, wetness, and poor accessibility.

These soils are generally not suited to cultivated crops. The uneven surface, slope, wetness, and poor accessibility are major problems.

This map unit is poorly suited to pasture and woodland. The uneven surface, slope, wetness, variability of soil material, and poor accessibility are major problems. Suitable pasture plants are common bermudagrass and Pensacola bahiagrass.

This soil is in capability subclass VIe.

UN—Una silty clay loam, frequently flooded. This soil is level and poorly drained. It is on flood plains that drain the terrace uplands. The area is irregular in shape and occurs as one delineation of about 7,500 acres. The observations were fewer than in most other areas because of poor accessibility. The detail in mapping, however, is adequate for the expected use of the soil. Slope is dominantly less than 1 percent.

Typically, the surface layer is dark grayish brown, very strongly acid silty clay loam about 5 inches thick. The subsoil extends to a depth of about 65 inches. It is light brownish gray, mottled, very strongly acid clay loam in the upper part; gray, mottled, very strongly acid silty clay loam in the middle part; and gray, mottled, very strongly acid clay loam in the lower part.

Included in this map unit are a few small areas of Barbary soils and a few large areas of Guyton soils. The Barbary soils are very poorly drained and are in lower positions than the Una soil. They are very fluid throughout. The Guyton soils are poorly drained and are in slightly higher positions. They have a thick subsurface layer that tongues into the subsoil. Also included are a few small areas of soils that are similar to the Una soils, except that they are more sandy in the middle and lower parts of the subsoil. Also included are a few small areas of sandy soils on narrow low ridges. The included soils make up about 20 percent of the map unit.

This soil is low in fertility and moderately high in exchangeable aluminum levels that are potentially toxic to crops. Water and air move through this soil very slowly. Water runs off the surface very slowly. This soil is frequently flooded with 1 foot to 6 feet of water for periods of 1 day to 10 days, mostly in winter, spring, and early in summer. A seasonal high water table fluctuates between depths of about 0.5 foot and 1 foot during November through April. This soil has moderate shrink-swell potential.

All areas of this soil are in woodland and are used for timber production and as habitat for wildlife.

This soil is moderately well suited to sweetgum, green ash, water oak, southern red oak, and water hickory. The main concerns in producing and harvesting timber are the flood hazard and wetness, which limit equipment use and cause seedling mortality. Conventional methods of harvesting timber can be used except sometimes during rainy periods, generally from November to June. Only trees that can tolerate seasonal wetness should be planted.

This soil is well suited to use as habitat for wetland wildlife and moderately well suited as habitat for woodland wildlife. Habitat for wildlife can be improved by selectively harvesting timber so that large den and mast-producing trees are left.

This soil is poorly suited to recreational development and urban development. The main limitation is wetness, and flooding is a hazard. The soil is not suited to use as homesites. Drainage and protection from flooding are possible, but extensive water control structures, such as levees, are required.

This Una soil is poorly suited to improved pasture. Wetness is the main limitation and flooding is a hazard. Common bermudagrass and Pensacola bahiagrass are suitable pasture plants. Proper grazing practices and weed control are needed for maximum quality of forage.

This soil is poorly suited to cultivated crops. Wetness is the main limitation and flooding is a hazard. Flooding occurs mainly in winter and spring, but it can damage crops during the summer of some years.

This soil is in capability subclass Vw and woodland group 2W.

Up—Urban land. This map unit consists of level areas where more than 85 percent of the surface is covered by asphalt, concrete, buildings, or other impervious surfaces. Examples are shopping and business centers, parking lots, airport runways, and industrial sites. The areas range from about 10 acres to 2,000 acres. Slopes are generally less than 1 percent.

Included are a few small areas of industrial waste material and disturbed soil material.

Examination and identification of soils or soil material in this map unit are impractical. Careful onsite investigation is needed to determine the potential and limitations for any proposed use.

Ur—Urbo silty clay loam, occasionally flooded. This soil is level and poorly drained. It is on small flood plains. Areas are irregular in shape and range from 30 to 300 acres. Slopes range from 0 to 1 percent.

Typically, the surface layer is dark grayish brown, very strongly acid silty clay loam about 4 inches thick. The subsoil to a depth of about 60 inches is grayish brown, mottled, very strongly acid silty clay in the upper part; light brownish gray, mottled, very strongly acid silty clay in the middle part; and gray, mottled, very strongly acid silty clay in the lower part.

Included in this map unit are a few small areas of Guyton, Kinder, and Messer soils. These soils are loamy throughout. The Guyton soils are poorly drained and are in positions similar to those of the Urbo soil. The Kinder soils are poorly drained and are in higher positions; the moderately well drained Messer soils are on convex mounds. Also included are a few small areas of Urbo soils that are frequently flooded. The included soils make up about 15 percent of the map unit.

This soil is low in fertility and moderately high in exchangeable aluminum levels that are potentially toxic to some crops. Water and air move through this soil very slowly. Water runs off the surface slowly and stands in low places for short periods after heavy rain. Wetness restricts root development of many plants. A seasonal high water table fluctuates between depths of about 1 foot and 2 feet during January through March. This soil is subject to brief to long periods of flooding, mainly in the winter, spring, and early in summer. The surface layer remains wet for long periods after heavy rain, and it is sticky when wet and hard when dry. Plants are damaged by lack of water during dry periods in summer and fall of some years. This soil has moderate shrink-swell potential.

This soil is mainly used as woodland. In a few areas, it is used as pasture.

This soil is well suited to loblolly pine, slash pine, water oak, sweetgum, and southern red oak. The main concerns in producing and harvesting timber are the hazard of flooding and wetness, which limit the use of equipment and cause seedling mortality. Reforestation must be carefully managed to reduce competition from undesirable understory plants.

This soil is moderately well suited to pasture. Wetness and low fertility are the main limitations, and flooding is a hazard. Common bermudagrass and Pensacola bahiagrass are suitable pasture plants. Wetness limits the choice of plants, the period of grazing, and also the use of equipment. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The Urbo soil is poorly suited to cultivated crops. Wetness, low fertility, and moderately high levels of exchangeable aluminum within the rooting zone are the main limitations. Flooding is a hazard. Rice and soybeans can be grown if they are planted late and flooding is controlled. This soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content. This soil is sticky when wet and hard when dry, and it becomes cloddy if tilled when it is too wet or too dry. The organic matter content can be maintained by using all crop residue, plowing under cover crops, and using a suitable cropping system. Most crops and pasture plants respond well to additions of fertilizer and lime that are formulated and systematically applied to overcome the low fertility and moderately high levels of exchangeable aluminum.

This soil is poorly suited to recreational development. Wetness and very slow permeability are the main limitations. Flooding is a hazard. Drainage and protection from flooding are needed if the soil is used for camp areas.

This soil is poorly suited to urban development. It is generally not suited to use as homesites. Wetness, moderate shrink-swell potential, and low strength for roads are the main limitations. Flooding is a hazard. Major flood-control structures and extensive local drainage systems are needed to protect this soil from flooding. Designs for roads should offset the limited ability of the soil to support a load and designs for buildings and roads should offset the effects of shrinking and swelling. Very slow permeability and the high water table increase the possibility that septic tank absorption fields will fail.

This soil is moderately well suited to use as habitat for woodland and wetland wildlife. Habitat for wildlife can be improved by selectively cutting timber so that large den and mast-producing trees are left.

This soil is in capability subclass IVw and woodland group 1W.

Vn—Vidrine silt loam, 1 to 3 percent slopes. This soil is very gently sloping and somewhat poorly drained. It is on side slopes of natural levees along abandoned stream channels on the Gulf Coast Prairies. Areas are long and narrow and range from 40 to 250 acres.

Typically, the surface layer is dark grayish brown, strongly acid silt loam about 8 inches thick. The subsoil is about 52 inches thick. It is yellowish brown, strongly acid silt loam in the upper part; grayish brown and light brownish gray, mottled, medium acid silty clay in the middle part; and light brownish gray, slightly acid silt loam in the lower part.

Included in this map unit are a few small areas of Crowley and Leton soils. The Crowley soils are in slightly higher positions than the Vidrine soil and are grayer in the upper part of the soil. The Leton soils are poorly drained and are in lower positions. They are loamy throughout. Also included are a few small areas of soils that are similar to the Vidrine soil, except that they have a subsoil that is loamy throughout. The included soils make up about 10 percent of the map unit.

This soil has medium fertility and is high in exchangeable aluminum levels that are potentially toxic to most crops. Water and air move through this soil slowly. Water runs off the surface at a medium rate. A seasonal high water table is at a depth of about 1 foot to 2 feet during December through April. Plants are damaged by lack of water during dry periods in summer and fall of some years. This soil has high shrink-swell potential.

This soil is mainly used for crops. In a few areas, it is used as pastureland or homesites.

This soil is moderately well suited to cultivated crops, mainly soybeans and rice. The main limitations are medium fertility, a moderate erosion hazard, and high levels of exchangeable aluminum within the rooting zone. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. Excessive cultivation can cause a tillage pan to form. This pan can be broken by subsoiling when the soil is dry. Maintaining crop residue on or near the surface reduces runoff and helps to maintain soil tilth and organic matter content. Erosion can be reduced if fall grain is seeded early, stubble-mulch tillage is used, and tillage and seeding are on the contour or across the slope. Also, waterways should be shaped and seeded to perennial grass.

This soil is well suited to pasture. Suitable pasture plants are common bermudagrass, Pensacola bahiagrass, ryegrass, white clover, winter peas, and vetch. Seedbed preparation should be on the contour or across the slope where practical. Grazing when the soil is wet compacts the surface layer and causes poor tilth and excessive runoff. Proper grazing, weed control, and fertilizer are needed for maximum forage quality.

This soil is well suited to loblolly pine and slash pine. Wetness limits the use of equipment, mainly during the winter and spring, and is the main concern in producing and harvesting timber.

This soil is poorly suited to recreational development. The main limitations are wetness and slow permeability. Intensively used areas, such as playgrounds, need drainage. Plant cover can be maintained by controlling traffic.

This soil is poorly suited to urban development. The main limitations are high shrink-swell potential, wetness, slow permeability, and low strength for roads. Designs for roads should offset the limited ability of the soil to support a load. Buildings and roads can be designed to offset the effects of shrinking and swelling. Preserving the existing plant cover during construction helps to control erosion. Septic tank absorption fields do not function properly during rainy periods because of wetness and slow permeability.

This Vidrine soil is in capability subclass IIe and woodland group 2W.

Prime Farmland

In this section, prime farmland is defined and discussed, and the prime farmland soils in Calcasieu Parish 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 producing food, feed, forage, fiber, and oilseed crops. Such soils have properties that are favorable for the economic production of sustained high yields of crops. The soils need only to be treated and managed using acceptable farming methods. The moisture supply, of course, must be adequate, and the growing season has to be sufficiently long. Prime farmland soils produce the highest yields with minimal inputs of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland soils may presently be in use as cropland, pasture, or woodland, or they may be in other uses. They either are used for producing 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 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, parks, military reservations, and state parks.

Prime farmland soils usually get 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 subject to frequent flooding during the growing season. The slope ranges mainly from 0 to 6 percent.

The following map units, or soils, make up prime farmland in Calcasieu Parish. 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 the text below. 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.

About 500,847 acres, or 72 percent, of Calcasieu Parish meets the soil requirements for prime farmland. This prime farmland is scattered throughout the parish. About 246,000 acres is in cultivated crops, mainly soybeans, rice, grain sorghum and wheat.

A trend in land use has been the loss of some prime farmland to industrial or urban uses, particularly around Lake Charles and along Interstate Highway 10. This loss puts pressure on marginal lands which generally are more erodible and difficult to cultivate and can flood more frequently than those designated as prime farmland.

Soils that have limitations, such as a high water table or flooding, may qualify as prime farmland if these limitations are overcome by such measures as drainage or flood control. The following map units meet the soil requirements for prime farmland except where the use is urban or built-up land.

Ac	Acadia silt loam, 1 to 3 percent slopes
Cd	Caddo-Messer silt loams
Ch	Cahaba fine sandy loam, 1 to 3 percent slopes
Cr	Crowley-Vidrine silt loams
Ge	Glenmora silt loam, 1 to 3 percent slopes
Gy	Guyton-Messer silt loams
Ju	Judice silty clay loam
Kd	Kinder-Messer silt loams
Lt	Leton silt loam
Mb	Malbis fine sandy loam, 1 to 3 percent slopes
Mh	Messer-Guyton silt loams, gently undulating
Mn	Midland silty clay loam
Mr	Morey loam
Mt	Mowata-Vidrine silt loams
Vn	Vidrine silt loam, 1 to 3 percent slopes

Urban and built-up land is any contiguous unit of 10 acres or more that is used for residences, industrial sites, commercial sites, institutional sites, public administration sites, railroad yards, small parks, cemeteries, airports, golf courses, sanitary landfills, sewage treatment plants, water control structures and spillways, and similar uses.

Use and Management of the Soils

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

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

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

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

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

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

Crops and Pasture

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

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

About 324,000 acres in Calcasieu Parish was used for crops or as pasture in 1982. About 246,000 acres was used for crops, mainly rice and soybeans, and about 78,000 acres was used as pasture. About 18,000 acres of the 78,000 acres of pasture is marsh rangeland.

Crop suitability and management needs are based on soil characteristics, such as fertility level, erodibility, organic matter content, availability of water for plants, drainage, and flooding hazard. Each farm has a unique soil pattern; therefore, each has unique management problems. Some principles of farm management, however, apply to specific soils and certain crops. This section presents the general principles of management that can be widely applied to the soils of Calcasieu Parish.

Pasture and Hayland

Perennial grasses or legumes, or mixtures of these, are grown for pasture and hay (fig. 7). The mixtures generally consist of either a summer or a winter perennial grass and a suitable legume. In addition, many farmers seed small grain or ryegrass in the fall for winter and spring forage. Excess grass in summer is harvested as hay for the winter.

Common and improved bermudagrass and Pensacola bahiagrass are the summer perennials most commonly grown. 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 these grasses respond well to fertilizers, particularly nitrogen.

White clover is the most commonly grown legume, which responds well to lime, particularly where grown on acid soils.

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

Grazing livestock on the understory native plants in woodland helps some farmers obtain additional forage. Forage volume varies with the woodland site, the condition of the native forage, and the density of the

Figure 7.—Improved pasture in an area of Glenmora silt loam, 1 to 3 percent slopes, a soil well suited to pasture.

timber stand. Although most woodland is managed mainly for timber, substantial volumes of forage are obtainable from those areas under good management. Stocking rates and grazing periods need to be carefully managed for optimum forage production and maintaining an adequate cover of understory plants helps to control erosion.

Grazing livestock on the native vegetation in areas of marshland adjacent to improved pastures at higher elevations helps some farmers obtain additional forage. Although the type and amount of vegetation varies with the site, most sites provide large volumes of high quality forage. Cattle can graze only those soils in the marsh that are firm enough to support their weight. In some areas, grazing distribution is improved by constructing walkways which allow cattle to range further into the marsh. Insects, storm tides, and the availability of stock water and shelters are the main management concerns. Stocking rates and grazing periods need to be properly managed in order to maintain a good quality range.

Fertilization and Liming

The soils of Calcasieu Parish range from extremely acid to slightly acid in the surface layer. Most soils that are used for crops are low in organic matter content and in available nitrogen. The only exceptions are the Judice and Morey soils that are medium in organic matter content and in available nitrogen. Most of the soils generally need lime and a complete fertilizer for crops and pasture plants. The amount of fertilizer needed depends on the kind of crop to be grown, on past cropping history, on the level of yield desired, and on the kind of soil. Amounts should be determined on the basis of soil test results. Information and instructions on 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 crop growth. It also increases the rate of water intake, reduces surface crusting, and improves tilth. Most soils of Calcasieu Parish that are used for crops are low in organic matter content. The level of organic matter can be maintained by growing crops that produce 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 Calcasieu Parish, residue from rice straw helps to maintain the organic matter content of the soils.

Soil Tillage

Soil should be tilled only enough to prepare a seedbed and to control weeds. Excessive tillage destroys soil structure. The clayey soils in the parish become cloddy if cultivated when they are too wet or too dry. A compacted layer, generally known as a trafficpan or plowpan, sometimes develops just below the plow layer in loamy soils. This problem can be avoided by plowing when the soil is dry or by varying the depth of plowing. If the compacted layer does develop, 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, thereby helping to control erosion, reduce runoff, increase infiltration, reduce surface crusting, and insure good seed germination (fig. 8).

Drainage

Most of the soils in Calcasieu Parish need surface drainage to make them more suitable for crops. The soils in high positions on the Gulf Coast Prairies and those on terrace uplands are drained by a gravity drainage system consisting of row drains and field drains. The clayey soils in low positions are drained by a gravity drainage system consisting of a series of mains, or principal pipelines, and laterals, or smaller drains that branch out from them. The success of the systems depends on the availability of adequate outlets. Drainage is also improved by land grading, water leveling, or precisely leveling the fields to a uniform grade (fig. 9). Land grading improves surface drainage, eliminates cross ditches, and creates larger and more uniformly shaped fields that are more suited to the use of modern, multirow farm machinery. However, deep cutting of soils that have unfavorable subsoil characteristics should be avoided.

Water for Plant Growth

The available water capacity of the soils in the parish ranges from low to very high, but in many years, sufficient water is not available at the critical time for optimum growth unless irrigation water is provided. Large amounts of rainfall occur in winter and spring. Sufficient rain generally occurs in summer and autumn of most years. However, on most soils, plants lack water during dry periods in summer and autumn.

Cropping System

A good cropping system includes a legume for nitrogen, a cultivated crop to aid in weed control, a deep-rooted crop to utilize substratum fertility and maintain substratum permeability, and a close-growing crop to help maintain organic matter content. The crop

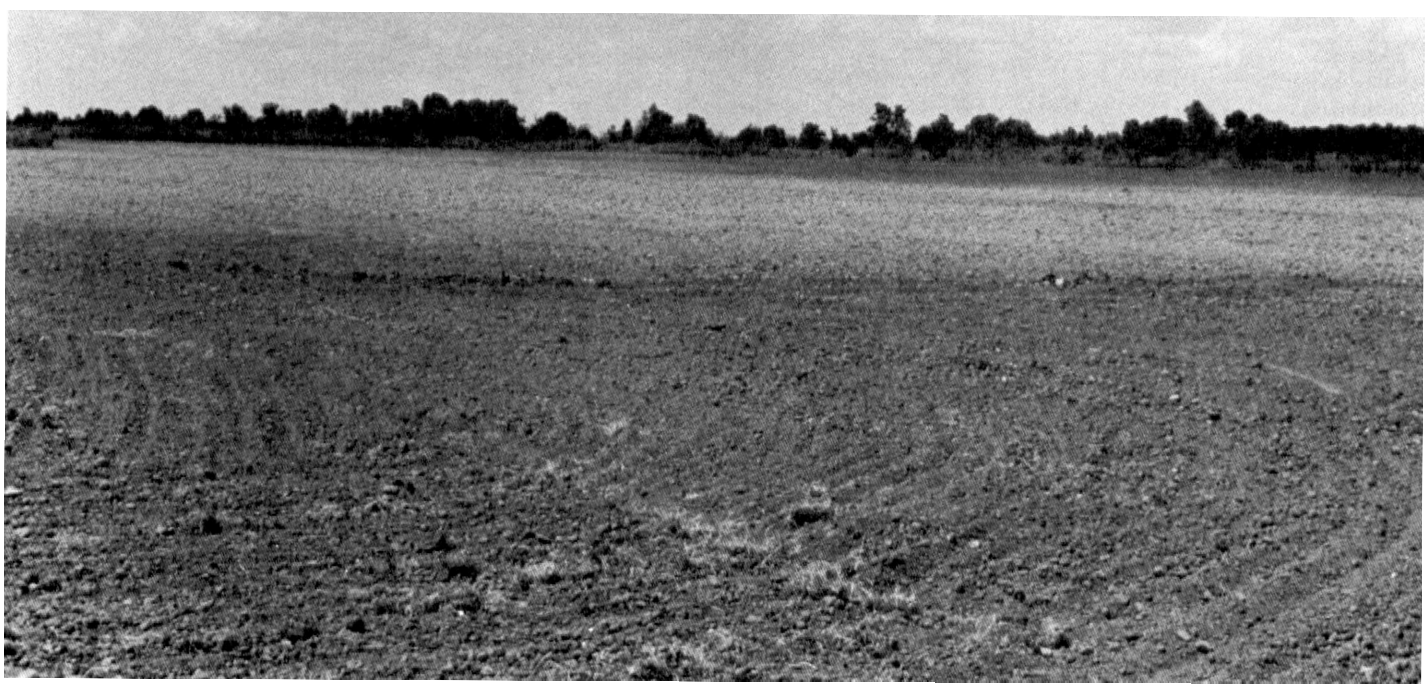


Figure 8.—A seedbed that has been prepared for soybeans in an area of Morey soil and Leton soil. The Morey soil is in the darker area and the Leton soil is in the lighter area.

Figure 9.—Water leveling for irrigation water management on Mowata-Vidrine silt loams is a common cultural practice for growing rice.

sequence should cover the soil as much of the year as possible.

In Calcasieu Parish, a variety of cropping systems is used, depending upon the main crop grown. Rice is commonly rotated with soybeans or pasture. Grass or legume cover crops are commonly grown during the fall and winter.

Control of Erosion

Soil erosion generally is not a serious problem on most of the soils in Calcasieu Parish, mainly because most of the topography is level to 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 left without plant cover for extended periods. If the surface layer is lost through erosion, most of the available plant nutrients and most of the organic matter are also lost. Soil erosion also results in sedimentation of drainage systems, and streams are polluted by sediment, nutrients, and pesticides.

Cropping systems that maintain a plant cover on the soil for extended periods reduce soil erosion. Use of legume or grass cover crops reduces erosion, increases the content of organic matter and nitrogen in the soils, and improves tilth. Constructing terraces, diversions, and grassed waterways; using minimum tillage; farming on the contour; and using cropping systems that rotate grass or close-growing crops with row crops help to control erosion in cropland and pasture. Constructing pipe drop structures in drainageways to drop water to different levels can help prevent gullying.

Additional information on erosion control, cropping systems, and drainage practices can be obtained from the local office of the Soil Conservation Service and the Cooperative Extension Service, or from 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 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

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

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

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

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

Crops other than those shown in table 6 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. These levels are defined in the following paragraphs.

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

Class I soils have few limitations that restrict their use. (None in Calcasieu Parish.)

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 limitation is 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 capability classification of each map unit is given in the section "Detailed Soil Map Units."

Woodland Management and Productivity

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

This section provides information on the relation between trees and their environment, in particular, trees and the soils in which they grow. It also includes information on the kind, amount, and condition of woodland resources in Calcasieu Parish; and interpretations of the soils that can be used by owners of woodland, foresters, forest managers, and agricultural workers in planning the use of soils for wood crops.

Soils directly influence the growth, management, harvesting, and multiple uses of forests. Soil is the medium in which a tree is anchored and from which it draws nutrients and moisture. Soil characteristics, such as chemical composition, texture, structure, depth, and slope position, affect tree growth, seedling survival, species adaptability, and equipment use.

The ability of a soil to supply moisture and nutrients to trees is strongly related to its texture, structure, and depth. Generally, sandy soils, such as the Bienville soils, are less fertile and have lower water holding capacity than those of clayey soils, such as the Gore soils. However, aeration is often impeded in clayey soils, particularly under wet conditions. Slope position strongly influences species composition as well as growth within an individual tree species.

These soil characteristics, in combination, largely determine the forest stand species composition and influence management and utilization decisions. Sweetgum, for example, is tolerant of many soils and sites, but grows best on rich, moist, alluvial loamy soils of bottom lands. Use of heavy logging and site preparation equipment is more restricted on clayey soils than on better drained sandy or loamy soils.

Woodland Resources

The topography and vegetation of Calcasieu Parish varies from piney woods in the north to salt marsh in the south. The dominant trees are: longleaf pine, slash pine, and loblolly pine on higher positions; sweetgum, red oak, white oak, elm, pecan, green ash, sycamore, and cottonwood on stream bottoms and river bottoms; and baldcypress and tupelo-gum in swamps.

The piney woods in the northern part of the parish was once a vast virgin forest. Around the turn of the century, this forest was clearcut and maintained as open range by regular burning until the late 1940's and early 1950's. At that time, effective fire protection was provided by the Louisiana Office of Forestry (then known as the Louisiana Forestry Commission). Also, the Office of Forestry increased operations of their pine seedling nurseries, thus making pine seedlings more readily available for planting in the cutover land. Finally, timber and land values began to increase, thus providing an incentive to landowners to bring their property into production. Today most of the land in Calcasieu Parish, which was once forest land, is again growing pine trees, and most of the forest land serves also as forest range. A substantial part of the parish is now devoted to urban use, pasture, cropland, and other non-forest uses. Other values associated with woodlands include wildlife habitat, recreation, natural beauty, and soil and water conservation.

Calcasieu Parish has about 165,400 acres of commercial woodland *(33)* or 23 percent of the total area of the parish. Commercial forest land is defined as land producing or capable of producing crops of industrial wood and not withdrawn from timber use. The commercial woodland area decreased by about 51,700 acres between 1964 and 1974. Another 27,100 acres was converted to other uses between 1974 and 1980. Most of the cleared land was converted to cropland. Other uses are urban land, transmission and transportation corridors, and pastureland. The ownership of forest land in Calcasieu Parish is: 5 percent public land, 31 percent forest industry, 6 percent private farms, and 58 percent miscellaneous private land *(33)*. The continued loss of forest land to these uses is expected to continue at about the present rate.

The Sabine Island Wildlife Management Area is located on an island formed by the Old River and the Sabine River in west-central Calcasieu Parish. Almost all the 8,103 acres of this Area is used as wetland habitat. Trees are bottom land hardwoods composed mostly of oak and baldcypress.

The parish is composed of three major land resource areas (MLRA's). These are the Western Gulf Coast Flatwoods, the Gulf Coast Prairies, and a small area in the Gulf Coast Marsh. The Western Gulf Coast Flatwoods MLRA and the Gulf Coast Prairies MLRA are in commercial forest. The Gulf Coast Marsh MLRA is completely devoid of commercial forest. The dominant trees in the Western Gulf Coast Flatwoods are loblolly pine, slash pine, longleaf pine, sweetgum, water oak, southern red oak, white oak, sycamore, and magnolia in the better drained soils in higher positions; and cottonwood, green ash, white oak, cherrybark oak, Nuttall oak, water oak, willow oak, sycamore, and tupelo-gum in poorly drained soils in lower positions.

The dominant trees in the Gulf Coast Prairies are sweetgum, slash pine, loblolly pine, water oak, southern red oak, white oak, blackgum, and green ash in better drained soils in higher positions; and green ash, white oak, cherrybark oak, Nuttall oak, water oak, willow oak, sycamore, and water tupelo in poorly drained soils in lower positions.

Commercial forests can be further divided into forest types based on tree species, site quality, or age. In this survey, forest types are stands of trees that have similar characteristics and species, and that grow under the same ecological and biological conditions. These forest types are named for the trees that predominate.

The oak-gum-cypress forest type covers 15 percent of the forest land area in Calcasieu Parish *(33)*. This type has bottom land forests of water tupelo, blackgum, sweetgum, willow oak, and baldcypress, either singularly or in combination. Associated trees include cottonwood, black willow, green ash, sugarberry, red maple, and elm.

The loblolly pine-shortleaf pine forest type covers 15 percent of the forest land area in Calcasieu Parish. Loblolly pine is usually dominant except in drier areas. Scattered hardwoods can be mixed with pines in the overstory. Sweetgum, blackgum, southern red oak, post oak, white oak, mockernut hickory, and pignut hickory are on well drained soils. Sweetgum, red maple, water oak, and willow oak are in moister areas. American beech and green ash are often associated with this forest type on fertile, well drained coves and along stream bottoms.

The oak-pine forest type covers 15 percent of the parish's forest land. In this forest type, 50 to 75 percent of the stocking is hardwoods (usually upland oaks) and 25 to 50 percent of the stocking is softwoods (except cypress). The trees that compose it are primarily the result of soil, slope, and aspect. In the higher, drier areas, the hardwood components tend to be upland oaks, such as post oak, southern red oak, and blackjack oak. In the moister, fertile areas, they are white oak, southern red oak, and black oak. Blackgum, winged elm, red maple, and various hickories are associated with this forest type on both of these broad site classifications.

The oak-hickory forest type covers 15 percent of the forest land area in the parish. This type of forest cover is one in which upland oaks or hickory, either singularly or in combination, cover a plurality of the stocking, except where pines cover 25 to 50 percent. The stand would then be classified as oak-pine. Elm and maple are common associates.

The longleaf pine-slash pine type (fig. 10) covers 38 percent of the total forest land area. This type of forest cover is one in which 50 percent or more of the stand is longleaf pine or slash pine, either singularly or in combination. Oak, gum, and other southern pines are common associates.

The forest land in Calcasieu Parish, by physiographic class, is 81 percent pine and 19 percent bottom land hardwood *(33)*.

The marketable timber volume is composed of about 71 percent pine and 29 percent hardwood. Most of the forest acreage is 50 percent sawtimber, 35 percent saplings and seedlings, and 12 percent pole timber. The other 3 percent is classified as "non-stocked areas" *(33)*. Productivity of forest land can be measured by the amount of cubic feet of wood produced per acre per year. Most of the more productive sites are in pasture or cropland. However, forest land in Calcasieu Parish is fairly productive, with 4 percent producing 165 cubic feet or more of wood, 12 percent producing 120 to 165 cubic feet, 15 percent producing 85 to 120 cubic feet, 46 percent producing 50 to 85 cubic feet, and 23 percent producing less than 50 cubic feet *(33)*.

Most of the upland pine forest type areas are owned by forest industries. These forests are generally well managed. However, small, privately-owned tracts and most of the bottom land tracts produce well below their potential. Most of these tracts would benefit if stands were improved by thinning out mature trees and undesirable species. Tree planting, timber stand improvement, and protection from grazing, fire, insects, and disease are needed.

The U.S. Soil Conservation Service, Louisiana Office of Forestry, and the Louisiana Cooperative Extension Service can help determine specific woodland management needs.

Production of Forage in Woodland

The kind and amount of understory vegetation that can be produced in an area is related to the soils, climate, and amount of tree overstory. In many pine woodlands, cattle grazing can be a compatible secondary use. Grazing is not recommended on hardwood woodland. The grasses, legumes, forbs, and much of the woody browse in the understory are grazable if properly managed to supplement a woodland enterprise without damage to the wood crop. In fact, on most pine woodland, grazing is beneficial to the woodland program because it reduces the accumulation of heavy "rough," thus reducing the hazard of wildfires. Grazing also helps to suppress undesirable woody plants. The success of a combined woodland and livestock program depends primarily on the degree and time of grazing of the forage plants. Intensity of grazing must be in such a manner that adequate cover for soil protection can be maintained and the quantity and quality of trees and forage vegetation can be maintained or improved.

Forage production varies according to the type of woodland and the amount of sunlight that reaches the understory vegetation during the growing season.

Soils that have similar potential to produce trees also have similar potential for producing about the same kind and amount of understory. Vegetation on these soils will reproduce as long as the environment does not change.

Research has proven a close correlation between the total potential yield of grasses, legumes, and forbs growing in similar soils and the amount of sunlight reaching the ground in the forest at midday. Herbage production declines as the forest canopy becomes denser.

The main objective in good woodland grazing management is to keep the woodland forage in excellent condition. If this is done, water is conserved, yields are improved, and the soils are protected.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops.

Figure 10.—An area of Caddo-Messer silt loams is planted in slash pines.

Only those soils suitable for wood crops are listed. The table lists the ordination symbol (woodland suitability) for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *c*, clay in the upper part of the soil; and *s*, sandy texture. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: w, t, c, and s.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *plant competition* indicate the degree to which undesirable plants are expected to invade where there are openings in the tree canopy. The invading plants compete with native plants or planted seedlings. A rating of *slight* indicates little or no competition from other plants; *moderate* indicates that plant competition is expected to hinder the development of a fully stocked stand of desirable trees; *severe* indicates that plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed to control undesirable plants.

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

Trees to plant are those that are suited to the soils and to commercial wood production.

Recreation

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

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

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

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

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

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use (fig. 11). They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

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

Calcasieu Parish has about 306,000 acres of openland, 165,400 acres of forest land, and 66,000 acres of marsh and swampland. These varied land uses provide habitat for many kinds of wildlife. The Calcasieu River and the Houston River are the two large stream systems in the interior of the parish. The Sabine River is the western boundary of the parish. All of these river systems have a significant freshwater fishery.

Bottom land hardwood forests cover 31,426 acres in the parish. This habitat type is one of the most productive for wildlife. Moderate to high numbers of

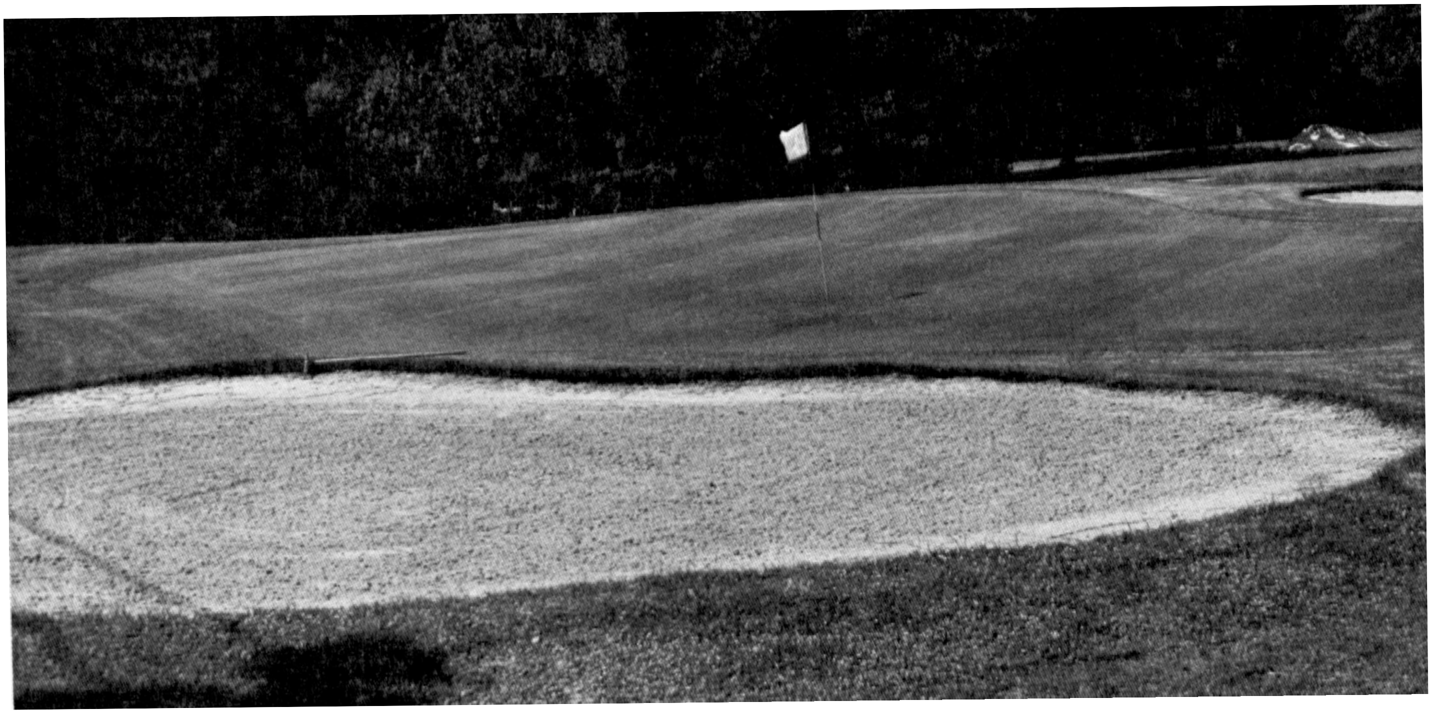


Figure 11.—Kinder-Messer silt loams are suited to most recreational uses where adequate drainage is provided.

white-tailed deer, gray squirrel, fox squirrel, swamp rabbit, wood duck, raccoon, mink, nutria, beaver, woodcock, reptiles, amphibians, nongame birds, and several kinds of wintering waterfowl inhabit the hardwood forest. Some of the more important plants in the hardwood forest are water oak, willow oak, overcup oak, white oak, southern red oak, hickory, sugarberry, persimmon, baldcypress, water tupelo, green ash, elderberry, Japanese honeysuckle, greenbrier, rattan vine, American beautyberry, hawthorn, palmetto, and many kinds of grasses, forbs, and ferns.

The remaining forest land has pines and mixed pines and hardwoods. These forests provide fair habitat for white-tailed deer, gray squirrel, fox squirrel, cottontail, swamp rabbit, raccoon, woodcock, quail, and nongame birds. Some of the more important plants are slash pine, loblolly pine, longleaf pine, water oak, sweetgum, southern red oak, and many kinds of grasses, forbs, and ferns.

The open agricultural lands provide fair to good habitat for mourning dove, bobwhite quail, woodcock, snipe, cottontail, swamp rabbit, and many nongame animals. Several kinds of waterfowl, including mallard, pintail, teal, snow geese, and white-fronted geese, utilize temporarily flooded soybean and rice fields. Geese also feed in the ryegrass pastures during the winter months. A small acreage of the openland is allowed to be fallow on a periodic basis. The fallow fields, if not grazed, provide good small game habitat.

Aquatic habitats are abundant in the parish. Numerous farm ponds and lakes are present and support a good fishery. Some of the fish are largemouth bass, white bass, white crappie, black crappie, bream (sunfish), gizzard shad, buffalo, carp, gar, bowfin, black bullhead, yellow bullhead, channel catfish, flathead catfish, blue catfish, freshwater drum, and several kinds of minnows and shiners.

The marshes and swamps of Calcasieu Parish provide highly productive wildlife habitat. The marshes are also part of the coastal estuarine complex that provides nursery areas for marine and estuarine species (fig. 12). The marsh plant communities are important contributors of detritus which benefits both the marine and estuarine systems.

The brackish marsh totals 24,764 acres. It provides habitat for furbearers, waterfowl, and other wildlife. Salinities for the brackish marsh along the entire coast vary from 0.42 to 28.08 ppt (parts per thousand) with a mean of 8 ppt. Some of the common plants found in the brackish marsh are marshhay cordgrass, needlegrass rush, seashore saltgrass, coastal waterhyssop, widgeongrass, Olney bulrush, hairypod cowpea, seashore paspalum, common reed, bearded sprangletop, saltmarsh morningglory, dwarf spikerush, and coast cockspur.

The freshwater marshes total 17,551 acres. Freshwater marshes provide habitat for waterfowl, especially the puddle duck group. Nutria populations are also highest in these marshes. Low salinities (0 to 5 ppt) characterize these marshes because the vegetation is very intolerant to salt. Freshwater marshes have the highest plant diversity of any of the marsh types. Some common plants are bulltongue, alligatorweed, maidencane, smartweed, rattlebox, barnyardgrass, water hyacinth, floating pennywort, common rush, pickerelweed, California bulrush, cattail, and giant cutgrass.

The area of swampland totals 23,616 acres. These areas provide good habitat for ducks, nongame birds, alligators, crawfish, and furbearers. The natural vegetation is mainly baldcypress and water tupelo. In open areas, the common plants are alligatorweed, water hyacinth, bulltongue, arrowhead, and pickerelweed.

Interest in crawfish culture is growing. In 1980, 161 acres of ponds were devoted to crawfish production. Double cropping of land to rice or soybeans and crawfish has good potential for future expansion.

Landowners should be encouraged to retain areas of bottom land hardwood forests. Also, the small game population in open agricultural areas could be significantly increased through a more diversified habitat. Diversity can be accomplished by providing vegetative strips along streams, ditches, fence rows, field borders, and other locations where large fields are currently devoted to a monoculture of soybeans or other crops.

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

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair*

Figure 12.—Marshhay cordgrass in an area of Clovelly muck. This soil is in brackish marshes that form part of the estuarine complex that helps support Gulf marine life.

indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

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

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

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

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

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

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, cedar, and baldcypress.

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 American beautyberry, waxmyrtle, American elder, and sumac.

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

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

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

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

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

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, muskrat, mink, nutria, and otters.

Engineering

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

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

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

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

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about 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 gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

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

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

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings 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 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 the depth to the water table.

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

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

Sanitary Facilities

Table 11 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfills. A rating of *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 and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

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

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, flooding, and content of organic matter.

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

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

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

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

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

Soil texture, wetness, and slope 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 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

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

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

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

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

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

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

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

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

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

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

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

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and releases a variety of plant-available nutrients as it decomposes.

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed 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 terraces and diversions.

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

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

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

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

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

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; and subsidence of organic layers. Excavating and grading and the stability of ditchbanks are affected by slope and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope and wetness affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

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 characterize key soils.

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

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

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

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

Classification of the soils is determined according to the Unified soil classification system *(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.

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

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

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

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

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

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They influence the soil's adsorption of cations, moisture retention, shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

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

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

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

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

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

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

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

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

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

K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

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

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 15, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Water Features

Table 16 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

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

The four hydrologic soil groups are:

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

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

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

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

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

The frequency of flooding for the occasional and frequent phases differs from the National Soil Conservation Service definition of flooding found elsewhere because the frequency of flooding for each of these phases is slightly different, and the period of flooding is from June 1 to November 30 rather than any time during the year. See the "Detailed Soil Map Units" to determine the frequency of flooding at other times of the year. Except for the land capability classes given in table 6, the interpretations in all other tables are based on the National Soil Conservation Service definition of flooding.

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 absence of distinctive horizons, which are characteristic of soils that are not subject to flooding.

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

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 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 16.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. 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.

The two numbers in the "High water table-Depth" column indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that the water table exists for less than a month.

Soil Fertility Levels

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

Crop composition and yield are a function of many environmental, plant, and soil factors. A list and brief description of the most important factors follows:

Environmental factors:

- Light—intensity and duration
- Temperature—air and soil
- Precipitation—distribution and amount
- Atmospheric carbon dioxide concentration

Plant factors (species and hybrid specific):

- Rate of nutrient and water uptake
- Rate of growth and related plant functions

Soil factors—physical properties:

- Particle size distribution—texture
- Structure
- Surface area
- Bulk density
- Water retention and flow
- Aeration

Soil factors—chemical properties and soil fertility:

- Quantity factor—Amount of an element in the soil that is readily available for uptake by plants. The quantity factor is often referred to as the available supply of an element. To determine the quantity factor, the available supply is removed from the soil using a suitable extractant and analyzed.
- Intensity factor—The intensity factor is related 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. Soils that have identical quantities of an element's available supply but have different element intensity factors will differ in element availability to the plant.
- Relative intensity factor—Effect that the availability of one element has on the availability of another.
- Quantity/Intensity relationship factor—These relationships include the reactions between the soil surfaces and soil water that control the distribution of element species between the available supply in the soil and the soil water. A special type of 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.
- Replenishment factor—Rate of replenishment of the available supply and intensity factors by weathering reactions, fertilizer additions, and transport by mass flow and diffusion.

These factors are interdependent. The magnitude of the factors and the interactions among them will control crop response. The relative importance of each factor changes from soil to soil, crop to crop, and environment to environment. This list demonstrates that 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 balance of the essential elements in the soil for crop and animal nutrition. Soil testing also protects the environment against the build-up of potentially toxic levels of essential and non-essential elements. Current soil tests measure only one soil factor, the available supply of nutrients in the surface horizon or plow layer. In those cases in which the available supply of one or more nutrients in the plow layer can clearly limit crop production, existing soil tests can usually diagnose the problem and reliable recommendations can be made to correct the problem. Soil management systems are usually based on physical and chemical alteration of the plow layer. Characteristics of this layer can vary from one location to another, depending upon management practices and soil use.

Subsurface horizons are less subject to change as a result of alteration of the plow layer, or else they change very slowly. Subsurface horizons reflect the soil's inherent ability to supply nutrients to plant roots and to provide a favorable environment for root growth. If followed, soil fertility recommendations based on current soil tests normally correct major fertility problems in the plow layer. Only crop and environmental factors, physical properties of the plow layer, and physical and chemical properties of the subsoil can now limit crop production.

Information on the available nutrient supply in subsoils allows evaluation of the native fertility levels of the soil. A number of soil profiles were sampled and analyzed for soil reaction (pH); organic matter content; extractable phosphorus (P); exchangeable cations of calcium (Ca), magnesium (Mg), potassium (K), sodium (Na), aluminum (Al), and hydrogen (H); total acidity; and cation-exchange capacity (CEC). These results are summarized in table 17 and are discussed in the following sections, which emphasize subsoil properties. More detailed information on these topics is also available *(1, 21, 22, 23, 31, 32)*.

Chemical Analyses Methods

The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods *(36)*.

Organic carbon—dichromate, ferric sulfate titration (6A1a).

Exchangeable cations—ammonium acetate pH 7.0, uncorrected; calcium (6N2), magnesium (602), sodium (6P2), potassium (6Q2).

Total acidity—barium chloride-triethanolamine I (6H1a).

Cation-exchange capacity—sum of cations (5A3a).

Effective cation-exchange capacity—sum of cations plus exchangeable aluminum and hydrogen (5A3b).
Base saturation—sum of cations, TEA, pH 8.2 (5C3).
Reaction (pH)—1:1 water dilution (8C1a).
Exchangeable aluminum and hydrogen—potassium chloride extraction (6G2).
Extractable phosphorus—(Bray No. 2).

Nitrogen is generally the most limiting nutrient element in crop production because plants have a high demand for it. Nitrogen fertilizer recommendations are nearly always based on the nitrogen requirement of the crop rather than on nitrogen soil test levels, since no reliable nitrogen soil tests are available.

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

The amounts of readily available ammonium and nitrate nitrogen in soils, the amount of organic nitrogen, the rate of mineralization of organic nitrogen to available forms of nitrogen, and the rate of conversion of fixed ammonium to available forms of nitrogen provide information on the fertility of a soil with respect to nitrogen despite the absence of an adequate nitrogen soil test. Unfortunately, since the amounts and rates of transformation of the various forms of nitrogen in the soils of Calcasieu Parish are unknown, no assessment of the nitrogen fertility status for these soils can be given.

Phosphorus exists 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. Thus, the availability of phosphorus in soils is a factor in controlling phosphorus uptake by plants.

The Bray 2 extractable phosphorus content of the soils in Calcasieu Parish is quite low, particularly in the subsoil. High levels of extractable phosphorus in the surface layer result from additions of fertilizer phosphorus.

The low extractable phosphorus content of Calcasieu Parish soils is a major factor limiting crop production. Native plant communities rely on biocycling of phosphorus and conversion to available forms of this mineral to meet their phosphorus requirement. Agronomic crops in the parish require the addition of fertilizer phosphorus for adequate production.

Potassium exists in soils in three major forms: exchangeable potassium associated with negatively-charged sites on clay mineral surfaces, non-exchangeable 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 is generally readily available for plant uptake. Non-exchangeable potassium and structural potassium must be converted to exchangeable potassium through weathering reactions to become available for plant uptake.

The exchangeable potassium content of the soils is an estimate of the supply available to plants. The available supply of potassium in the soils of Calcasieu Parish is quite low, reflecting a general lack of micaceous minerals that supply exchangeable potassium through weathering reactions. The low available supply of potassium in these soils is a major limiting factor for crop production. Agronomic crops in Calcasieu Parish need additional sources of potassium for adequate production. These additional sources can include conversion of non-exchangeable potassium to exchangeable potassium and fertilizer potassium.

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

The exchangeable magnesium content of the soils of Calcasieu Parish is more than adequate for crop production. Magnesium deficiencies in plants are normally rare. Thus, no fertilizer sources of magnesium are needed for crop production on the soils of the parish.

The exchangeable magnesium content of the soils of Calcasieu Parish generally increases with depth. Calcium is usually the most abundant exchangeable cation within the soil profile. Frequently, exchangeable magnesium is more abundant than exchangeable calcium in subsoils. This condition is true in Malbis and Messer soils on terrace uplands; Crowley, Gore, and Kinder soils on the Gulf Coast Prairies; Cahaba soils on stream terraces; and Larose soils on the Gulf Coast Marshes. High levels of exchangeable magnesium are expected in the Gulf Coast Marsh soils influenced by water from the Gulf of Mexico because the magnesium content in seawater is higher than the calcium content. Excessively high levels of exchangeable magnesium and low levels of exchangeable calcium in upland mineral soils can be associated with poor soil structure.

Calcium exists in soils as exchangeable calcium associated with negatively-charged sites on clay mineral surfaces and as structural calcium in mineral crystal lattices. Generally, exchangeable calcium is available for plant uptake while structural calcium is not.

The exchangeable calcium levels in the soils of Calcasieu Parish are adequate for crop production. Calcium deficiencies in plants are extremely rare.

Calcium is generally the most abundant exchangeable cation in the soil profile and it generally increases with depth, although some exceptions are shown in table 17.

The increase in exchangeable calcium with depth is generally associated with an increase in clay mineral content with depth for acid soils. In soils such as Brimstone, Midland, and Morey soils the increase in exchangeable calcium in the subsoil is due to the presence of carbonates and is also indicated by a sharp increase in soil pH with depth.

The *organic matter content* of a soil greatly influences other soil properties. High organic matter content in mineral soils are highly desirable while low organic matter content can lead to many problems. Increasing the organic matter content can greatly improve soil structure, drainage, and other physical properties; and can increase the moisture holding capacity, cation-exchange capacity, and nitrogen content of a soil.

Increasing the organic matter content of a soil is very difficult, since organic matter is continually subject to microbial degradation. In Louisiana, higher temperatures increase microbial activity, hence increasing the degradation rate. Native plant communities are in a steady dynamic state where the rate of organic matter breakdown is balanced by the input of fresh material. Disruption of this natural process can lead to a dramatic decline in the organic matter content of the soil. Unsound soil management practices lead to a further decrease in organic matter content.

Even if no degradation of organic matter occurs, 10 tons of organic matter input are needed to raise the organic matter content on the upper six inches of soil by just 1 percent. Since breakdown of organic matter occurs in the soil, production of a small increase in the organic matter content of the soil takes several decades of adding large amounts of organic matter to the soil. Sound management practices, such as conservation tillage and the planting of cover crops which will slowly increase the soil's organic matter content or at least prevent further declines, are to be encouraged.

The organic matter content of the upland mineral soils of Calcasieu Parish is low and decreases sharply with depth as fresh inputs of organic matter are confined to the A horizon. The Gulf Coast Marsh and Freshwater Swamp soils have O horizons and A horizons high in organic matter content. These soils have a degree of biomass production and degradation that is higher than that of upland mineral soils.

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

The Gulf Coast Marsh soils in Calcasieu Parish, such as the Larose soils, are high in sodium since they are influenced by the salt water of the Gulf of Mexico. Soils on uplands in Calcasieu Parish, such as Brimstone, Kinder, Mowata, and Basile soils, have significant levels of exchangeable sodium in the subsoil because of restricted subsoil drainage. In general, the exchangeable sodium content of all soils except for Bienville and Cahaba soils increases with depth because of slow permeability in the subsoil. Bienville soils are somewhat excessively drained. Cahaba soils are well drained. Most subsoils in Calcasieu Parish contain significant levels of exchangeable sodium, but these levels are not excessive and they are below the normal rooting depth of the soil.

The *pH* of the soil solution in contact with the soil is a fundamental soil property that greatly affects other soil properties. The pH is an intensity factor rather than a quantity factor (the more acidic the soil, the lower the pH). The pH controls the availability of essential and non-essential elements for plant uptake by controlling mineral solubility, ion exchange, and adsorption/desorption reactions with soil surfaces. The pH also affects microbial activity.

Exchangeable aluminum in soils is determined by extraction with neutral salts such as potassium chloride or barium chloride. The presence of exchangeable aluminum in soils is directly related to pH. Significant amounts of exchangeable aluminum are in soils that have pH below 5.5. Aluminum is toxic to plants; thus, significant reductions in plant growth of aluminum-sensitive crops can be expected in soils that have a pH of less than 5.5 and appreciable amounts of exchangeable aluminum. The toxic effects of aluminum on plant growth can be alleviated by adding lime to the soil to convert exchangeable aluminum to non-exchangeable polymeric hydrolysis species. High levels of organic matter can also alleviate aluminum toxicity by complexing the aluminum.

Sources of *exchangeable hydrogen* in soils include hydrolysis of exchangeable and non-exchangeable aluminum and pH-dependent exchange sites on metal oxides, certain layer silicates, and organic matter. Exchangeable hydrogen, as determined by extraction with neutral salts such as potassium chloride, is normally not a major component of soil acidity because exchangeable hydrogen is not readily replaceable by other cations unless accompanied by a neutralization reaction. Most of the neutral salt exchangeable hydrogen in soils apparently comes 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 at the pH of the soil. Titratable acidity is the amount of acidity neutralized to a selected pH, usually pH 7.0 or 8.2. The titratable acidity 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 determined 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.

All soils on terrace uplands in Calcasieu Parish have a low pH and high levels of exchangeable aluminum throughout. Acadia, Crowley, Gore, Kinder, Mowata, and Vidrine soils on the Gulf Coast Prairies also have horizons with a low pH and high levels of exchangeable aluminum. Cahaba, Guyton, Una, and Urbo soils on Stream Terrace and Flood Plain setting also have a low pH and high levels of exchangeable aluminum. The Gulf Coast Marsh and Freshwater Swamp soils, despite their low pH levels, do not have high levels of exchangeable aluminum because organic matter in these soils effectively complexes the aluminum, preventing its extraction by neutral salts.

The high levels of exchangeable aluminum in the soils of Calcasieu Parish are a major limitation for crop production of aluminum-sensitive plants such as soybeans. Where soils that have restricted drainage are irrigated for rice production, the pH levels are raised and reducing conditions are maintained for long periods, causing exchangeable aluminum to be converted into non-exchangeable forms. Toxicity problems from high levels of exchangeable aluminum in surface soils can be alleviated by adding lime to a pH above 5.5 or by complexing the aluminum with large amounts of organic matter. Toxicity problems from high levels of exchangeable aluminum in subsoils cannot yet be alleviated economically.

The *cation-exchange capacity (CEC)* represents the available supply of nutrient and non-nutrient 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 mineral surfaces 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.

The cation-exchange capacity is operationally defined by the method used to determine it. 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 since unbuffered salt methods include only a portion of the pH-dependent cation-exchange capacity in the overall cation-exchange capacity. Buffered salt methods include all of the pH-dependent cation-exchange capacity up to the pH of the buffer (usually pH 7.0 or 8.2) in the overall cation-exchange capacity. Errors in the saturation, washing, and replacement steps of the methods also cause different results in determining cation-exchange capacity.

The effective cation-exchange capacity is the sum of exchangeable cations (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 is generally less than the sum cation-exchange capacity. The effective cation-exchange capacity includes only that portion 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 contains no pH-dependent exchange sites or the pH of the soil is about 8.2, then the effective and sum cation-exchange capacity will be approximately the same. When the cation-exchange capacity is larger, however the method used to determine it, the capacity to store nutrient cations is also larger.

Physical and Chemical Analyses of Selected Soils

The results of physical analysis of several typical pedons in the survey area are given in table 18 and the results of chemical analysis in table 19. The data are for soils sampled at carefully selected sites. 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 oven-dry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods *(36)*.

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

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

Clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of materials less than 2 mm (3A1).
Water retained—pressure extraction, percentage of oven-dry weight of less than 2 mm material; 1/3 or 1/10 (3/10) bar (4B1), 15 bars (4B2).
Moist bulk density—of less than 2 mm material, saran-coated clods (4A1).
Organic carbon—dichromate, ferric sulfate titration (6A1a).
Extractable cations—ammonium acetate pH 7.0, uncorrected; calcium (6N2e), magnesium (6O2d), sodium (6P2b), potassium (6Q2b).
Extractable acidity—barium chloride-triethanolamine I (6H1a).
Cation-exchange capacity—ammonium acetate, pH 7.0 (5A1b).
Base saturation—ammonium acetate, pH 7.0 (5C1).
Reaction (pH)—1:1 water dilution (8C1a).
Reaction (pH)—potassium chloride (8C1c).
Reaction (pH)—calcium chloride (8C1e).
Aluminum—potassium chloride extraction (6G).
Iron—dithionate-citrate extract (6C2b).
Available phosphorus—(method of reporting laboratory).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(35)*. 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 20 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

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

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hydraquents (*Hydr*, meaning 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. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is very-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 substratum within a series. An example is the Barbary series, which is a member of the very-fine, montmorillonitic, nonacid, thermic Typic Hydraquents.

Soil Series and Their Morphology

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

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (34)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (35)*. 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."

Acadia Series

The Acadia series consists of somewhat poorly drained, very slowly permeable soils on ridges and side slopes on terrace uplands. These soils formed in clayey alluvium of Pleistocene age. Slopes range from 1 to 3 percent.

Soils of the Acadia series are fine, montmorillonitic, thermic Aeric Ochraqualfs.

Acadia soils commonly are near Basile, Gore, and Kinder soils. Basile soils are poorly drained and are in lower positions on the landscape than Acadia soils. They have a fine-silty control section. Gore soils are well drained and are on steeper slopes. They have a red subsoil. Kinder soils are poorly drained. They are on broad flats and are in higher positions than Acadia soils. Kinder soils have a fine-silty control section.

Typical pedon of Acadia silt loam, 1 to 3 percent slopes; about 5.5 miles southwest of Gillis, 0.25 mile south on Dunn Ferry Road, 20 feet south of a dirt road; NW1/4NW1/4 sec. 27, T. 8 S., R. 9 W.

A—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; common medium and fine roots; extremely acid; abrupt wavy boundary.

E—5 to 14 inches; light yellowish brown (10YR 6/4) silt loam; few medium distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; common medium and fine roots; few medium black concretions; very strongly acid; clear wavy boundary.

BE—14 to 19 inches; yellowish brown (10YR 5/6) silt loam; common medium distinct grayish brown (10YR 5/2) mottles; common medium prominent yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; friable; few fine roots; few brown concretions; very strongly acid; clear wavy boundary.

Btg—19 to 33 inches; light brownish gray (10YR 6/2) silty clay; many medium prominent red (2.5YR 4/8) mottles; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure parting to moderate fine subangular blocky; firm; few fine roots; common thin patchy clay films on faces of peds; strongly acid; gradual wavy boundary.

BCg1—33 to 48 inches; light brownish gray (2.5Y 6/2) silty clay; many medium distinct yellowish brown (10YR 5/8) mottles; few medium prominent dark red (2.5YR 3/6) mottles; weak medium subangular blocky structure; firm; few fine roots; strongly acid; gradual wavy boundary.

BCg2—48 to 63 inches; light brownish gray (2.5Y 6/2) silty clay; many medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; firm; strongly acid.

The solum is 30 to 60 inches thick. Depth to the clayey Btg horizon ranges from 10 to 20 inches. The effective cation-exchange capacity of this soil has 20 to 50 percent exchangeable aluminum in the control section to a depth of 30 inches or more.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 to 3. It is 3 to 8 inches thick. Reaction is typically extremely acid.

The E horizon has hue of 10YR, value of 5 or 6, and chroma of 2 to 4. It is 2 to 12 inches thick. Reaction is very strongly acid to medium acid.

The BE horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 8. Texture is silt loam or silty clay loam. Reaction is very strongly acid or strongly acid.

The Btg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. Texture is silty clay or clay. Reaction is very strongly acid to medium acid.

The BCg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. Texture is clay, silty clay, or silty clay loam. Reaction is very strongly acid to medium acid.

Some pedons have a Cg horizon. It has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. Texture is clay, silty clay, or silty clay loam. Reaction is strongly acid or medium acid.

The Acadia soils in Calcasieu Parish are taxadjuncts to the Acadia series because they have an A horizon that is typically extremely acid. This is slightly more acid than is permitted in the range for the series. This difference, however, does not affect the use and management of these soils.

Allemands Series

The Allemands series consists of very poorly drained, organic soils in freshwater coastal marshes that are ponded and flooded most of the time. These soils formed in moderately thick accumulations of decomposed herbaceous material underlain by clayey 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 Ged soils and Larose soils. Ged soils and Larose soils are mineral soils and are in similar positions on the landscape as Allemands soils.

Typical pedon of Allemands peat; 3 miles southwest of Bell City, 75 feet west of Bell City ditch; SW1/4SE1/4 sec. 16, T. 11 S., R. 6 W.

Oe—0 to 12 inches; dark brown (10YR 4/3) peat; about 90 percent fiber, 75 percent rubbed; massive; many medium and fine roots; dominantly herbaceous material; about 25 percent mineral; strongly acid; clear smooth boundary.

Oa—12 to 29 inches; black (10YR 2/1) muck; about 10 percent fiber, 2 percent rubbed; massive; many medium and fine roots; very fluid (flows easily between fingers when squeezed leaving small residue in hand); dominantly herbaceous material; 60 percent mineral; strongly acid; clear smooth boundary.

Abg—29 to 44 inches; black (10YR 2/1) mucky clay; massive; many medium and fine roots; very fluid (flows easily between fingers when squeezed leaving small residue in hand); very strongly acid; clear smooth boundary.

Cg1—44 to 50 inches; dark gray (5Y 4/1) clay; massive; few medium and fine roots; very fluid (flows easily between fingers when squeezed leaving small residue in hand); strongly acid; clear wavy boundary.

Cg2—50 to 60 inches, gray (5Y 5/1) clay; few fine distinct light olive brown (2.5Y 5/4) mottles; massive; few fine roots; very fluid (flows easily between fingers when squeezed leaving small residue in hand); strongly acid; gradual wavy boundary.

Cg3—60 to 80 inches; gray (5Y 5/1) clay; many medium distinct light olive brown (2.5Y 5/4) mottles; massive; very fluid (flows easily between fingers when squeezed leaving small residue in hand); medium acid.

The organic material is 16 to 51 inches thick. The organic fraction is dominantly herbaceous material.

The surface tier, 0 to 12 inches, has hue of 10YR, value of 2 to 4, and chroma of 1 to 3. The content of rubbed fiber ranges from 2 to 80 percent. Reaction is strongly acid to slightly acid. The subsurface tier, 12 to 29 inches, and the bottom tier, 36 to 51 inches, have hue of 7.5YR or 10YR, value of 2 to 4, and chroma of 1 or 2. The content of fiber ranges from 1 to 10 percent after rubbing. Reaction is strongly acid to mildly alkaline.

The Abg horizon has hue of 10YR, 2.5Y, or 5Y, value of 2 to 4, and chroma of 1. Texture is clay or mucky clay. Reaction is very strongly acid to mildly alkaline. Some pedons do not have an Abg horizon.

The Cg horizon has hue of 10YR, 5Y, 5G, or 5GY, value of 4 to 6, and chroma of 1; or it is neutral. Texture is mucky clay, silty clay, or clay. Reaction is very strongly acid to mildly alkaline.

Arat Series

The Arat series consists of very poorly drained, slowly permeable soils in low, broad, backswamp areas along the flood plains of major streams. These soils are ponded and flooded most of the time. Arat soils formed in very fluid, loamy alluvium. Slope is less than 0.5 percent.

Soils of the Arat series are fine-silty, siliceous, nonacid, thermic Typic Hydraquents.

The Arat soils commonly are near Acadia, Basile, Crowley, Guyton, Midland, and Mowata soils, all of which are firm mineral soils. Acadia soils are somewhat poorly drained and are on side slopes. The Basile soils and Guyton soils are poorly drained and are in higher positions on the flood plains than Arat soils. Crowley soils are somewhat poorly drained. Midland soils and Mowata soils are poorly drained. These soils are in higher positions on the landscape than Arat soils. They are on the Gulf Coast Prairie.

Typical pedon of Arat mucky silt loam; 3 miles north of Lake Charles, 200 feet east of old U.S. Highway 171; SW1/4SW1/4 sec. 10, T. 8 S., R. 8 W.

O—3 to 0 inches; dark grayish brown (10YR 4/2) suspended partly decomposed wood and moss fiber; medium acid.

A—0 to 6 inches; very dark grayish brown (10YR 3/2) mucky silt loam; massive; very fluid (flows easily between fingers when squeezed); about 15 percent wood fragments and herbaceous fibers; slightly acid; clear smooth boundary.

Cg1—6 to 36 inches; dark grayish brown (10YR 4/2) silty clay loam; massive; very fluid (flows easily between fingers when squeezed); slightly acid; abrupt smooth boundary.

Cg2—36 to 60 inches; dark grayish brown (10YR 4/2) silty clay loam; massive; very fluid (flows easily between fingers when squeezed); about 90 percent logs and partly decomposed wood fragments; slightly acid.

All mineral horizons have *n* value of 1 or more. The O horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. It is partly decomposed wood or peat and reaction is strongly acid to slightly acid. Some pedons do not have an O horizon.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. It is 5 to 18 inches thick. Reaction is strongly acid to neutral. Undecomposed logs and wood fragments range from few to many.

The Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 to 5, and chroma of 1 or 2. It is silty clay loam, silt loam, or mucky silty clay loam. Reaction is medium acid to mildly alkaline. Subhorizons of the C horizon are 50 to 95 percent logs and wood fragments, by volume.

Barbary Series

The Barbary series consists of very poorly drained, very slowly permeable soils in low, broad, backswamp areas along the flood plains of major streams. These soils are ponded and flooded most of the time. Barbary soils formed in very fluid clayey alluvium. Slope is less than 1 percent.

Soils of the Barbary series are very-fine, montmorillonitic, nonacid, thermic Typic Hydraquents.

Barbary soils commonly are near Acadia, Guyton, Kinder, Larose, and Una soils. Acadia soils are somewhat poorly drained and are on side slopes. Guyton soils and Una soils are firm and are poorly drained. These soils are in higher positions on the flood plains than Barbary soils. Kinder soils are poorly drained. They are in higher positions on broad flats and have red mottles. Larose soils are very poorly drained. These soils are in similar positions in nearby marshes and have logs in the lower part of their profile.

Typical pedon of Barbary mucky clay; 2.5 miles west of Toomey, 450 feet east of the Sabine River; SW1/4NE1/4 sec. 33, T. 10 S., R. 13 W.

A—0 to 5 inches; dark gray (10YR 4/1) mucky clay; massive; very fluid (flows easily between fingers when squeezed leaving small residue in hand); few fragments of wood; many fine roots; strongly acid; clear smooth boundary.

Cg1—5 to 42 inches; gray (10YR 5/1) clay; massive; very fluid (flows easily between fingers when squeezed leaving small residue in hand); slightly acid; gradual wavy boundary.

Cg2—42 to 80 inches; gray (5Y 5/1) clay; massive; very fluid (flows easily between fingers when squeezed leaving small residue in hand); many logs and wood fragments; slightly acid.

The *n* values are more than 0.7 in all horizons to a depth of 40 inches or more.

The A horizon has hue of 10YR or 5Y, value of 3 to 5, and chroma of 1 or 2. It is 2 to 10 inches thick. Reaction is strongly acid to slightly acid.

An Oa or Oe horizon, 2 to 8 inches thick, is on the surface of some pedons. This horizon is muck. It has hue of 10YR or 5Y, value of 3 to 5, and chroma of 1 or 2. Reaction is strongly acid to slightly acid.

The Cg horizon has hue of 10YR, 5Y, 5GY, 5G, or 5BG, value of 4 or 5, and chroma of 1. Its texture is clay or mucky clay. Reaction is strongly acid to slightly acid.

The Barbary soils in Calcasieu Parish are taxadjuncts to the Barbary series because they are more acid throughout the profile than is permitted in the defined range for the series. This difference, however, does not affect the use and management of these soils.

Basile Series

The Basile series consists of poorly drained, slowly permeable soils on narrow flood plains and in drainageways on terrace uplands. These soils formed in loamy alluvium of Pleistocene age. Slopes are less than 1 percent.

Soils of the Basile series are fine-silty, mixed, thermic Typic Glossaqualfs.

Basile soils commonly are near Acadia, Arat, Gore, Guyton, and Kinder soils. Acadia soils are somewhat poorly drained, and Gore soils are moderately well drained. These soils are on side slopes. Arat soils are poorly drained. They are in lower positions on the flood plains than Basile soils. Guyton soils are poorly drained. These soils are more acid than Basile soils and are in slightly higher positions. Kinder soils are poorly drained but are in higher positions on the landscape. These soils have red mottles, and they are more acid than Basile soils.

Typical pedon of Basile silt loam, in an area of Basile and Guyton silt loams, frequently flooded; 4 miles southwest of Gillis, 75 feet south of Coffee Road along Indian Bayou; SW1/4NW1/4 sec. 26, T. 8 S., R. 9 W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam; few fine faint grayish brown mottles; weak fine granular structure; friable; many fine and medium roots; very strongly acid; clear smooth boundary.

Eg1—4 to 23 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; many medium and few coarse roots; few fine discontinuous random tubular pores; few fine black and brown concretions; few light gray silt coatings; strongly acid; clear wavy boundary.

Eg2—23 to 30 inches; light gray (10YR 7/2) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular structure; firm and brittle; few fine roots; common fine discontinuous random tubular pores; many soft brown and black accumulations; slightly acid; gradual wavy boundary.

B/E—30 to 42 inches; light brownish gray (10YR 6/2) silt loam (Bt); common medium distinct yellowish brown (10YR 5/8) mottles; about 40 percent light gray (10YR 7/2) silt loam (E); moderate medium subangular blocky structure; firm; thin patchy clay films on faces of peds; few fine roots; neutral; clear smooth boundary.

Btg—42 to 62 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium and coarse distinct yellowish brown (10YR 5/8) mottles; few pockets of light gray silt loam; moderate medium subangular blocky structure; firm; few fine roots; thick patchy clay films on faces of peds; neutral; gradual wavy boundary.

BCg—62 to 70 inches; light olive gray (5Y 6/2) silt loam; few fine distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; firm; neutral.

The solum is 40 to 100 inches thick. Base saturation is more than 80 percent at 50 inches below the top of the argillic horizon.

The A horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. It is 3 to 6 inches thick. Reaction is very strongly acid to neutral.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. It is 12 to 30 inches thick. Mottles are in shades of brown. Reaction is very strongly acid to slightly acid.

The Btg horizon and the Bt part of the B/E horizon have hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 or 2. Texture is silt loam or silty clay loam. Mottles in shades of brown range from few to many. Reaction is medium acid to moderately alkaline.

The BCg horizon has the same range in colors and textures as the Btg horizon. Reaction is slightly acid to moderately alkaline. In some pedons, this horizon has calcium carbonate concretions.

Bienville Series

The Bienville series consists of somewhat excessively drained, moderately rapidly permeable soils on ridges on stream terraces. These soils formed in sandy alluvium. Slopes range from 1 to 3 percent.

Soils of the Bienville series are sandy, siliceous, thermic Psammentic Paleudalfs.

Bienville soils commonly are near Acadia, Cahaba, Gore, Guyton, and Kinder soils. Acadia soils are somewhat poorly drained, and Gore soils are moderately well drained. These soils are on side slopes on the adjacent terrace uplands. They have a fine control section. Cahaba soils are well drained and are in lower positions on the landscape than Bienville soils. They have a fine-loamy control section. Guyton soils are poorly drained and are in lower positions. They have a fine-silty control section. Kinder soils are poorly drained and are in flat areas on the adjacent terrace uplands. They have a fine-silty control section.

Typical pedon of Bienville loamy fine sand, 1 to 3 percent slopes; 1 mile north of Niblett Bluff, 175 feet east of a gravel road, 10 feet north of a dirt road; NW1/4SW1/4 sec. 2, T. 10 S., R. 13 W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) loamy fine sand; weak fine granular structure; very friable; many very fine and common medium roots; very strongly acid; clear smooth boundary.

E—4 to 16 inches; yellowish brown (10YR 5/4) loamy fine sand; few pale brown spots of uncoated sand grains; weak medium subangular blocky structure; very friable; common fine and medium roots; strongly acid; clear wavy boundary.

B/E—16 to 40 inches; strong brown (7.5YR 5/6) loamy fine sand (Bt); 25 percent pale brown (10YR 6/3) spots and streaks of uncoated sand grains (E); weak medium subangular blocky structure; very friable; common fine and very fine roots; strongly acid; gradual wavy boundary.

Bt—40 to 75 inches; strong brown (7.5YR 5/6) loamy fine sand; few pale brown spots of uncoated sand grains; weak medium subangular blocky structure; very friable; few fine roots; strongly acid.

The solum is 60 to 80 inches thick.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. It is 4 to 10 inches thick. Reaction ranges from very strongly acid to slightly acid.

The E horizon has hue of 10YR, value of 4 to 6, and chroma of 3 or 4. It is 10 to 30 inches thick. Texture is fine sand or loamy fine sand. Reaction is very strongly acid to slightly acid.

The Bt horizon and the Bt part of the B/E horizon have hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6. Some pedons have subhorizons of the Bt horizon that have hue of 10YR and chroma of 4. Streaks of E material make up 15 to 40 percent of the B/E horizon. Texture is fine sandy loam, loamy fine sand, or fine sand. Reaction is very strongly acid to medium acid. In some pedons, the lower part of the Bt horizon is lamellae of dark reddish brown, reddish brown, or brown.

The Bienville soils in Calcasieu Parish are taxadjuncts to the Bienville series because they have an A horizon that is typically very strongly acid. The Bienville series has an A horizon that is strongly acid to slightly acid. This difference, however, does not affect the use and management of the soils.

Brimstone Series

The Brimstone series consists of poorly drained, slowly permeable soils that are high in exchangeable sodium. These soils are on broad flats on terrace uplands. They formed in loamy alluvium of Pleistocene age. Slope is less than 1 percent.

Soils of the Brimstone series are fine-silty, siliceous, thermic Glossic Natraqualfs.

Brimstone soils commonly are near Basile, Caddo, Glenmora, Guyton, Kinder, Messer, and Vidrine soils. These associated soils do not have a natric horizon. In addition, the Basile soils are in lower positions on the landscape than Brimstone soils. Guyton soils are in lower positions and are more acid in the subsoil. Caddo soils and Kinder soils are in higher positions. These soils have red mottles in the subsoil. Glenmora soils are on side slopes. Messer soils and Vidrine soils are on low mounds.

Typical pedon of Brimstone silt loam; 1 mile east of Gillis, 240 feet west of an irrigation canal; NE1/4NE1/4 sec. 16, T. 8 S., R. 8 W.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many fine roots; common fine pores; few dark yellowish brown stains in pores and on faces of peds; very strongly acid; abrupt smooth boundary.

E—6 to 16 inches; grayish brown (10YR 5/2) silt loam; common medium faint yellowish brown (10YR 5/4) mottles; weak very coarse prismatic structure; firm and brittle; few fine roots; common fine pores; few patches and streaks of light gray silt; common medium strong brown stains on faces of prisms; medium acid; clear irregular boundary.

E/Btng—16 to 27 inches; about 60 percent tongues of light brownish gray (10YR 6/2) silt loam (E); firm and brittle; about 40 percent grayish brown (10YR 5/2) silt loam (Bt); common medium faint yellowish brown (10YR 5/4) mottles; weak coarse prismatic structure; friable; few fine roots; distinct discontinuous clay films on faces of peds; few fine black concretions; common dark gray clay bands and few streaks and pockets of light gray silt (E); neutral; gradual irregular boundary.

Btng/E—27 to 39 inches; about 65 percent grayish brown (10YR 5/2) silty clay loam (Bt); common medium faint yellowish brown (10YR 5/4) mottles; weak coarse prismatic structure; friable; few fine roots; few discontinuous clay films on faces of peds; about 35 percent light brownish gray (10YR 6/2) silt loam (E); massive; firm and brittle; few medium and fine black concretions; mildly alkaline; gradual irregular boundary.

Btng1—39 to 52 inches; grayish brown (10YR 5/2) silty clay loam; common medium faint yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm; few fine pores; thin discontinuous clay films on faces of peds; few fine and medium black concretions; few streaks of light gray silt; few medium and coarse concretions of calcium carbonate; mildly alkaline; gradual wavy boundary.

Btng2—52 to 70 inches; light olive gray (5Y 6/2) silty clay loam; common medium prominent strong brown (7.5YR 5/8) mottles; weak coarse subangular blocky structure; firm; thin patchy clay films on faces of peds; few medium concretions of calcium carbonate; moderately alkaline.

The solum is 40 to 100 inches thick. Exchangeable sodium saturation ranges from 15 to 30 percent in the A and E horizons and in the upper 6 inches of the E/Btng horizon. Exchangeable sodium saturation decreases with depth.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. It is 4 to 7 inches thick. Reaction is very strongly acid to mildly alkaline.

The E horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. It is 8 to 24 inches thick. Texture is silt loam or very fine sandy loam. Reaction is medium acid to moderately alkaline. Tongues of the E horizon extend into the Bt horizons. Accumulations or discontinuous clay bands in the E horizon are few or common.

The Btng horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 or 2. Texture is silt loam or silty clay loam. Mottles are in shades of brown or gray. Reaction is neutral to moderately alkaline. Calcium carbonate concretions range from none to common.

Some pedons have a BCg horizon that has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 or 2. Texture is silt loam or silty clay loam. Reaction is neutral to moderately alkaline.

Caddo Series

The Caddo series consists of poorly drained, slowly permeable soils on broad flats on terrace uplands. These soils formed in loamy alluvium of Pleistocene age. Slopes are less than 1 percent.

Soils of the Caddo series are fine-silty, siliceous, thermic Typic Glossaqualfs.

Caddo soils commonly are near Brimstone, Glenmora, Guyton, Malbis, and Messer soils. Brimstone soils are poorly drained but are more alkaline than Caddo soils. They are in lower positions on the landscape. Glenmora soils are moderately well drained. These soils are on side slopes. They are more brown in the upper part of the subsoil than Caddo soils. Guyton soils are poorly drained but are in lower positions than Caddo soils. These soils do not have red mottles in the subsoil. Malbis soils are moderately well drained. These soils are in higher positions on convex ridges and side slopes. They have a subsoil in shades of brown. Messer soils are moderately well drained and are on mounds. These soils have a coarse-silty control section.

Typical pedon of Caddo silt loam, in an area of Caddo-Messer silt loams; 8 miles southwest of DeQuincy, 1 mile south of Bennett Road, 130 feet south of a dirt road; NW1/4NE1/4 sec. 20, T. 10 S., R. 12 W.

A—0 to 5 inches; grayish brown (10YR 5/2) silt loam; weak fine granular structure; friable; many fine and common coarse roots; few fine brown and black concretions; very strongly acid; abrupt smooth boundary.

Eg1—5 to 17 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; common fine roots; few fine discontinuous random tubular pores; few fine brown and black concretions; very strongly acid; clear wavy boundary.

Eg2—17 to 29 inches; light brownish gray (10YR 6/2) silt loam; common coarse distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable and slightly brittle; few fine roots; common fine discontinuous random tubular pores; few fine brown and black concretions; very strongly acid; abrupt irregular boundary.

B/E—29 to 51 inches; light brownish gray (10YR 6/2) silt loam (Bt); many coarse prominent red (2.5YR 4/8) mottles; common medium distinct yellowish brown (10YR 5/8) mottles; moderate coarse prismatic structure parting to moderate coarse subangular blocky; firm; few fine roots; many fine discontinuous random tubular pores; common discontinuous thick clay films on faces of peds; about 25 percent tongues of silt loam (E), 1 to 10 centimeters wide, to a depth of 37 inches; few medium and fine plinthite modules; few medium black accumulations; strongly acid; gradual wavy boundary.

Btg1—51 to 64 inches; light brownish gray (10YR 6/2) silt loam; many coarse distinct strong brown (7.5YR 5/8) mottles; common medium prominent red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; firm; few fine discontinuous random tubular pores; common discontinuous thick clay films on faces of peds; few medium black accumulations; strongly acid; gradual wavy boundary.

Btg2—64 to 74 inches; light brownish gray (10YR 6/2) silt loam; many coarse distinct strong brown (7.5YR 5/8) mottles; few medium prominent red (2.5YR 4/8) mottles; weak coarse subangular blocky structure; firm; few fine discontinuous random tubular pores; thin patchy clay films on faces of peds; few medium black accumulations; strongly acid.

The solum is 60 to 100 inches thick. Reaction is very strongly acid to medium acid throughout. The effective cation-exchange capacity of this soil has 50 percent or more exchangeable aluminum in the control section to a depth of 30 inches or more.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. It is 2 to 8 inches thick.

The Eg horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. It is 11 to 30 inches thick. Mottles in shades of brown range from few to many.

The Btg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. Texture is silt loam, loam, or silty clay loam. Mottles in shades of red, brown, and yellow range from few to many.

Cahaba Series

The Cahaba series consists of well drained, moderately permeable soils on stream terraces. These soils formed in loamy and sandy alluvium. Slopes range from 1 to 3 percent.

Soils of the Cahaba series are fine-loamy, siliceous, thermic Typic Hapludults.

Cahaba soils commonly are near Bienville and Guyton soils. Bienville soils are somewhat excessively drained and are in slightly higher positions on the landscape than Cahaba soils. Bienville soils are sandy throughout. Guyton soils are poorly drained. They are in lower positions on flats and along drainageways. They are more gray throughout than Cahaba soils.

Typical pedon of Cahaba fine sandy loam, 1 to 3 percent slopes; 6 miles south of Starks, 0.1 mile south of a graveled road; NW1/4NE1/4 sec. 1, T. 10 S., R. 13 W.

A—0 to 4 inches; brown (10YR 5/3) fine sandy loam; weak fine granular structure; very friable; common fine and medium roots; extremely acid; clear smooth boundary.

E—4 to 15 inches; pale brown (10YR 6/3) fine sandy loam; weak fine granular structure; very friable; common fine and medium roots; very strongly acid; clear smooth boundary.

E/B—15 to 19 inches; pale brown (10YR 6/3) fine sandy loam (E) and yellowish red (5YR 4/6) fine sandy loam (Bt); weak fine granular structure; very friable; common fine roots; strongly acid; clear smooth boundary.

Bt1—19 to 44 inches; yellowish red (5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; common fine roots; thin patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—44 to 56 inches; yellowish red (5YR 4/6) clay loam; weak medium subangular blocky structure; friable; few fine roots; thin patchy clay films on faces of peds; few spots of pale brown (10YR 6/3) sand grains; very strongly acid; gradual wavy boundary.

C—56 to 64 inches; yellowish red (5YR 4/6) and pale brown (10YR 6/3) sandy loam; friable; massive; very strongly acid.

The solum is 36 to 60 inches thick. Reaction is very strongly acid to medium acid throughout except in the A horizon. The A horizon is typically extremely acid. The effective cation-exchange capacity of this soil has 50 percent or more exchangeable aluminum in the control section to a depth of 30 inches or more.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. It is 4 to 8 inches thick.

The E horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. It is 4 to 12 inches thick. Texture is fine sandy loam or loamy fine sand.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8. Texture is sandy clay loam, loam, or clay loam. The content of clay ranges from 18 to 30 percent, and the content of silt ranges from 20 to 50 percent.

The C horizon has hue of 10YR to 2.5YR, value of 4 to 6, and chroma of 4 to 8. It is commonly stratified with sand, loamy sand, and fine sandy loam. The C horizon has mottles of brown, yellow, or gray in some pedons.

The Cahaba soils in Calcasieu Parish are taxadjuncts to the Cahaba series because they have an A horizon that is extremely acid. The Cahaba series typically has an A horizon that is very strongly acid to medium acid. This difference, however, does not affect the use and management of the soils.

Clovelly Series

The Clovelly series consists of very poorly drained, very slowly permeable organic soils that are moderately saline and very fluid. These soils are in brackish coastal marshes that are ponded and flooded most of the time. Clovelly soils formed in moderately thick accumulations of herbaceous plant material underlain by clayey alluvium. Elevation ranges from sea level to 1 foot above sea level. Slope is less than 0.2 percent.

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

Clovelly soils commonly are near Aquents, Gentilly, and Larose soils. Aquents are in higher positions on the landscape than Clovelly soils. Aquents are made up of soil material that was excavated or pumped out in the construction and maintenance of waterways. Gentilly soils and Larose soils are in similar positions as Clovelly soils. They are mineral soils.

Typical pedon of Clovelly muck; 9 miles south of Sulphur, 250 feet south of Choupique Bayou bridge, 120 feet west of Louisiana State Highway 27; NE1/4NW1/4 sec. 23, T. 11 S., R. 10 W.

Oa1—0 to 8 inches; very dark grayish brown (10YR 3/2) muck; pressed and rubbed, very dark grayish brown (10YR 3/2) massive; about 30 percent fiber, 8 percent rubbed; about 50 percent mineral; many medium and fine roots; very fluid (flows easily between fingers leaving only fiber and roots in hand); slightly acid; clear smooth boundary.

Oa2—8 to 20 inches; black (10YR 2/1) muck; black (10YR 2/1) pressed and rubbed; about 10 percent fiber, 3 percent rubbed; about 60 percent mineral; massive; very fluid (flows easily between fingers when squeezed leaving hand empty); few medium and fine roots; neutral; gradual smooth boundary.

Oa3—20 to 36 inches; black (10YR 2/1) muck; black (10YR 2/1) pressed and rubbed; about 5 percent fiber, 2 percent rubbed; about 65 percent mineral; massive; very fluid (flows easily between fingers when squeezed leaving hand empty); neutral; gradual smooth boundary.

Abg—36 to 51 inches; black (10YR 2/1) mucky clay; few streaks of dark gray (N 4/0) clay; massive; very fluid (flows easily between fingers when squeezed leaving hand empty); neutral; clear smooth boundary.

Cg—51 to 80 inches; gray (N 5/0) clay; massive; very fluid (flows easily between fingers when squeezed leaving hand empty); neutral.

The organic horizons are 16 to 51 inches thick. The organic fraction is dominantly herbaceous sapric material, but some pedons have hemic or fibric surface layers. The accumulative thickness of these surface layers is less than half of the total thickness of the organic horizons. Reaction of the organic layers is slightly acid to moderately alkaline. Reaction of the mineral layers is neutral to moderately alkaline. Salinity, expressed as electrical conductivity of the saturation extract (millimhos/centimeter), ranges from 3 to 8 in at least one layer within a depth of 40 inches.

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

The Abg horizon has hue of 10YR or 5Y, value of 2 to 4, and chroma of 2 or less. Texture is mucky clay, clay, or silty clay. The *n* value ranges from 0.7 to more than 1.0. Some pedons do not have an Abg horizon.

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. Texture 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 2 to 10 inches thick.

Crowley Series

The Crowley series consists of somewhat poorly drained, very slowly permeable soils on broad, slightly convex ridges on the Gulf Coast Prairies. These soils formed in clayey alluvium of late Pleistocene age. Slopes are less than 1 percent.

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

Crowley soils commonly are near Leton, Midland, Morey, Mowata, and Vidrine soils. Leton, Midland, Morey, and Mowata soils are poorly drained and are in lower positions on the landscape than Crowley soils. In addition, Leton soils are loamy throughout, Midland soils have a more clayey surface layer than Crowley soils, Morey soils have a mollic epipedon, and Mowata soils have tongues of albic material extending into the argillic horizon. Vidrine soils are somewhat poorly drained. They are on mounds and side slopes. These soils have a coarse-silty over clayey control section.

Typical pedon of Crowley silt loam, in an area of Crowley-Vidrine silt loams; 2.5 miles northwest of Holmwood, 900 feet north of Louisiana State Highway 14, 350 feet east of a fence; SE1/4SW1/4 sec. 20, T. 10 S., R. 7 W.

Ap1—0 to 3 inches; dark grayish brown (10YR 4/2) silt loam; weak medium granular structure; friable; common fine roots; very strongly acid; clear smooth boundary.

Ap2—3 to 10 inches; dark grayish brown (10YR 4/2) silt loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; massive; firm; many fine roots; very strongly acid; abrupt smooth boundary.

E—10 to 25 inches; grayish brown (10YR 5/2) silt loam; few medium distinct dark yellowish brown (10YR 4/4) mottles; weak coarse subangular blocky structure; friable; few fine roots; few medium black concretions; few fine tubular pores; strongly acid; abrupt irregular boundary.

Btg1—25 to 34 inches; grayish brown (10YR 5/2) silty clay; many coarse prominent red (2.5YR 4/8) mottles; dark gray (10YR 4/1) and very dark gray (10YR 3/1) coatings on faces of peds; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; thick continuous clay films on faces of peds; common vertical channels filled with streaks and pockets of grayish brown silt loam; strongly acid; gradual wavy boundary.

Btg2—34 to 41 inches; gray (10YR 6/1) silty clay; many coarse prominent red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; thick discontinuous clay films on faces of peds; few vertical channels filled with streaks of grayish brown silt loam; strongly acid; gradual wavy boundary.

Btg3—41 to 53 inches; gray (10YR 6/1) clay loam; common medium prominent red (2.5YR 5/8) mottles; common coarse distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; few fine roots; thick discontinuous clay films on faces of peds; medium acid; gradual wavy boundary.

Btg4—53 to 65 inches; gray (10YR 6/1) clay loam; many medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; few fine roots; thin discontinuous clay films on faces of peds; medium acid.

The solum is 40 to 75 inches thick. The effective cation-exchange capacity of this soil has 20 to 50 percent exchangeable aluminum in the control section to a depth of 30 inches or more.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. It is 4 to 11 inches thick. Reaction is very strongly acid to medium acid.

The E horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. It is 5 to 15 inches thick. Reaction is very strongly acid to medium acid.

The Bt horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. Texture is silty clay or silty clay loam and ranges from silty clay or silty clay loam to clay loam in the lower part. Mottles in shades of red and brown range from common to many. The faces of peds are very dark gray or dark gray in the upper part of the Bt horizon. Reaction is very strongly acid to slightly acid.

The Crowley soils in Calcasieu Parish are taxadjuncts to the Crowley series because they have mixed mineralogy. The Crowley series is montmorillonitic. This difference, however, does not affect the use and management of the soils.

Ged Series

The Ged series consists of very poorly drained, very slowly permeable soils in freshwater marshes that are adjacent to the Gulf Coast Prairies. These soils formed in clayey alluvium underlain by soils that formed in sediment of Pleistocene age. Ged soils are flooded most of the time. Elevation ranges from sea level to 2 feet above sea level. Slope is less than 0.5 percent.

Soils of the Ged series are very-fine, mixed, thermic Typic Ochraqualfs.

Ged soils commonly are near Allemands, Gentilly, Judice, Leton, Larose, Midland, Morey, Mowata, and Vidrine soils. Allemands soils are in similar positions on the landscape as Ged soils. These soils have an organic surface layer more than 16 inches thick. Gentilly soils are in similar positions but are more saline throughout. Judice and Morey soils are poorly drained and are in higher positions than Ged soils. These soils have a mollic epipedon. Leton and Mowata soils are poorly drained and are in higher positions. These soils have tongues of albic material extending into the argillic horizon. Larose soils are very poorly drained and are in similar positions as Ged soils. These soils are very fluid throughout. Vidrine soils are somewhat poorly drained. These soils are on low mounds. They have a coarse-silty over clayey control section.

Typical pedon of Ged clay; 3.75 miles south of Toomey; SW1/4SE1/4 sec. 13, T. 11 S., R. 13 W.

A—0 to 5 inches; dark gray (10YR 4/1) clay; massive; very fluid (flows easily between fingers when squeezed leaving small residue in hand); 1.5 *n* value; many fine roots; slightly acid; abrupt wavy boundary.

2A—5 to 9 inches; dark gray (10YR 4/1) clay; massive; sticky (flows with difficulty between fingers when squeezed leaving large residue in hand); 0.5 *n* value; many fine roots; mildly alkaline; clear wavy boundary.

2Btg1—9 to 24 inches; gray (5Y 5/1) clay; many medium distinct olive (5Y 5/4) mottles; moderate medium and coarse subangular blocky structure; plastic and sticky; few thin clay films on faces of peds; mildly alkaline; gradual wavy boundary.

2Btg2—24 to 48 inches; gray (5Y 5/1) clay; many medium distinct olive (5Y 5/4) mottles; weak medium and coarse subangular blocky structure; plastic and sticky; many thick clay films on faces of peds; neutral; gradual wavy boundary.

2Cgy—48 to 60 inches; gray (5Y 6/1) clay; many medium distinct light olive brown (2.5Y 5/4) mottles; massive; plastic and sticky; common medium gypsum crystals; neutral.

The solum is 45 to 80 inches thick. Surface mineral layers with *n* value of more than 0.7 are 4 to 18 inches thick.

The A horizon has hue of 10YR or 5Y, value of 2 to 4, and chroma of 2 or less. It is 4 to 18 inches thick. Reaction is medium acid to mildly alkaline. The *n* value ranges from 0.7 to 2.0.

The 2A horizon has hue of 10YR or 5Y, value of 2 to 4, and chroma of 2 or less. Texture is silty clay, clay, or mucky clay. The *n* value ranges from 0.1 to 0.6. Reaction is medium acid to mildly alkaline.

The 2Btg and 2Cgy horizons have hue of 10YR to 5GY, value of 4 to 6, and chroma of 1 or less. Texture is silty clay or clay. Mottles are olive, olive brown, light olive brown, or yellowish brown. Reaction is slightly acid to moderately alkaline.

Gentilly Series

The Gentilly series consists of very poorly drained, very slowly permeable mineral soils in brackish coastal marshes that are continuously flooded. These soils are moderately saline and very fluid. Gentilly soils formed in clayey and organic sediment. 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 Clovelly soils and Ged soils. These soils are in similar positions on the landscape as Gentilly soils. Clovelly soils are organic. Ged soils have a thinner very fluid surface layer than Gentilly soils, and they are not as saline.

Typical pedon of Gentilly muck; 6.5 miles southeast of Toomey, 800 feet north of the Intracoastal Canal; SW1/4NE1/4 sec. 31, T. 11 S., R. 12 W.

O—6 inches to 0; very dark gray (10YR 3/1) muck; about 25 percent fiber, 5 percent rubbed; massive; about 60 percent mineral; very fluid (flows easily between fingers when squeezed leaving only roots and fiber in hand); many fine and medium roots; neutral; abrupt smooth boundary.

A—0 to 19 inches; black (10YR 2/1) clay; massive; very fluid (flows easily between fingers when squeezed leaving small residue in hand); many fine roots; neutral; clear wavy boundary.

Cg—19 to 31 inches; gray (5Y 6/1) clay loam; massive; very fluid (flows easily between fingers when squeezed leaving small residue in hand); few fine roots; mildly alkaline; clear smooth boundary.

2Cg1—31 to 54 inches; greenish gray (5GY 6/1) silty clay loam; many medium distinct light olive brown (2.5Y 5/6) mottles; massive; firm; mildly alkaline; gradual wavy boundary.

2Cg2—54 to 64 inches; greenish gray (5GY 6/1) clay; many medium distinct light olive brown (2.5Y 5/6) mottles; massive; firm; common medium carbonate concretions; mildly alkaline.

Soil salinity, expressed as electrical conductivity of the saturation extract (millimhos/centimeter), ranges from 3 to 8 in at least one layer within a depth of 40 inches. All layers between 8 and 20 inches below the mineral surface layer have an *n* value of more than 0.7. Depth to underlying layers that have *n* values of less than 0.7 ranges from 20 to 40 inches below the mineral surface layer.

The O horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is 4 to 15 inches thick. Reaction is medium acid to mildly alkaline.

The A horizon has hue of 10YR to 5Y, value of 2 to 4, and chroma of 1. It is mucky clay, silty clay, or clay. Reaction is neutral or mildly alkaline. Some pedons do not have an A horizon.

The Cg and 2Cg horizons have hue of 10YR, 5Y, 5GY, or 5BG, value of 4 to 6, and chroma of 1; or they are neutral. Texture is clay loam, silty clay loam, silty clay, or clay. Reaction is neutral or mildly alkaline.

The Gentilly soils in Calcasieu Parish are taxadjuncts to the Gentilly series because they have a fine particle-size control section. The Gentilly series has a very-fine particle-size control section. This difference, however, does not affect the use and management of the soils.

Glenmora Series

The Glenmora series consists of moderately well drained, slowly permeable soils on ridgetops and side slopes on terrace uplands. These soils formed in loamy alluvium of Pleistocene age. Slopes range from 1 to 3 percent.

Soils of the Glenmora series are fine-silty, siliceous, thermic Glossaquic Paleudalfs.

Glenmora soils commonly are near Caddo, Guyton, Kinder, Malbis, and Messer soils. Caddo, Guyton, and Kinder soils are poorly drained and have a gray subsoil. Caddo soils are on broad flats at high elevations, and Guyton and Kinder soils are in lower positions on the landscape than Glenmora soils. Malbis soils are in higher positions than Glenmora soils. These soils do not have gray mottles within a depth of 30 inches. Messer soils are on mounds. These soils have a coarse-silty control section.

Typical pedon of Glenmora silt loam, 1 to 3 percent slopes; 3 miles southwest of DeQuincy, 0.8 mile west of a gravel road, 70 feet north of a dirt road; SW1/4NW1/4 sec. 26, T. 8 S., R. 11 W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many fine roots; extremely acid; clear smooth boundary.

BA—4 to 10 inches; yellowish brown (10YR 5/4) silt loam; few fine faint yellowish brown and grayish brown mottles; weak coarse subangular blocky structure; friable; few fine roots; few fine discontinuous random tubular pores; strongly acid; gradual wavy boundary.

Bt1—10 to 15 inches; yellowish brown (10YR 5/6) silt loam; common medium distinct grayish brown (10YR 5/2) mottles; common medium faint strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; friable; few fine roots; few fine discontinuous random tubular pores; common discontinuous distinct thin clay films on faces of peds; thin coatings of silt on vertical faces of peds; strongly acid; gradual wavy boundary.

Bt2—15 to 26 inches; light yellowish brown (10YR 6/4) silty clay loam; common medium prominent yellowish red (5YR 5/6) mottles; common medium distinct grayish brown (10YR 5/2) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; firm and slightly brittle; few fine roots; common discontinuous thin clay films on faces of peds; strongly acid; clear wavy boundary.

B/E—26 to 34 inches; yellowish brown (10YR 5/6) silty clay loam; common medium prominent yellowish red (5YR 5/6) mottles; common medium distinct light brownish gray (10YR 6/2) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; 10 percent light brownish gray silt coatings, 5 to 10 millimeters thick, on ped faces (E); few pockets of light brownish gray silt loam about 10 centimeters thick (E); few fine roots; common discontinuous thin clay films on faces of peds; few red (2.5YR 4/8) brittle accumulations about 2 centimeters thick; about 3 percent plinthite; strongly acid; gradual wavy boundary.

Btv—34 to 56 inches; strong brown (7.5YR 5/6) silty clay loam; many coarse distinct light brownish gray (10YR 6/2) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; firm; few light brownish gray (10YR 6/2) silt coatings on faces of peds; few red (2.5YR 4/8) brittle accumulations about 2 centimeters thick; about 3 percent plinthite; strongly acid; gradual wavy boundary.

BCg—56 to 65 inches; light brownish gray (2.5Y 6/2) silty clay loam; many medium distinct yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; firm; strongly acid.

The solum is 60 to 100 inches thick. The effective cation-exchange capacity of this soil has 20 to 50 percent exchangeable aluminum in the control section to a depth of 30 inches or more.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2; or hue of 10YR, value of 5, and chroma of 3. It is 4 to 7 inches thick. Reaction is typically extremely acid.

The BA and Bt horizons have hue of 10YR, value of 5, and chroma of 3 to 6; or hue of 10YR, value of 6, and chroma of 3 or 4; or hue of 7.5YR, value of 5, and chroma of 6. Texture is silt loam or silty clay loam. Mottles in shades of gray, grayish brown, or red range from few to many. Reaction is very strongly acid to medium acid.

The B part of the B/E horizon has hue of 10YR, value of 5, and chroma of 3 to 6; hue of 10YR, value of 6, and chroma of 3 or 4; hue of 7.5YR, value of 5, and chroma of 6; or hue of 10YR, value of 5 or 6, and chroma of 1 or 2. Texture is silty clay loam. The E part is gray or light brownish gray silt loam. It occurs as interfingering around primary peds or as pockets. The E part is about 5 to 15 percent of the horizon. Reaction is very strongly acid to medium acid.

The Btv and BCg horizons have hue of 10YR, value of 5, and chroma of 3 to 6; hue of 10YR, value of 6, and chroma of 3 or 4; hue of 7.5YR, value of 5, and chroma of 6; or hue of 10YR, value of 5 or 6, and chroma of 1 or 2. Texture is silty clay loam. Mottles in shades of red, brown, or gray range from few to many and from fine to coarse. Reaction is very strongly acid to medium acid.

The Glenmora soils in Calcasieu Parish are taxadjuncts to the Glenmora series because they have an A horizon that is extremely acid. The Glenmora series typically has an A horizon that is very strongly acid to medium acid. This difference, however, does not affect the use and management of the soils.

Gore Series

The Gore series consists of moderately well drained, very slowly permeable soils on side slopes on terrace uplands. These soils formed in clayey alluvium of Pleistocene age. Slopes range from 1 to 5 percent.

Soils of the Gore series are fine, mixed, thermic Vertic Paleudalfs.

Gore soils commonly are near Acadia, Basile, and Kinder soils. Acadia soils are somewhat poorly drained and are in lower positions on the landscape than Gore soils. They have a gray subsoil. Basile and Kinder soils are poorly drained and have fine-silty control sections. Basile soils are in narrow stream bottoms. Kinder soils are on broad flats.

Typical pedon of Gore silt loam, 1 to 5 percent slopes; 1 mile southwest of Hecker, 150 feet south of a road; NE1/4SW1/4 sec. 16, T. 8 S., R. 7 W.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; friable; many medium and fine roots; very strongly acid; clear wavy boundary.

E—2 to 5 inches; brown (10YR 5/3) silt loam; weak medium subangular blocky structure; friable; common fine and medium roots; strongly acid; clear wavy boundary.

Bt—5 to 17 inches; yellowish red (5YR 4/6) clay; moderate medium and fine subangular blocky structure; firm; few fine roots; thin discontinuous clay films on faces of peds; very strongly acid; clear wavy boundary.

Btg—17 to 45 inches; light brownish gray (10YR 6/2) clay; many coarse prominent red (2.5YR 4/6) mottles; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; thin discontinuous clay films on some faces of peds; very strongly acid; gradual wavy boundary.

BCg—45 to 60 inches; light brownish gray (10YR 6/2) silty clay; common medium prominent red (2.5YR 4/6) mottles; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; very strongly acid.

The solum is 40 to 60 inches thick. The effective cation-exchange capacity of this soil has 50 percent or more exchangeable aluminum in the control section to a depth of 30 inches or more.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 3. It is 2 to 4 inches thick. Reaction is very strongly acid to medium acid.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 2 or 3. It is about 5 inches thick in some pedons. Texture is silt loam or very fine sandy loam. Reaction is very strongly acid to medium acid. Some pedons do not have an E horizon.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6 in the upper part, and hue of 10YR, value of 5 or 6, and chroma of 1 or 2 in the lower part. Texture is silty clay or clay. Reaction is very strongly acid to neutral. Mottles in shades of red or brown range from few to many.

The BCg horizon to a depth of 60 inches or more has hue of 10YR, value of 6, and chroma of 1 or 2. Texture is silty clay or clay. Reaction is very strongly acid to moderately alkaline.

The Gore soils in Calcasieu Parish are taxadjuncts to the Gore series because they do not have dominant reddish colors in the lower part of the solum. This is outside the defined range for the series, but this difference does not affect the use and management of the soils.

Guyton Series

The Guyton series consists of poorly drained, very slowly permeable soils on flood plains and broad flats and in depressional areas on terrace uplands and low stream terraces. These soils formed in loamy alluvium of Pleistocene age. Slopes are less than 1 percent.

Soils of the Guyton series are fine-silty, siliceous, thermic Typic Glossaqualfs.

Guyton soils commonly are near Arat, Basile, Bienville, Brimstone, Caddo, Cahaba, Glenmora, Kinder, and Messer soils. Arat soils are poorly drained and are in lower positions on the flood plains. Basile soils are poorly drained, and are in slightly lower positions on the landscape than Guyton soils. Basile soils are also more alkaline in the lower part of the subsoil. Bienville soils are excessively drained, are in higher positions, and are sandy throughout. Cahaba soils are well drained, are in higher positions, and have a red subsoil. Brimstone, Caddo, and Kinder soils are poorly drained and are in similar positions as Guyton soils. In addition, Brimstone soils have a natric horizon, and Caddo and Kinder soils have red mottles in the subsoil. Glenmora soils are moderately well drained and are on side slopes. The upper part of the subsoil of Glenmora soils is in shades of brown. Messer soils are moderately well drained, are on mounds, and have a coarse-silty control section.

Typical pedon of Guyton silt loam, frequently flooded; 3 miles south of DeQuincy, 255 feet west of a bridge; SW1/4SE1/4 sec. 36, T. 7 S., R. 11 W.

A—0 to 7 inches; grayish brown (10YR 5/2) silt loam; weak fine granular structure; friable; common medium and fine roots; few coarse roots; dark yellowish brown oxidation stains around root channels; strongly acid; clear smooth boundary.

Eg1—7 to 18 inches; light brownish gray (10YR 6/2) silt loam; many coarse distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine roots; common fine tubular pores; few medium black and brown concretions; very strongly acid; clear wavy boundary.

Eg2—18 to 28 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm and slightly brittle; few fine roots; few fine and medium tubular pores; few fine and medium black and brown concretions; very strongly acid; clear irregular boundary.

B/E—28 to 39 inches; grayish brown (10YR 5/2) silty clay loam (Bt); common medium distinct strong brown (7.5YR 5/8) and yellowish brown (10YR 5/8) mottles; tongues of light brownish gray (10YR 6/2) silt loam (E); weak medium prismatic structure parting to weak medium subangular blocky; firm; few fine roots; common discontinuous clay films on faces of peds; few black and brown concretions; very strongly acid; clear wavy boundary.

Btg—39 to 51 inches; light brownish gray (10YR 6/2) silty clay loam; many medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; few fine tubular pores; common discontinuous clay films on faces of peds; common medium black and brown concretions; strongly acid; clear wavy boundary.

BCg—51 to 62 inches; light brownish gray (2.5Y 6/2) silt loam; common medium distinct brownish yellow (10YR 6/8) mottles; weak coarse subangular blocky structure; few very fine roots; many medium black concretions; strongly acid.

The solum is 50 to 80 inches thick. The effective cation-exchange capacity has 50 percent or more exchangeable aluminum in the control section to a depth of 30 inches or more.

The A horizon has hue of 10YR, value of 4 to 6, and chroma of 2 or 3. It is 2 to 8 inches thick. Texture is silt loam or very fine sandy loam. Reaction is extremely acid to medium acid.

The Eg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. It is 11 to 27 inches thick. Texture is silt loam or very fine sandy loam. Mottles in shades of brown range from few to many. Reaction is extremely acid to medium acid.

The Btg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. Mottles in shades of brown range from few to many. Texture is silt loam, silty clay loam, or clay loam. Reaction is extremely acid to medium acid.

The BCg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. Texture is silt loam, silty clay loam, clay loam, or sandy clay loam. Reaction is extremely acid to medium acid.

Judice Series

The Judice series consists of poorly drained, very slowly permeable soils in broad, slightly concave areas on the Gulf Coast Prairies. These soils formed in clayey alluvium of late Pleistocene age. Slopes are less than 1 percent.

Soils of the Judice series are fine, montmorillonitic, thermic Vertic Haplaquolls.

Judice soils commonly are near Leton, Midland, Morey, and Mowata soils. The associated soils are poorly drained. Leton soils are in similar positions on the landscape as Judice soils and are loamy throughout. Midland soils are also in similar positions as Judice soils. These soils do not have a mollic epipedon. Morey soils are in slightly higher positions and have a fine-silty control section. Mowata soils are in higher positions on the landscape. These soils do not have a mollic epipedon.

Typical pedon of Judice silty clay loam; 6 miles southwest of Holmwood, 400 feet east of Gayle Road, 550 feet south of Helms Road; NW1/4NW1/4 sec. 36, T. 11 S, R. 7 W.

Ap—0 to 5 inches; black (10YR 2/1) silty clay loam; massive; firm; many fine roots; strongly acid; abrupt smooth boundary.

A—5 to 11 inches; black (10YR 2/1) silty clay; weak coarse subangular blocky structure; firm; few strong brown stains along root channels; common fine roots; shiny faces on most peds; strongly acid; clear wavy boundary.

Bg1—11 to 22 inches; dark gray (10YR 4/1) silty clay loam; many medium distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few ped faces of very dark gray to black; common crawfish krotovinas 3 to 5 centimeters in diameter; medium acid; gradual wavy boundary.

Bg2—22 to 36 inches; grayish brown (2.5Y 5/2) silty clay loam; many coarse distinct yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; dark gray (10YR 4/1) primary ped faces; dark gray vertical root channels; few peds coated with light gray silt loam; common crawfish krotovinas 3 to 5 centimeters in diameter; few fine black concretions; common fine white barite crystals; slightly acid; gradual wavy boundary.

BCg—36 to 60 inches; light brownish gray (2.5Y 6/2) silty clay loam; many coarse distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure parting to weak fine subangular blocky; firm; few fine roots; few dark gray or gray ped faces; few slickensides 3 to 15 centimeters long; dark gray vertical root channels; few crawfish krotovinas 3 to 5 centimeters in diameter; common fine white barite crystals; slightly acid.

The solum is 50 to 80 inches thick. The mollic epipedon is 10 to 20 inches thick.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is 10 to 20 inches thick. Reaction is typically strongly acid.

The Bg and BCg horizons have hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. Texture is silty clay loam, clay loam, or silty clay. Mottles in shades of brown or olive range from few to many. Reaction is medium acid in the upper part of the Bg horizon and is medium acid to moderately alkaline in the lower part of the Bg horizon and in the BCg horizon.

The Judice soils in Calcasieu Parish are taxadjuncts to the Judice series because reaction is strongly acid in the A horizon and medium acid in the upper part of the Bg horizon. The Judice series typically has an A horizon that is medium acid to moderately alkaline and a Bg horizon that is slightly acid to moderately alkaline. These differences, however, do not affect the use and management of the soils.

Kinder Series

The Kinder series consists of poorly drained, slowly permeable soils on broad flats on terrace uplands. These soils formed in loamy alluvium of Pleistocene age. Slopes are less than 1 percent.

Soils of the Kinder series are fine-silty, siliceous, thermic Typic Glossaqualfs.

Kinder soils commonly are near Acadia, Basile, Brimstone, Crowley, Glenmora, Guyton, Messer, Mowata, and Vidrine soils. Acadia soils are somewhat poorly drained and are on side slopes. These soils have a fine control section. Glenmora soils are moderately well drained and are on side slopes. These soils have a brown subsoil. Basile and Brimstone soils are poorly drained and are in lower positions on the landscape than Kinder soils. These soils have a more alkaline subsoil. Crowley soils are somewhat poorly drained and are in similar positions as Kinder soils. Crowley soils have a fine control section. Guyton soils are poorly drained and are in lower positions than Kinder soils. These soils do not have red mottles in the subsoil. Messer soils are moderately well drained and are on mounds. These soils have a coarse-silty control section. Vidrine soils are somewhat poorly drained and are on mounds. These soils have a coarse-silty over clayey control section.

Mowata soils are poorly drained and are in lower positions than Kinder soils. They have a fine control section.

Typical pedon of Kinder silt loam, in an area of Kinder-Messer silt loams; 3 miles northwest of Westlake, 45 feet south of Highway 3065; SE1/4NW1/4 sec. 17, T. 9 S., R. 9 W.

A—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; common fine faint dark yellowish brown stains around root channels; weak fine granular structure; friable; many fine roots; medium acid; abrupt smooth boundary.

Eg—6 to 17 inches; light brownish gray (10YR 6/2) loam; many medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine roots; many fine tubular pores; few fine black and brown concretions; very strongly acid; abrupt irregular boundary.

B/E—17 to 22 inches; light brownish gray (10YR 6/2) clay loam (Bt); common medium prominent red (2.5YR 4/8) mottles; common medium distinct yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few fine pores; few medium brown and black concretions; thick discontinuous clay films on faces of peds; tongues of light brownish gray (10YR 6/2) silt loam 5 centimeters wide (E); strongly acid; clear irregular boundary.

Btg1—22 to 36 inches; light brownish gray (10YR 6/2) clay loam; common medium prominent red (2.5YR 4/8) mottles; common medium distinct yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few fine pores; few medium brown and black concretions; thick discontinuous clay films on faces of peds; strongly acid; gradual wavy boundary.

Btg2—36 to 60 inches; light brownish gray (10YR 6/2) loam; common medium prominent strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; firm; few fine roots; few fine pores; few fine black concretions; thin patchy clay films on faces of peds; strongly acid; gradual wavy boundary.

BCg—60 to 70 inches; mottled light brownish gray (2.5Y 6/2) very fine sandy loam and yellowish red (5YR 5/6) loam; weak coarse subangular blocky structure; firm; few soft accumulations of calcium carbonate; medium acid.

The solum is 50 to 75 inches thick. The effective cation-exchange capacity of this soil has 50 percent or more exchangeable aluminum in the control section to a depth of 30 inches or more.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. It is 3 to 8 inches thick. Reaction is very strongly acid to medium acid.

The E horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. It is 5 to 15 inches thick. Texture is silt loam, loam, or very fine sandy loam. Reaction is very strongly acid to medium acid.

The Btg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. Texture is silt loam, loam, clay loam, or silty clay loam. Mottles in shades of red are common or many. Mottles in shades of brown range from few to many. Reaction is 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. Texture is silt loam, loam, or silty clay loam. Reaction is very strongly acid to moderately alkaline.

Larose Series

The Larose series consists of very poorly drained, very slowly permeable, very fluid mineral soils in freshwater marshes that are ponded and flooded most of the time. These soils formed in clayey alluvium. 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, Barbary, Ged, and Gentilly soils. Allemands soils are in similar positions on the landscape as Larose soils. They have an organic surface layer that is more than 16 inches thick. Barbary soils are in nearby swamps and have stumps and logs within their profiles. Ged soils are in similar positions as Larose soils. These soils have a firm mineral layer within 18 inches of the mineral surface layer. Gentilly soils are in nearby brackish marshes and are moderately saline.

Typical pedon of Larose mucky clay; 4.75 miles southwest of Toomey, 300 feet north of a ditch; NW1/4SW1/4 sec. 16., T. 11 S., R. 13 W.

A—0 to 5 inches; dark gray (5Y 4/1) mucky clay; massive; very fluid (flows easily between fingers when squeezed leaving only roots in hand); many fine and medium roots; slightly acid; clear wavy boundary.

Oa—5 to 12 inches; very dark gray (10YR 3/1) muck; about 10 percent fiber, 2 percent rubbed; massive; about 60 percent mineral; very fluid (flows easily between fingers when squeezed leaving only roots and fiber in hand); neutral; clear smooth boundary.

A'—12 to 42 inches; black (10YR 2/1) mucky clay; massive; very fluid (flows easily between fingers when squeezed leaving hand empty); mildly alkaline; gradual wavy boundary.

Cg—42 to 80 inches; very dark gray (10YR 3/1) clay; massive; very fluid (flows easily between fingers when squeezed leaving hand empty); mildly alkaline.

All mineral horizons to a depth of 60 inches have an *n* value of 1 or more. Reaction ranges from medium acid to mildly alkaline in the O and A horizons and from slightly acid to moderately alkaline in the Cg horizon.

The A horizon has hue of 10YR, 2.5Y, or 5Y, value of 2 to 4, and chroma of 1 or 2; or it is neutral. It is 4 to 12 inches thick.

The Oa horizon has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 or 2. It is 4 to 12 inches thick. The Oa horizon is the first surface layer in some pedons.

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. Texture is clay, silty clay, or mucky clay. A thin organic layer is in the mineral layers in most pedons.

Leton Series

The Leton series consists of poorly drained, slowly permeable soils on low, broad flats and along drainageways on the Gulf Coast Prairies. These soils formed in loamy alluvium of late Pleistocene age. Slopes are 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 soils are somewhat poorly drained and are on convex ridges. These soils have a fine control section. Judice and Midland soils are poorly drained and are in similar positions on the landscape as Leton soils. These soils have a fine control section. Morey and Mowata soils are poorly drained and are in higher positions than Leton soils. In addition, Morey soils have a mollic epipedon, and Mowata soils have a fine control section. Vidrine soils are somewhat poorly drained and are on low mounds. These soils have a coarse-silty over clayey control section.

Typical pedon of Leton silt loam; 5 miles west of Holmwood, 0.5 mile south of a road intersection, 396 feet east of a gravel road; SW1/4NW1/4 sec. 11, T. 11 S., R. 8 W.

Ap1—0 to 5 inches; grayish brown (10YR 5/2) silt loam; weak fine granular structure; friable; many fine roots; common pockets and lenses of uncoated grains of very fine sand; strongly acid; abrupt smooth boundary.

Ap2—5 to 7 inches; grayish brown (10YR 5/2) loam; strong brown oxidation stains along root channels; massive; firm; few fine roots; common lenses of uncoated grains of very fine sand; strongly acid; abrupt smooth boundary.

Eg1—7 to 20 inches; gray (10YR 5/1) loam; strong brown oxidation stains along root channels; weak medium subangular blocky structure; friable; few spots of uncoated very fine sand; few fine roots; few fine tubular pores; very strongly acid; gradual wavy boundary.

Eg2—20 to 26 inches; gray (10YR 5/1) loam; few fine prominent yellowish brown (10YR 5/6) mottles; strong brown 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; very strongly acid; gradual wavy boundary.

E/B—26 to 34 inches; light brownish gray (10YR 6/2) loam (E); gray (10YR 5/1) loam (Bt); common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; friable; thick discontinuous clay films on faces of peds and along root channels; few small spots of uncoated very fine sand; very strongly acid; gradual wavy boundary.

B/E—34 to 42 inches; gray (10YR 5/1) loam (Bt); light brownish gray (10YR 6/2) loam (E); common medium distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium and fine subangular blocky; friable; thick discontinuous clay films on faces of peds and along root channels; few small spots of uncoated very fine sand; few fine barite crystals; very strongly acid; clear wavy boundary.

Btg—42 to 62 inches; gray (5Y 5/1) loam; many medium distinct strong brown (7.5YR 5/6) mottles; common medium distinct yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure parting to weak medium and fine subangular blocky; firm; thick discontinuous gray (10YR 5/1) clay films on faces of peds; few medium black concretions; few fine barite crystals; strongly acid.

The solum is 50 to 60 inches or more thick. The content of sand in the control section ranges from 15 to 42 percent, and the content of fine sand or coarser sand is less than 15 percent.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. It is 3 to 7 inches thick. Reaction is strongly acid to slightly acid.

The E horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. Texture is silt loam, loam, or very fine sandy loam. Reaction typically is very strongly acid. Tongues of the E horizon extend into the Bt horizon.

The Btg horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. It is mottled with shades of brown. Surfaces of peds are dark gray or gray. Texture is silt loam, loam, silty clay loam, or clay loam. Reaction is typically very strongly acid.

The Leton soils in Calcasieu Parish are taxadjuncts to the Leton series because they have E and B/E horizons that are very strongly acid and a Btg horizon that is strongly acid. The Leton series has E and B/E horizons that are strongly acid to neutral and a Btg horizon that is medium acid to moderately alkaline. This difference, however, does not affect the use and management of the soils.

Malbis Series

The Malbis series consists of moderately well drained, moderately slowly permeable soils on ridgetops and side slopes on terrace uplands. These soils formed in loamy sediments of Pleistocene age. Slopes range from 1 to 3 percent.

Soils of the Malbis series are fine-loamy, siliceous, thermic Plinthic Paleudults.

Malbis soils commonly are near Caddo, Glenmora, and Guyton soils. Caddo and Guyton soils are poorly drained and are in lower positions on the landscape than Malbis soils. These soils have a gray subsoil. Glenmora soils are moderately well drained and are on side slopes. These soils have gray mottles within 30 inches of the surface.

Typical pedon of Malbis fine sandy loam, 1 to 3 percent slopes; 1 mile southeast of DeQuincy, 0.2 mile east of a cemetery, 125 feet south of a gravel road; NE1/4NW1/4 sec. 29, T. 7 S., R. 10 W.

A—0 to 5 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; many fine and common medium roots; few fine black and brown concretions; extremely acid; abrupt smooth boundary.

E—5 to 9 inches; yellowish brown (10YR 5/4) fine sandy loam; common vertical streaks of dark grayish brown (10YR 4/2); weak fine granular structure; very friable; common fine roots; very strongly acid; clear smooth boundary.

Bt1—9 to 26 inches; yellowish brown (10YR 5/8) clay loam; weak medium subangular blocky structure; friable; common fine and very fine roots; few fine nodules of plinthite; thin patchy clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt2—26 to 35 inches; yellowish brown (10YR 5/8) clay loam; few medium faint light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; common fine and very fine roots; few fine nodules of plinthite; thin patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btv—35 to 65 inches; yellowish brown (10YR 5/8) clay loam; common medium distinct strong brown (7.5YR 5/8) mottles; weak coarse subangular blocky structure; firm; major ped faces coated with light gray very fine sand; few fine roots; thin patchy clay films on faces of peds; 7 to 10 percent nodules of plinthite; very strongly acid.

The solum ranges from 60 to 100 inches thick. The effective cation-exchange capacity of this soil has 50 percent or more exchangeable aluminum in the control section to a depth of 30 inches or more.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. It is 4 to 8 inches thick. Reaction is typically extremely acid.

The E horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 6. It is 2 to 6 inches thick. Reaction is typically very strongly acid.

The Bt horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 to 8. Texture is loam, clay loam, or sandy clay loam. Mottles are in shades of red or brown, and gray mottles commonly are below 30 inches. Reaction is very strongly acid or strongly acid.

The Btv horizon has hue of 10YR, value of 5, and chroma of 4 to 8. Texture is loam, clay loam, or sandy clay loam. Mottles in shades of brown and gray range from none to many. Reaction is very strongly acid or strongly acid. This horizon has about 5 to 20 percent plinthite.

The Malbis soils in Calcasieu Parish are taxadjuncts to the Malbis series because they have an A horizon that is extremely acid and an E horizon that is very strongly acid. The Malbis series has A and E horizons that are medium acid or strongly acid. This difference, however, does not affect the use and management of the soils.

Messer Series

The Messer series consists of moderately well drained, slowly permeable soils on low mounds on broad flats and on narrow ridges and side slopes on terrace uplands. These soils formed in loamy alluvium of Pleistocene age. Slopes range from 1 to 8 percent.

Soils of the Messer series are coarse-silty, siliceous, thermic Haplic Glossudalfs.

Messer soils commonly are near Acadia, Caddo, Glenmora, Guyton, and Kinder soils. Acadia soils are somewhat poorly drained and are on nearby side slopes. These soils have a fine control section. Caddo, Guyton, and Kinder soils are poorly drained and are in lower positions on the landscape than Messer soils. These soils have a fine-silty control section. Glenmora soils are moderately well drained and are on side slopes. These soils have a fine-silty control section.

Typical pedon of Messer silt loam, in an area of Caddo-Messer silt loams; 8 miles southwest of DeQuincy, 1 mile south of Bennett Road, 50 feet south of a dirt road; NW1/4NE1/4 sec. 20, T. 10 S., R. 12 W.

A—0 to 3 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; very friable; many fine and very fine roots; common coarse roots; common fine black concretions; extremely acid; clear smooth boundary.

E—3 to 6 inches; pale brown (10YR 6/3) silt loam; weak fine granular structure; very friable; many fine and very fine roots; common medium roots; few very fine discontinuous random tubular pores; common fine black concretions; very strongly acid; clear smooth boundary.

Bw—6 to 31 inches; light yellowish brown (10YR 6/4) silt loam; common coarse pale brown (10YR 6/3) vertical streaks; weak coarse subangular blocky structure; friable; few medium and very fine roots; many very fine discontinuous random tubular pores; many fine and medium black and brown concretions; very strongly acid; clear irregular boundary.

B/E—31 to 37 inches; yellowish brown (10YR 5/6) silty clay loam (Bt); few medium distinct strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure parting to weak coarse blocky; firm and slightly brittle; few very fine roots between peds; common very fine discontinuous random tubular pores; thin patchy clay films on faces of peds; about 20 percent tongues and ped coatings of pale brown (10YR 6/3) silt loam (E); very strongly acid; gradual wavy boundary.

Bt—37 to 62 inches; yellowish brown (10YR 5/6) silty clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; common medium prominent red (2.5YR 4/6) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; firm and slightly brittle; few fine roots; many very fine discontinuous random tubular pores; common patchy faint thin clay films; few ped coatings of pale brown (10YR 6/3) silt loam; less than 5 percent plinthite; common medium brown and black concretions; very strongly acid.

The solum is 60 to 100 inches thick. Reaction is typically extremely acid in the A horizon and ranges from very strongly acid to medium acid in the rest of the solum. The effective cation-exchange capacity of this soil has 50 percent or more exchangeable aluminum in the control section to a depth of 30 inches or more.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. It is 2 to 7 inches thick.

The E horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. It is 3 or 4 inches thick. Texture is silt loam or very fine sandy loam.

The Bw horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 to 6. Texture is silt loam, loam, or very fine sandy loam.

The Bt horizon and the Bt part of the B/E horizon have hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 to 6. Texture is loam, silty clay loam, or clay loam. Mottles are in shades of red, yellow, or gray. Grayish silt tongues and ped coatings (E) make up about 15 to 50 percent of the B/E horizon. Some pedons have a BC horizon. Texture is loam, silt loam, silty clay loam, or clay loam. Mottles are in shades of gray, brown, or olive.

The Messer soils in Calcasieu Parish are taxadjuncts to the Messer series because they have an A horizon that is extremely acid. The Messer series has an A horizon that is very strongly acid to medium acid. This difference, however, does not affect the use and management of the soils.

Midland Series

The Midland series consists of poorly drained, very slowly permeable soils in slightly concave areas on the Gulf Coast Prairies. These soils formed in clayey alluvium of late Pleistocene age. Slopes are less than 1 percent.

Soils of the Midland series are fine, montmorillonitic, thermic Typic Ochraqualfs.

Midland soils commonly are near Crowley, Judice, Leton, Morey, and Mowata soils. Crowley soils are somewhat poorly drained and are on the higher convex ridges. These soils have an abrupt textural change between the surface and the subsoil. Judice and Leton soils are poorly drained and are in similar positions on the landscape as Midland soils. In addition, Judice soils have a mollic epipedon, and Leton soils have a fine-silty control section. Morey and Mowata soils are poorly drained and are in higher positions than Midland soils. In addition, Morey soils have a fine-silty control section and have a mollic epipedon, and Mowata soils have an albic horizon that has tongues extending into the argillic horizon.

Typical pedon of Midland silty clay loam; 5 miles southeast of Holmwood, 450 feet north of a gravel road; SE1/4NW1/4 sec. 25, T. 11 S., R. 7 W.

Ap—0 to 5 inches; dark gray (10YR 4/1) silty clay loam; massive; firm; few fine roots; medium acid; abrupt smooth boundary.

A—5 to 10 inches; dark gray (10YR 4/1) silty clay loam; common reddish brown oxidation stains along root channels and on faces of peds; weak medium subangular blocky structure; firm; few fine roots; neutral; clear wavy boundary.

Btg1—10 to 25 inches; dark gray (10YR 4/1) silty clay; common medium distinct olive yellow (2.5Y 6/6) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm; dark gray shiny ped faces; thick continuous clay films on faces of peds; few fine roots; mildly alkaline; clear wavy boundary.

Btg2—25 to 54 inches; gray (5Y 5/1) silty clay; many medium distinct olive yellow (2.5Y 6/6) mottles; moderate medium subangular blocky structure parting to moderate medium subangular blocky; firm; thick discontinuous clay films; few medium soft accumulations of carbonates; mildly alkaline; gradual wavy boundary.

BCg—54 to 60 inches; gray (5Y 6/1) silty clay loam; many coarse distinct brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; firm many medium soft accumulations of carbonates; moderately alkaline.

The solum is 40 to 80 inches thick.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. It is 5 to 18 inches thick. Reaction is strongly acid to neutral.

The Btg and BCg horizons have hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1; or hue of 10YR, 2.5Y, or 5Y, value of 6, and chroma of 2. Mottles are in shades of brown, yellow, or olive. Texture is clay, silty clay, or silty clay loam. Reaction is medium acid to moderately alkaline.

Morey Series

The Morey series consists of poorly drained, slowly permeable soils on broad flats on the Gulf Coast Prairies. These soils formed in loamy alluvium of late Pleistocene age. Slopes are less than 1 percent.

Soils of the Morey series are fine-silty, mixed, thermic Typic Argiaquolls.

Morey soils commonly are near Crowley, Judice, Leton, Midland, Mowata, and Vidrine soils. Crowley soils are somewhat poorly drained and are on convex ridges. These soils have a fine control section. Judice and Midland soils are poorly drained and are in lower positions on the landscape than Morey soils. These soils have a fine control section. Leton soils are poorly drained and are in lower positions than Morey soils. These soils do not have a mollic epipedon. Mowata soils are poorly drained and are in similar positions as Morey soils. Mowata soils do not have a mollic epipedon and they have a fine control section. Vidrine soils are somewhat poorly drained and are on mounds. These soils do not have a mollic epipedon.

Typical pedon of Morey loam; 6 miles south of Vinton, 150 feet east of a road, 51 feet north of a fence; SW1/4SW1/4 sec. 5, T. 11 S., R. 11 W.

Ap—0 to 9 inches; very dark gray (10YR 3/1) loam; common medium distinct dark yellowish brown (10YR 3/4) mottles; weak medium and fine granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

A—9 to 11 inches; very dark gray (10YR 3/1) loam; few fine distinct dark yellowish brown (10YR 3/4) mottles; massive; firm; few fine roots; few thick patches of very fine sand; slightly acid; abrupt irregular boundary.

BA—11 to 18 inches; very dark gray (10YR 3/1) loam; few fine distinct dark yellowish brown (10YR 3/4) mottles; weak medium and coarse subangular blocky structure; firm; thick discontinuous clay films on faces of peds; common fine roots; few thin streaks of very fine sand; medium acid; gradual wavy boundary.

Btg1—18 to 28 inches; dark gray (10YR 4/1) clay loam; few fine distinct dark yellowish brown (10YR 3/4) mottles; moderate medium subangular blocky structure; firm; thick continuous clay films on faces of peds; common fine roots; strongly acid; gradual wavy boundary.

Btg2—28 to 39 inches; dark gray (10YR 4/1) clay loam; common medium distinct dark brown (10YR 4/3) mottles; moderate coarse prismatic structure parting to weak medium subangular blocky; firm; thick discontinuous clay films on faces of peds; common fine roots; medium acid; gradual wavy boundary.

Btg3—39 to 52 inches; gray (5Y 5/1) clay loam; common medium distinct light olive brown (2.5Y 5/4) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; thick discontinuous clay films on faces of peds; a few very dark gray clay flows between prisms and in channels; medium acid; gradual wavy boundary.

Btg4—52 to 60 inches; gray (5Y 6/1) clay loam; many medium distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm; thin discontinuous dark gray clay films on faces of prisms; few fine roots; few channels filled with dark gray material; few fine black and brown concretions; few thin patches of white crystals; medium acid.

The solum is 60 to more than 80 inches thick. The mollic epipedon is 10 to 20 inches thick.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is 6 to 15 inches thick. Reaction is strongly acid to neutral.

The BA horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. Texture is silt loam, loam, or silty clay loam. Reaction is strongly acid to neutral.

The upper part of the Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1. Texture is silty clay loam or clay loam. Mottles in shades of brown or olive range from few to many. Reaction is typically strongly acid.

The lower part of the Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 or 2. Texture is silty clay loam, silty clay, or clay loam. Mottles in shades of brown or olive range from few to many. Some pedons have calcium carbonate concretions below a depth of 40 inches. Reaction is medium acid to moderately alkaline.

The Morey soils in Calcasieu Parish are taxadjuncts to the Morey series because they have a Btg horizon that is strongly acid. The Morey series has a Btg horizon that is medium acid to moderately alkaline. This difference, however, does not affect the use and management of the soils.

Mowata Series

The Mowata series consists of poorly drained, very slowly permeable soils on broad flats and along drainageways on the Gulf Coast Prairies. These soils formed in clayey alluvium of Pleistocene age. Slopes are less than 1 percent.

Soils of the Mowata series are fine, montmorillonitic, thermic Typic Glossaqualfs.

Mowata soils commonly are near Crowley, Judice, Leton, Midland, Morey, and Vidrine soils. Crowley soils are on the higher convex ridges and have an abrupt textural change from the E horizon to the Btg horizon. Judice and Leton soils are in lower positions on the landscape than Mowata soils. In addition, Judice soils have a mollic epipedon, and Leton soils have a fine-silty control section. Midland soils are in slightly lower positions than Mowata soils. These soils do not have a subsurface layer that has tongues extending into the subsoil. Morey soils are in similar positions as Mowata soils. These soils have a mollic epipedon. Vidrine soils are on mounds. These soils have a coarse-silty over clayey control section.

Typical pedon of Mowata silt loam, in an area of Mowata-Vidrine silt loams; 3 miles west of Iowa, 0.2 miles south of U.S. Highway 190, 105 feet south of a dirt road; NW1/4NW1/4 sec. 34, T. 9 S., R. 7 W.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; common fine roots; strong brown oxidation stains along root channels; very strongly acid; abrupt smooth boundary.

Eg—6 to 21 inches; gray (10YR 5/1) silt loam; few fine faint light brownish gray mottles; weak medium subangular blocky structure; friable; few fine roots; few fine discontinuous tubular pores; strong brown oxidation stains along root channels and some ped faces; strongly acid; abrupt irregular boundary.

B/E—21 to 34 inches; gray (10YR 5/1) silty clay; many coarse distinct strong brown (7.5YR 5/8) mottles; few fine faint light brownish gray mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; thick continuous dark gray clay films on faces of peds; about 20 percent tongues of gray (10YR 6/1) silt loam (E) to a depth of 32 inches; few fine dark concretions; strongly acid; clear wavy boundary.

Btg1—34 to 45 inches; gray (10YR 6/1) silty clay; many coarse distinct strong brown (7.5YR 5/8) mottles; moderate coarse and medium subangular blocky structure; firm; few fine roots; thick discontinuous clay films on faces of peds; few slickensides 5 to 15 centimeters long in lower part; few fine and medium dark concretions; strongly acid; gradual wavy boundary.

Btg2—45 to 60 inches; light brownish gray (2.5Y 6/2) silty clay loam; many medium distinct yellowish brown (10YR 5/8) mottles; few medium faint gray (10YR 5/1) mottles; weak medium subangular blocky structure; firm; thin patchy clay films on faces of peds; common medium and coarse dark concretions; few fine barite crystals; slightly acid.

The solum is 40 to 60 inches thick.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. It is 4 to 8 inches thick. If moist values are less than 3.5, the A horizon is less than 6 inches thick. Reaction is very strongly acid or strongly acid.

The Eg horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. It is 9 to 15 inches thick. Reaction is very strongly acid or strongly acid.

The Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 or 2. Surfaces of peds are dark gray or gray. Texture is silty clay, silty clay loam, or clay loam. Mottles are in shades of brown or yellow. Reaction is strongly acid to moderately alkaline. Tongues of silt loam extend deep into the Btg horizon and are 0.5 inch to 8 inches wide.

The Mowata soils in Calcasieu Parish are taxadjuncts to the Mowata series because they have A and Eg horizons that are very strongly acid or strongly acid. The Mowata series has A and E horizons that are medium acid to neutral. This difference, however, does not affect the use and management of the soils.

Una Series

The Una series consists of poorly drained, very slowly permeable soils on flood plains. These soils formed in loamy alluvium. Slopes are less than 1 percent.

Soils of the Una series are fine, mixed, acid, thermic Typic Haplaquepts.

Una soils commonly are near Barbary and Guyton soils. Barbary soils are very poorly drained and are in lower positions on the landscape than Una soils. These soils are very fluid. Guyton soils are poorly drained and are in slightly higher positions than Una soils. These soils have a fine-silty control section.

Typical pedon of Una silty clay loam, frequently flooded; 4 miles west of Starks on Louisiana State Highway 12, 0.7 mile east of Sabine River bridge, 250 feet south of Louisiana State Highway 12, 65 feet north of a borrow pit; NE1/4SW1/4 sec. 6, T. 9 S., R. 13 W.

A—0 to 5 inches; dark grayish brown (10YR 4/2) silty clay loam; weak medium granular structure; firm; many medium and coarse roots; very strongly acid; clear smooth boundary.

Bg1—5 to 17 inches; light brownish gray (10YR 6/2) clay loam; many medium distinct yellowish brown (10YR 5/4) mottles; weak coarse angular blocky structure; firm; common fine roots; thin patchy clay films on vertical faces of peds; very strongly acid; gradual wavy boundary.

Bg2—17 to 31 inches; light brownish gray (10YR 6/2) clay loam; many medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; firm; few fine roots; thin patchy clay films on faces of peds; few fine black accumulations; very strongly acid; gradual wavy boundary.

Bg3—31 to 45 inches; gray (10YR 6/1) silty clay loam; many medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; firm; few fine roots; thin patchy clay films on faces of peds; few fine black accumulations; very strongly acid; gradual wavy boundary.

Bg4—45 to 65 inches; gray (10YR 6/1) clay loam; many medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; firm; few fine roots; thin patchy clay films on faces of peds; very strongly acid.

The solum is more than 60 inches thick. Reaction is very strongly acid or strongly acid throughout. The effective cation-exchange capacity has 20 to 50 percent exchangeable aluminum in the control section to a depth of 30 inches or more.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. It is 4 to 6 inches thick.

The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 5, and chroma of 1; or hue of 10YR, 2.5Y, or 5Y, value of 6, and chroma of 1 or 2. Texture is silty clay loam or clay loam. Mottles are in shades of brown or yellow.

The Una soils in Calcasieu Parish are taxadjuncts to the Una series because they have a fine-silty particle-size control section. The Una series has a fine particle-size control section. This difference, however, does not affect the use and management of the soils.

Urbo Series

The Urbo series consists of somewhat poorly drained, very slowly permeable soils on flood plains. These soils formed in clayey alluvium. Slopes are less than 1 percent.

Soils of the Urbo series are fine, mixed, acid, thermic Aeric Haplaquepts.

Urbo soils commonly are near Acadia, Guyton, Kinder, and Messer soils. Acadia soils are somewhat poorly drained and are on side slopes. These soils have an argillic horizon. Guyton soils are poorly drained and are in similar positions on the landscape as Urbo soils. Guyton soils have a fine-silty control section. Kinder soils are poorly drained and are in higher positions than Urbo soils. Kinder soils have a fine-silty control section. Messer soils are moderately well drained. These soils are on mounds. They have a coarse-silty control section.

Typical pedon of Urbo silty clay loam, occasionally flooded; 4 miles south of Starks, 300 feet southwest of a road; NW1/4SE1/4 sec. 23, T. 9 S., R. 13 W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) silty clay loam; common dark brown oxidation stains along root channels; weak medium subangular blocky structure; friable; many medium and fine roots; very strongly acid; clear wavy boundary.

Bg1—4 to 21 inches; grayish brown (10YR 5/2) silty clay; many coarse distinct dark yellowish brown (10YR 4/6) mottles; moderate medium subangular blocky structure; firm; common medium and fine roots; very strongly acid; gradual wavy boundary.

Bg2—21 to 48 inches; light brownish gray (10YR 6/2) silty clay; many coarse distinct dark yellowish brown (10YR 4/6) mottles; weak medium subangular blocky structure; firm; few fine roots; few non-intersecting slickensides; very strongly acid; gradual wavy boundary.

Bg3—48 to 60 inches; gray (10YR 6/1) silty clay; many medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; few slickensides; very strongly acid.

The solum is more than 60 inches thick. Reaction is very strongly acid or strongly acid throughout. The effective cation-exchange capacity of the soil has 20 to 50 percent exchangeable aluminum in the control section to a depth of 30 inches or more.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2. It is 4 to 8 inches thick.

The Bg1 horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2. Texture is silty clay loam, clay loam, silty clay, or clay. Mottles in shades of brown range from few to many. The Bg2 and Bg3 horizons have hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. Texture is silty clay loam, clay loam, silty clay, or clay. Mottles in shades of brown range from few to many.

Vidrine Series

The Vidrine series consists of somewhat poorly drained, slowly permeable soils on low mounds on broad flats and on side slopes on the Gulf Coast Prairies. These soils formed in clayey alluvium of late Pleistocene age. Slopes range from 0 to 3 percent.

Soils of the Vidrine series are coarse-silty over clayey, mixed, thermic Glossaquic Hapludalfs.

Vidrine soils commonly are near Crowley, Kinder, Leton, Morey, and Mowata soils. The associated soils are in the intermound areas. Crowley soils are somewhat poorly drained and have a fine control section. Mowata soils are poorly drained and also have a fine control section. Kinder, Leton, and Morey soils are poorly drained. These soils have a fine-silty control section.

Typical pedon of Vidrine silt loam, in an area of Crowley-Vidrine silt loams; 2.5 miles northeast of Holmwood, 140 feet north of Louisiana State Highway 14; SE1/4SW1/4 sec. 20, T. 10 S., R. 7 W.

Ap1—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; common fine roots; strongly acid; abrupt smooth boundary.

Ap2—4 to 8 inches; dark grayish brown (10YR 4/2) silt loam; few streaks of yellowish brown silt loam; massive; firm; few fine roots; strongly acid; abrupt wavy boundary.

BA—8 to 20 inches; yellowish brown (10YR 5/4) silt loam; few medium faint yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; common medium tubular pores; common medium black and brown accumulations; strongly acid; clear irregular boundary.

B/E—20 to 23 inches; brown (10YR 5/3) silty clay loam (Bt); many coarse prominent red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; firm; pale brown (10YR 6/3) silt coatings about 1 to 5 millimeters thick on faces of peds (E); medium acid; clear wavy boundary.

Btg1—23 to 39 inches; grayish brown (10YR 5/2) silty clay; many coarse prominent red (2.5YR 4/8) mottles; few medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure parting to moderate fine subangular blocky; firm; thick continuous clay films on faces of peds; medium acid; gradual wavy boundary.

Btg2—39 to 51 inches; light brownish gray (10YR 6/2) silty clay; many coarse prominent red (2.5YR 4/8) and common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; thick discontinuous clay films on faces of peds; slightly acid; gradual wavy boundary.

Btg3—51 to 60 inches; light brownish gray (10YR 6/2) silty clay loam; common medium prominent red (2.5YR 4/8) mottles; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; slightly acid; gradual wavy boundary.

The solum is 48 to 80 inches thick. Combined thickness of the A and BA horizons ranges from 14 to 22 inches if mounds are smoothed and ranges from 20 to 36 inches in the natural state. The effective cation-exchange capacity has 50 percent or more exchangeable aluminum in the control section to a depth of 30 inches or more.

The Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. It is 5 to 12 inches thick. An Ap horizon that has a value of 3 is less than 6 inches thick. Reaction is very strongly acid to medium acid.

The BA horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. Texture is silt loam or very fine sandy loam. Reaction is very strongly acid to medium acid.

The Btg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. Texture is silty clay loam or silty clay. Mottles in shades of red or brown range from few to many. Reaction is very strongly acid to medium acid in the upper part of the Btg horizon, and medium acid to moderately alkaline in the lower part. In some pedons, carbonate concretions are in the lower part of the Btg horizon.

Some pedons have a BCg horizon. It has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 to 6. Texture is silty clay loam, silty clay, or silt loam. Reaction is slightly acid to moderately alkaline.

Formation of the Soils

This section explains the processes and factors of soil formation and relates them to the soils in the survey area.

Processes of Soil Formation

The processes of soil formation influence the kind and degree of development of soil horizons. 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 materials from one point to another within the soil; and physical and chemical transformation of mineral and organic material within the soil *(29)*.

Many processes occur simultaneously, for example, 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 some soils are flooded or saturated with water. Some processes that have contributed to the formation of the soils in Calcasieu Parish are discussed in the following paragraphs.

Organic matter has accumulated, has partly decomposed, and has been incorporated in all the soils. The organic accumulations range from the humus in mineral horizons of Acadia and Guyton soils to the muck in organic horizons of Clovelly soils. Because most of the organic matter is produced in and above the surface layer, the surface layer is higher in organic matter content than the deeper horizons. Living organisms decompose, incorporate, and mix organic residue into the soil. Some of the more stable products of decomposition remain as finely divided materials that contribute to darker colors, increased water-holding and cation-exchange capacities, and 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 and large amounts are produced. This organic matter decomposes slowly and remains in the soil for long periods of time.

The addition of alluvium on the surface has helped to form some of the soils. Added material provides new parent material for soil formation. Consequently, soils developed under these conditions can lack prominent horizons. For example, Una soils formed in areas characterized by accumulations of loamy deposits of local streams. Una soils have essentially uniform textures throughout and have a B horizon that is neither prominent nor strongly developed.

Processes resulting in development of soil structure have occurred in most of the soils. Plant roots and other organisms contribute to the rearrangement of soil material into secondary aggregates. The decomposition products of organic residue and the secretions of organisms serve as cementing agents that help stabilize structural aggregates. Alternate wetting and drying as well as shrinking and swelling contribute to the development of structural aggregates and are particularly effective in soils that have appreciable amounts of clay. Consequently, soil structure is typically most pronounced in the surface horizon which contains the most organic matter, and clayey horizons that alternately undergo wetting and drying. However, the saturated state of the marsh and swamp soils has buffered the soil structure-forming processes. As a result these soils have massive structure.

Most of the soils in the parish have 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 horizon and Cg horizon that are characteristic of many of the soils. In the more soluble reduced form, appreciable amounts of iron and manganese can be removed from the soils or translocated within the soil by water.

The presence of iron and manganese concretions and of brown mottles in predominantly gray horizons indicates segregation and local concentration of oxidized and reducing conditions in the soil. The well drained and somewhat excessively drained soils do not have the gray color associated with wetness and poor aeration. Apparently they are not dominated by a reducing environment for significant periods.

Loss of elements from the soils also has been a process in their formation. Water moving through the soil has leached soluble bases and any free carbonates that may have been present initially from some horizon of most of the soils in the parish. Most of the mineral soils are less acid with depth below horizons at or near the surface. The most extensive leaching typically occurs in loamy, well drained soils such as Cahaba soils.

The formation, translocation, and accumulation of clay have also been processes that have helped to develop most of the soils in Calcasieu Parish. Silicon and aluminum, released as a result of weathering of such minerals as hornblende, amphiboles, and feldspars, can recombine with the components of water to form secondary clay minerals such as kaolinite. Secondary accumulations of clay result largely from translocation of clays from upper to lower horizons. As water moves downward it can carry small amounts of clay in suspension. This clay is redeposited, and it accumulates at the deepest position of water penetration or in horizons where the clay becomes flocculated or is filtered out by fine pores in the soil. Over long periods, such processes can result in distinct horizons of clay accumulation. All the soils on terrace uplands of Calcasieu Parish have a subsoil characterized by a secondary accumulation of clay.

Secondary accumulation of calcium carbonate in the lower soil horizons is also a process that has helped to develop some of the soils in Calcasieu Parish. Basile, Midland, and Morey soils have, in places, secondary accumulations of carbonates at a depth of less than 60 inches. Secondary accumulations of sodium salts and calcium carbonate are in the subsoil of Brimstone soils. Carbonates dissolved from overlying horizons can also be translocated to these depths by water and redeposited. Other sources and processes can contribute to carbonate accumulations, such as segregation of material within the horizon; upward translocation of materials from deeper horizons during fluctuation of water table levels; and material 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 effect of climate and living matter 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 the soils. These factors are climate; the physical and chemical composition of the parent material; the kind 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 length of time for the soil to form.

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. Because of these interactions, many of the differences in soils cannot be attributed to differences in only one factor. For example, organic matter content in the soils of Calcasieu Parish is influenced by several factors, including relief, parent material, and living organisms. In the following paragraphs the factors of soil formation are discussed as they relate to soils in the parish.

Climate

Calcasieu Parish is in a region characterized by a humid, subtropical climate. A detailed discussion of the climate in the parish is given in the section "General Nature of the Survey Area."

The climate is relatively uniform throughout the parish. Local differences in the soils are not a result of great differences in climate. The warm average temperatures and the large amounts of precipitation favor a rapid rate of weathering of readily weatherable minerals in the soils. Weathering processes involving the release and reduction of iron and manganese are indicated by the gray colors in the Bg horizon or Cg horizon in many of the soils. Oxidation and segregation of these elements as a result of alternating oxidizing and reducing conditions is indicated by mottled horizons and iron and manganese concretions in most of the soils.

The depth and degree of leaching and weathering of the predominant soils on the parish's two major Pleistocene age terraces increase from the younger terrace to the older terrace. Thus, the soils on the older terrace were weathered in a climate that had sufficient rainfall to cause considerable leaching and weathering for long periods before the parent materials of the soils on the younger terrace were deposited. The ancient climates, or paleoclimates, could have differed considerably from the present climate. Landscapes of differing ages can have variations between soils because, in part, of climatic variations over thousands of years. In landscapes of comparable ages, differences in weathering, leaching, and translocating clay are caused chiefly by variations in time, relief, and parent material rather than by variations in climate.

Living Organisms

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 soil, thereby affecting porosity, tilth, and content of organic matter. Through photosynthesis, plants use energy from the sun to synthesize compounds necessary for growth. Plant decomposition returns nutrients to the soil and serves as a major source of organic residue. Decomposition and incorporation of organic matter by micro-organisms enhance the tilth and generally increase the infiltration rate and available water capacity in soils.

Relatively stable organic compounds in soils generally have high cation-exchange capacities and thus increase the ability of the soil 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 soil. For example, the organic matter content of soils developed under prairie vegetation is typically higher than that of soils developed under forests *(8, 20)*.

The soils in Calcasieu Parish formed under five different major groups of native vegetation. Crowley, Judice, Leton, Midland, Morey, Mowata, and Vidrine soils developed under prairie vegetation, predominantly tall grasses such as big bluestem. Basile, Guyton, Una, and Urbo soils developed where the predominant native vegetation was bottom land hardwoods, such as water oak, baldcypress, and water tupelo. Allemands, Clovelly, Ged, Gentilly, and Larose soils formed under aquatic vegetation with successions of fresh and saline environments. Arat and Barbary soils developed under aquatic vegetation, as well as baldcypress and water tupelo. Other soils in the parish, such as Acadia, Caddo, and Messer soils, developed in areas of pine or pine-hardwood vegetation.

The organic matter content of soils formed under prairie vegetation is typically higher than that of soils formed under forests. In Calcasieu Parish, the soils formed under prairie vegetation generally have a higher organic matter content than those formed under hardwood vegetation. Soils formed under pine forest vegetation are generally lowest in organic matter content. None of the soils on terrace uplands have large accumulations of organic matter, and most have less than 2 percent in the surface horizon, where quantities of organic matter typically are the greatest. Allemands and Clovelly soils developed under aquatic vegetation in the marshes and have 60 to 70 percent organic matter by weight in the surface horizon. The organic matter content of cultivated soils is typically lower than that of similar uncultivated soils and it can vary widely depending on use and management.

The role of vegetation in the leaching of plant nutrients is apparent in nearly all 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 surface horizons where they can be absorbed again and used by growing plants. In soils that become highly leached and weathered, this process can considerably influence the quantity and distribution of bases in the soil over long periods of time. For example, base saturation and soil reaction can decrease with depth to less leached and weathered zones. This pattern of distribution of bases is characteristic of essentially all the soils on terrace uplands in Calcasieu Parish.

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 present. Aerobic organisms use oxygen from the air to decompose organic matter through rapid oxidation. These organisms are most abundant and prevail for long periods in such better drained and aerated soils as Bienville and Cahaba. Anaerobic organisms are dominant in the more poorly drained soils for long periods during the year. Anaerobic organisms do not require oxygen from the air, and they decompose organic residues very slowly. These different rates of decomposition can result in greater accumulations of organic matter in poorly drained soils than in soils that are drained better.

Relief

Major physiographic features of Calcasieu Parish are discussed in the section "Landforms and Surface Geology." Relief and other physiographic features influence soil formation by affecting soil drainage, runoff, erosion and deposition, and exposure to the sun and wind.

The influence of relief on soils in Calcasieu Parish is especially evident in runoff rate, soil drainage, and depth to and duration of a seasonal high water table. Relief and degree of dissection by streams generally increases along with the geological age of landforms. For example, relief is greater on land surfaces of Intermediate (Montgomery) age than on those of Prairie age. When other factors such as parent material and time are comparable, the steeper soils are better drained, have faster runoff, are more subject to erosion, have a thinner A horizon and B horizon, are less highly leached, and have a seasonal high water table at a greater depth than those soils in areas that are less sloping. This is evident in a comparison of the sloping Glenmora soils with the level Caddo soils.

Parent Material and Time

Parent material is the unconsolidated mass in which soil develops. Its effects are particularly expressed as differences in soil color, texture, permeability, and degree of leaching. Parent material also has a major influence on mineralogy of the soils and is a significant factor in determining their susceptibility to erosion.

Parent material and time are independent factors of soil formation. A particular kind of parent material could have been exposed to 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 development. Long periods of time are generally required for prominent horizons to form. In Calcasieu Parish, possible differences in the time of soil formation amount to several thousand years for some of the soils.

The soils in Calcasieu Parish developed in a variety of different parent materials that range in age from the most recent alluvium along streams and in marshes and swamps to the late to middle Pleistocene sediments that form the core of the Gulf Coast Prairies and the terrace uplands. The characteristics, distribution, and depositional pattern of the different parent materials are discussed in detail in the section "Landforms and Surface Geology."

Landforms and Surface Geology

Saul Aronow, Department of Geology, Lamar University, helped prepare this section.

Calcasieu Parish, in southwestern Louisiana, is in the West Gulf Coastal Plain geomorphic province *(19)*. The surface sediments dip gently gulfward and are Holocene (Recent) age to middle Pleistocene age. These surface sediments are underlain by Tertiary rocks to depths of thousands of feet *(25)*.

Salt domes are thin spires of salt rising from depths of several thousand feet. These are the source of some of the elevations and features of the topographic surface *(18)*. An example of a conspicuous dome feature is the Vinton dome. This dome is outlined by Vidrine soils on the detailed soil map, and it has a local relief of at least 10 feet. The salt in the dome is many feet below the soil surface and does not affect the properties of the Vidrine soils. The center of the dome area, occupied by Ged Lake, has subsided, possibly due to fluid extraction.

The Houston Ridge is another conspicuous topographic feature. It is a relict Pleistocene age barrier island, evident in the vicinity of the Houston River *(6)*. This feature is the east-west trending part of the Bienville-Cahaba-Guyton map unit on the general soil map, and follows the east-west alignment of salt domes.

The surface geology of the parish has been depicted on small-scale maps *(6, 28)* which have been derived or adapted from earlier maps prepared by H.N. Fisk *(13, 16)*. The Geologic Map of Louisiana *(27)* is also on a small scale (1:500,000) and also renders the geology relative to the soil mapping of the soil survey.

The soil series and detailed soil map units in the parish are based on a variety of factors including sediment or parent material, depositional topography associated with the sediment, such as channeled and unchanneled water erosion and deposition, and the subsequent gradual obliteration of the depositional topography. The developing soils respond to these processes under long-term changes in climate, plant cover, and water table depth.

The principal surface geologic units in Calcasieu Parish are divided into three categories, based on age and geomorphic expression. These are, from youngest to oldest, the Pleistocene, Late Pleistocene, and Holocene sequences. The Pleistocene sequence includes the Intermediate Formation or Terrace, the Prairie Formation or Terrace, and the Houston Ridge. The Late Pleistocene sequence includes the Deweyville Formation or stream terraces, and the Holocene sequence includes the recent alluvium on flood plains and the marshes and swamps.

Pleistocene Sequence

The oldest surface deposits in Calcasieu Parish are of Pleistocene age. The Intermediate Formation and the Prairie Formation are coastwise, fluvial-deltaic terraces. In some geologic reports the Intermediate Formation and the Prairie Formation are described as being lithologically similar *(7)*. However, the major differences between them are a general increase in clay content and a decrease in gravel content from the older (Intermediate) formation and the younger (Prairie) formation. Both terrace formations were deposited under variable fluvial conditions, and a typical depositional sequence is difficult to describe. The composition of both terraces ranges from the coarsest sediment 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 on either terrace are horizontally continuous.

The deposition of Pleistocene formations and Holocene alluvium was controlled by changes in sea level caused by several advances and retreats of continental glaciers. During advances of continental glaciers, water was removed from the oceans and returned to land as snow. The transference caused 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 themselves 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 *(5, 6, 12, 14, 15)*. The Pleistocene formations in Calcasieu Parish are thought to be the products of the interglacial times 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. Preserved depositional surfaces of older formations have been subject to successive tiltings and have progressively greater slopes than surfaces of younger formations.

The criteria for differentiating the Pleistocene formations include lithologic differences; regional slope of uneroded, preserved portions of the surfaces, and scarps of sharp slope discontinuities bounding the units.

Intermediate Formation or Terrace—This formation, as outlined on the Geologic Map of Louisiana *(27)*, corresponds with the Caddo-Glenmora-Messer and Kinder-Messer-Guyton map units and most of the Brimstone-Kinder map unit on the general soil map.

The Intermediate Formation or Terrace locally includes both the Montgomery and Bentley terraces described in a geologic report by Fisk *(13)*. The Geologic Map of Louisiana does not provide a dating scheme for the Pleistocene terraces relative to a standard Pleistocene chronology. The Intermediate Formation or Terrace, however, can tentatively be assigned to the Yarmouth interglacial period between the Illinoian and Kansan glacial stages, or in Middle Pleistocene time about 1.3 to 1.4 million years ago *(4)*.

The Intermediate Formation or Terrace is separated from the younger Prairie Terrace by a low scarp or break in slope which is best defined between Indian Bayou, a tributary of the Houston River, and the community of Lunita in the eastern part of the parish. The dissection of this terrace by headward eroding streams can be seen as the extensions of the Brimstone-Kinder and Guyton-Una-Basile general soil map units protruding northward into the Caddo-Glenmora-Messer general soil map unit.

Caddo and Messer soils are on the higher, flatter parts of the terrain; Glenmora soils are on slopes; and Brimstone and Guyton soils are in lower areas of the terrain and valley bottoms.

The flatter surfaces of the Caddo-Messer map unit, the best preserved remnants of continuous surface, retain few relict geomorphic features of their fluvial-deltaic origin. These surface features are the result of a lowering and "homogenization" of the surface, as distinctions among point bar, channel, levee, and flood basin geomorphic forms have mostly been lost.

The Intermediate Formation or Terrace has two distinctive micro-relief features: shallow circular to elliptical, undrained depressions, known locally as bagols; and pimple mounds. These micro-relief features are even more common and distinctive on the Prairie and Deweyville Terraces. These features influence the local distribution of soils and characterize some of the map units and soil series.

The undrained depressions are common surface features of Caddo and Guyton soils on the higher, flatter surfaces. These depressions have been identified as segments of relict channels or swales between point bar ridges *(14)*. Other possible origins, such as wind excavation or deflation, have also been suggested for similar features in other areas *(26)*.

Pimple mounds are small, round to elliptical knolls 30 to 150 feet in diameter and 2 to 6 feet high. The loamy Messer soils are on the mounds. Pimple mounds are generally in flatter areas. Several theories of pimple mound origin exist. They could have originated as residual patches left after sheet flood erosion or deflation of the surface by wind *(10, 33)*; accumulation of wind-transported sand, silt, or clay chips around clumps of vegetation *(10)*; sites of wind accumulations started by, or later topographically enhanced by, erosion processes; or the "fluffing up" or lowering of the bulk densities of the A horizon and B horizon by the burrowing activities of animals, with possible eolian increments *(11, 17)*.

Prairie Formation or Terrace—This formation is the younger coastwise terrace. It corresponds with the Mowata-Vidrine-Crowley and the Morey-Leton-Mowata general soil map units and parts of the Kinder-Messer-Guyton and the Brimstone-Kinder general soil map units. It is separated from the older Intermediate Formation or Terrace by a low and, in places, poorly defined scarp. To the south the terrace is overlapped by Holocene marsh and swamp deposits.

The Prairie Formation or Terrace, like the Intermediate Formation or Terrace, is fluviatile to deltaic in origin *(16)*. Most radiocarbon dates on the Prairie Formation or Terrace are older than 40,000 years, possibly falling within a high sea level episode of the Wisconsin glaciation or in the Sangamon interglacial period between the Wisconsin and Illinoian glacial stages. Following the deposition of the Prairie Formation or Terrace, the sea level dropped and the local major streams widened and deepened their channels. The fluviatile portions of the Prairie Formation or Terrace acquired their raised or terrace positions. The subsequent Deweyville Formation (the Bienville-Cahaba-Guyton general soil map unit) and the Holocene alluvium (mostly the Guyton-Una-Basile general soil map unit) are the backfilling of these deeper, glacially controlled channels.

The Prairie Formation or Terrace displays large relict meandering traces of 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. Leton and Guyton soils are usually in relict channels, and Brimstone, Crowley, Kinder, Messer, and Vidrine soils are in higher areas, or on natural levee ridges. The variations in pattern preservation are due in part to 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 sea level between 22,000 and 15,000 years ago *(7)*.

The Houston Ridge—This formation is most obviously expressed by the east-west trending portion of the Bienville-Cahaba-Guyton general soil map unit in the vicinity of the Houston River *(6)*. Geomorphically, it is a relict barrier island of Pleistocene age. It rises to about 20 feet above the surrounding surfaces *(16)*. The ridge and the associated general soil map units end in Sam Houston Jones State Park.

The ridge or barrier sands and silts are thought to be over 35 feet thick. After deposition, the lagoon or estuary landward of the ridge and the shallow offshore area seaward of the ridge were covered by fluvial and deltaic sediment of the Prairie Formation or Terrace.

During the survey, two transects were made across the Houston Ridge to determine the relationships between the sandy sediment of the ridge and the more clayey associated sediment. Although the absolute age and mode of deposition are not established, it was determined that sands on the ridge predate at least the uppermost clayey sediment of the Prairie Formation or Terrace. Sandy deposits lacking more clayey strata can exceed 18 feet thick in some places and can range to less than 6 feet in others *(24)*. Elevations are typically lower on the north side of the ridge than they are on the south side. In the main area of the ridge, the transition from sands that do not have clayey strata to stratified clayey sediment is abrupt in some places and gradational through a zone having alternating sandy and clayey strata in other places. The peripheral basal margins of the uniform sands on the ridges are characterized by alternating sandy and more clayey deposits The sandy strata are contiguous with the sand core of the ridge and have limited horizontal extent into the more clayey deposits. Similarly, the more clayey strata are not horizontally continuous through the main area of the sandy ridge.

Late Pleistocene Sequence

The Deweyville Formation or Terrace—The Bienville-Cahaba-Guyton general soil map unit along the Sabine River corresponds to the local Deweyville Formation or Terrace. This terrace was first identified near Deweyville in east Texas by H.A. Bernard *(5)*. The terrace is intermediate in elevation between the bottom lands of the Sabine River and the Prairie Formation or Terrace. The surface of the Deweyville Terrace displays relict meander patterns and arcuate point bar complexes with radii of curvature several times greater than that of the meanders of the present Sabine River. Channels on the terrace surface are also wider than those of the present Sabine River. Large arcuate meander scars scallop the edges of the Prairie and Intermediate Terraces bounding both the Deweyville Formation and, where the Deweyville is concealed, the Holocene alluvium. Terraces that have these characteristics are also known as Deweyville Formations or Terraces and are evident along several other Louisiana streams *(28)*. The large meander bends and the wide channels mean the paleo-Sabine and other streams carried considerably greater discharges, which can be attributed to higher rainfall in post-Prairie time.

Bernard and LeBlanc *(6)* note that radiocarbon dates from the Deweyville range from about 17,000 to 30,000 years before the present. A sample collected from a sand pit near Deweyville, Texas, dated about 13,000 years before the present. According to the Pleistocene age sequence of Beard and others *(4)* these dates encompass the Late Pleistocene Farmdalian high sea level stand and the subsequent Woodfordian glacial advance. The dates also span the whole fall and rise cycle of sea level changes 22,000 to 15,000 years before the present. The youngest date is pre-Two Creeks, or prior to the last glacial advance in the United States. A Late Pleistocene assignment of the Deweyville seems plausible.

Holocene Sequence

The lower reaches of the Sabine and Calcasieu Rivers and the coastal marsh along the southern boundary of Calcasieu Parish were flooded following marine transgression subsequent to the sea level low of about 18,000 years before the present. The advancing sea carried mud, silt, and sand, which have been partly covered by erosional products from the upland areas. Sea level probably stabilized 2,500 to 3,500 years ago. Major backfilling of the flooded areas and seaward extension of a new fluvial deltaic terrace surface has scarcely begun. The chenier plain to the south in Cameron Parish is mainly the product of coastal reworking of mud, silt, and sand.

The Holocene alluvium or the potential sites of Holocene alluvium are represented by Gentilly-Clovelly, Arat-Barbary, Ged-Larose-Allemands, and Guyton-Una-Basile general soil map units. Most of the soils in these map units are Histosols (peats), Entisols, and Inceptisols. Apparent anomalies are Guyton and Basile soils, both upland soils (Alfisols) but also along the flood plain surfaces of the Sabine, Calcasieu, and smaller rivers. The lack of a more recent alluvium over these soils at flood plain levels suggests that the flood plains are stable, that these soils are neither in an eroding nor depositing condition, and that they can be, in part, low level strath surfaces cut during a lower sea level phase of the Deweyville Formation or Terrace. Their presence in the channels of minor tributaries to the Sabine and Calcasieu Rivers likewise can be interpreted in terms of stream channel stability and low sediment yield to the major streams.

The Holocene alluvium of marshes and swamps is the youngest of the soil parent materials in the parish. Some of this alluvium is less than 3,000 years old.

Arat and Barbary soils are in the swamps along the Calcasieu and Sabine Rivers. These soils formed in a pre-weathered alluvium that was almost entirely eroded from surrounding areas; hence, they are acid throughout. Both of these soils are very fluid throughout because they formed in a permanently wet environment and have never dried.

The soils of the marshes formed mainly in organic material (peat) and an admixture of sediments including those of the Mississippi River transported in the gulf by westerly currents.

The subsided surface of the Prairie Terrace underlies the Holocene alluvium, and in some parts of the marsh it nearly outcrops at the surface. Ged soils formed where the recent alluvium which overlies the Prairie Formation or Terrace is about 1.5 to 3 feet thick.

Larose soils are in the freshwater marshes, and formed entirely in recent alluvium. Organic soils (Histosols), such as Allemands and Clovelly soils, are in old embayments and other areas where the alluvial deposition was insufficient to raise the mineral surface to or above sea level. These organic soils formed partly in decomposed vegetation and in the underlying clayey alluvium.

Some of the soils of the marshes probably formed in an environment of varying levels of salinity, ranging from fresh or nonsaline to saline. All of the soils of the marshes and swamps in Calcasieu Parish formed in a permanently wet environment. Because the soils have never dried, the processes of soil formation have had little effect on them and they remain in a very fluid state throughout.

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Glossary

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.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

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.

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, i.e., 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.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

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.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, such as fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay are in the soil. The soil is not a source of gravel or sand for construction purposes.

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.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Green-manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

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.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material. 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

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.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

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.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water 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.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

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 degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

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.

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.

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.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

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.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

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 will be planted to rice. The fields are flooded to a shallow depth by irrigation water; then the soil surface is scraped and stirred up to create a soil-water suspension. As the soil particles settle out of the suspension, the land surface is smoothed.

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

[Data 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	.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	0.96	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	0.88	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 °F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Data 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--	January 25	February 21	March 10
2 years in 10 later than--	January 19	February 13	March 3
5 years in 10 later than--	January 5	January 27	February 18
First freezing temperature in fall:			
1 year in 10 earlier than--	December 12	November 27	November 11
2 years in 10 earlier than--	December 21	December 8	November 18
5 years in 10 earlier than--	January 11	December 29	December 2

TABLE 3.--GROWING SEASON

[Data 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 MAP UNITS ON THE GENERAL SOIL MAP FOR MAJOR LAND USES

Map unit	Percent of area	Cultivated crops	Pastureland	Woodland	Urban uses	Intensive recreation areas
1. Caddo-Glenmora-Messer	11	Moderately well suited: wetness, low fertility, slope.	Moderately well suited: wetness, low fertility.	Well suited	Poorly suited: wetness, slow permeability, shrink-swell.	Poorly suited: wetness, slow permeability.
2. Brimstone-Kinder	5	Moderately well suited: wetness, low fertility, sodium.	Moderately well suited: wetness, low fertility.	Moderately well suited: wetness, sodium.	Poorly suited: wetness, flooding, slow permeability.	Poorly suited: wetness, flooding, slow permeability.
3. Kinder-Messer-Guyton	18	Moderately well suited: wetness, low fertility, flooding, slope.	Moderately well suited: wetness, low fertility.	Well suited	Poorly suited: wetness, flooding, slow permeability.	Poorly suited: wetness, slow permeability, flooding.
4. Bienville-Cahaba-Guyton	2	Moderately well suited: wetness, slope, droughtiness, low fertility.	Moderately well suited: wetness, droughtiness, low fertility.	Well suited	Moderately well suited: Wetness, flooding, slow permeability.	Moderately well suited: wetness, droughtiness, slow permeability, flooding.
5. Guyton-Una-Basile	8	Poorly suited: flooding, wetness.	Poorly suited: flooding, wetness.	Moderately well suited: wetness, flooding.	Not suited: flooding, wetness.	Not suited: flooding, wetness.
6. Mowata-Vidrine-Crowley	25	Moderately well suited: wetness, low fertility.	Moderately well suited: wetness, low fertility.	Well suited	Poorly suited: wetness, shrink-swell, very slow and slow permeability.	Poorly suited: Wetness, very slow and slow permeability.
7. Morey-Leton-Mowata	20	Moderately well suited: wetness, medium fertility.	Moderately well suited: wetness, medium fertility.	Well suited	Poorly suited: wetness, flooding, slow and very slow permeability, shrink-swell.	Poorly suited: wetness, flooding, slow and very slow permeability.
8. Arat-Barbary	4	Not suited: flooding, low strength, ponding.	Not suited: wetness, flooding, low strength, ponding.	Poorly suited: wetness, flooding, low strength, ponding.	Not suited: wetness, flooding, low strength for roads, ponding.	Not suited: wetness, flooding, low strength, ponding.

TABLE 4.--SUITABILITY AND LIMITATIONS OF MAP UNITS ON THE GENERAL SOIL MAP FOR MAJOR LAND USES--Continued

Map unit	Percent of area	Cultivated crops	Pastureland	Woodland	Urban uses	Intensive recreation areas
9. Gentilly-Clovelly---	4	Not suited: wetness, flooding, low strength, salinity, ponding.	Not suited: wetness, flooding, ponding, salinity, low strength.	Not suited: wetness, flooding, ponding, salinity, low strength.	Not suited: wetness, flooding, ponding, salinity, low strength.	Not suited: wetness, flooding, ponding, salinity, low strength.
10. Ged-Larose-Allemands	3	Not suited: wetness, flooding, ponding, low strength.	Not suited: wetness, flooding, ponding, low strength.	Not suited: wetness, flooding, ponding, low strength.	Not suited: wetness, flooding, ponding, low strength.	Not suited: wetness, flooding, ponding, low strength.

TABLE 5.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
Ac	Acadia silt loam, 1 to 3 percent slopes	13,655	2.0
AE	Allemands peat	1,281	0.2
AN	Aquents, frequently flooded	2,300	0.3
AR	Arat mucky silt loam	14,814	2.1
BA	Barbary mucky clay	8,802	1.3
BB	Basile and Guyton silt loams, frequently flooded	8,825	1.3
Bh	Bienville loamy fine sand, 1 to 3 percent slopes	1,938	0.3
Bn	Bienville-Cahaba-Guyton complex, gently undulating	10,148	1.4
Bo	Brimstone silt loam	27,702	4.0
Cd	Caddo-Messer silt loams	44,155	6.3
Ch	Cahaba fine sandy loam, 1 to 3 percent slopes	475	0.1
CO	Clovelly muck	7,840	1.1
Cr	Crowley-Vidrine silt loams	45,122	6.4
Dm	Dumps	593	0.1
GB	Ged clay	9,124	1.3
GC	Gentilly muck	14,624	2.1
Ge	Glenmora silt loam, 1 to 3 percent slopes	26,562	3.8
Gg	Gore silt loam, 1 to 5 percent slopes	1,336	0.2
Go	Guyton silt loam, occasionally flooded	22,435	3.2
GU	Guyton silt loam, frequently flooded	30,310	4.3
Gy	Guyton-Messer silt loams	28,203	4.0
Ju	Judice silty clay loam	12,634	1.8
Kd	Kinder-Messer silt loams	70,540	10.1
LE	Larose mucky clay	7,146	1.0
Lt	Leton silt loam	39,500	5.6
Mb	Malbis fine sandy loam, 1 to 3 percent slopes	2,038	0.3
Mg	Messer silt loam, 1 to 8 percent slopes	885	0.1
Mh	Messer-Guyton silt loams, gently undulating	2,991	0.4
Mn	Midland silty clay loam	13,565	1.9
Mr	Morey loam	68,572	9.8
Mt	Mowata-Vidrine silt loams	129,380	18.6
Pt	Pits, sand	214	*
UA	Udifluvents, 1 to 20 percent slopes	7,217	1.0
UN	Una silty clay loam, frequently flooded	7,568	1.1
Up	Urban land	5,227	0.7
Ur	Urbo silty clay loam, occasionally flooded	1,061	0.2
Vn	Vidrine silt loam, 1 to 3 percent slopes	3,455	0.5
	Water	7,679	1.1
	Total	699,916	100.0

* Less than 0.1 percent.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Map symbol and soil name	Land capability	Soybeans	Rice	Wheat	Grain sorghum	Bahiagrass	Common bermudagrass	Improved bermudagrass
		Bu	Bu*	Bu	Bu	AUM**	AUM**	AUM**
Ac-------------- Acadia	IIIe	25	90	---	---	6.5	5.0	---
AE-------------- Allemands	VIIw	---	---	---	---	---	---	---
AN-------------- Aquents	VIIw	---	---	---	---	---	---	---
AR-------------- Arat	VIIIw	---	---	---	---	---	---	---
BA-------------- Barbary	VIIw	---	---	---	---	---	---	---
BB-------------- Basile and Guyton	Vw	---	---	---	---	---	4.0	---
Bh-------------- Bienville	IIs	27	---	---	36	6.5	6.0	11.0
Bn-------------- Bienville-Cahaba-Guyton	IIIw	26	---	---	34	6.0	6.0	---
Bo-------------- Brimstone	IIIs	24	90	---	---	6.5	5.5	---
Cd-------------- Caddo-Messer	IIIw	25	104	29	35	6.5	5.5	---
Ch-------------- Cahaba	IIe	28	---	---	---	8.0	---	9.5
CO-------------- Clovelly	VIIw	---	---	---	---	---	---	---
Cr-------------- Crowley-Vidrine	IIIw	30	115	34	50	8.0	6.0	10.0
Dm. Dumps								
GB-------------- Ged	VIIw	---	---	---	---	---	---	---
GC-------------- Gentilly	VIIw	---	---	---	---	---	---	---
Ge-------------- Glenmora	IIe	27	90	31	36	7.0	5.0	---
Gg-------------- Gore	IVe	23	---	---	---	6.5	4.5	---

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Soybeans	Rice	Wheat	Grain sorghum	Bahiagrass	Common bermudagrass	Improved bermudagrass
		Bu	Bu*	Bu	Bu	AUM**	AUM**	AUM**
Go------------- Guyton	IVw	24	90	---	---	---	5.4	---
GU------------- Guyton	Vw	---	---	---	---	---	4.5	---
Gy------------- Guyton-Messer	IIIw	25	101	---	---	---	5.5	---
Ju------------- Judice	IIIw	31	119	---	---	8.0	7.0	---
Kd------------- Kinder-Messer	IIIw	29	108	32	36	7.5	6.0	---
LE------------- Larose	VIIw	---	---	---	---	---	---	---
Lt------------- Leton	IIIw	28	115	---	---	7.5	6.1	---
Mb------------- Malbis	IIe	30	---	---	---	8.5	---	10.5
Mg------------- Messer	IIIe	---	---	---	---	5.8	4.2	---
Mh------------- Messer-Guyton	IIIw	---	---	---	---	7.7	5.4	---
Mn------------- Midland	IIIw	29	115	34	56	7.5	6.5	---
Mr------------- Morey	IIIw	33	115	36	60	9.0	8.0	---
Mt------------- Mowata-Vidrine	IIIw	30	115	32	40	7.0	6.1	---
Pt. Pits								
UA------------- Udifluvents	VIe	---	---	---	---	---	---	---
UN------------- Una	Vw	---	---	---	---	---	---	---
Up. Urban land								
Ur------------- Urbo	IVw	---	---	---	---	---	---	---
Vn------------- Vidrine	IIe	30	108	34	50	7.5	6.0	---

* Barrels (Bu. x .279); TONS (Bu. x .0225).
** Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Map symbol and soil name	Ordination symbol	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
Ac------ Acadia	2w	Moderate	Slight	Moderate	Loblolly pine-------	86	Loblolly pine, slash pine.
					Slash pine----------	86	
					Longleaf pine-------	70	
					Sweetgum------------	80	
					Water oak-----------	80	
AR------ Arat	5w	Severe	Severe	Slight	Water tupelo--------	50	Baldcypress.
					Baldcypress---------	50	
BA------ Barbary	4w	Severe	Severe	Slight	Baldcypress---------	---	Baldcypress.
					Water tupelo--------	60	
					Black willow--------	---	
BB:							
Basile------	5w	Severe	Severe	Severe	Sweetgum------------	65	
					Baldcypress---------	---	
					Laurel oak----------	---	
					Overcup oak---------	---	
Guyton------	2w	Severe	Moderate	Severe	Loblolly pine-------	90	Loblolly pine, sweetgum.
					Slash pine----------	90	
					Sweetgum------------	---	
					Green ash-----------	---	
					Southern red oak----	---	
					Water oak-----------	---	
Bh------ Bienville	2s	Moderate	Moderate	Moderate	Loblolly pine-------	90	Loblolly pine, slash pine.
					Longleaf pine-------	80	
					Shortleaf pine------	85	
Bn:							
Bienville------	2s	Moderate	Moderate	Moderate	Loblolly pine-------	90	Loblolly pine, slash pine.
					Longleaf pine-------	80	
					Shortleaf pine------	85	
Cahaba------	2o	Slight	Slight	Moderate	Loblolly pine-------	87	Loblolly pine, slash pine, yellow-poplar, sweetgum.
					Slash pine----------	91	
					Yellow-poplar-------	---	
					Sweetgum------------	90	
Guyton------	2w	Severe	Moderate	Severe	Loblolly pine-------	90	Loblolly pine, sweetgum.
					Slash pine----------	90	
					Sweetgum------------	---	
					Green ash-----------	---	
					Southern red oak----	---	
					Water oak-----------	---	
Bo------ Brimstone	3t	Severe	Moderate	Severe	Slash pine----------	85	Slash pine, loblolly pine.
					Loblolly pine-------	80	

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
Cd:							
Caddo	2w	Severe	Moderate	Severe	Loblolly pine	90	Loblolly pine, slash pine.
					Slash pine	90	
					Sweetgum	---	
Messer	2w	Moderate	Slight	Moderate	Loblolly pine	95	Loblolly pine, slash pine.
					Slash pine	95	
					Longleaf pine	75	
					Sweetgum	90	
Ch: Cahaba	2o	Slight	Slight	Moderate	Loblolly pine	87	Loblolly pine, slash pine, yellow-poplar, sweetgum.
					Slash pine	91	
					Yellow-poplar	---	
					Sweetgum	90	
Cr:							
Crowley	2w	Severe	Moderate	Severe	Slash pine	90	Slash pine, loblolly pine.
					Loblolly pine	90	
Vidrine	2w	Severe	Slight	Severe	Loblolly pine	90	Loblolly pine, slash pine.
					Slash pine	90	
					Sweetgum	---	
Ge: Glenmora	2w	Moderate	Slight	Moderate	Loblolly pine	93	Loblolly pine, slash pine.
					Slash pine	93	
					Longleaf pine	73	
					Sweetgum	---	
					Water oak	---	
					Cherrybark oak	---	
Gg: Gore	3c	Moderate	Moderate	Moderate	Loblolly pine	78	Loblolly pine, slash pine.
					Longleaf pine	---	
					Slash pine	---	
Go, GU: Guyton	2w	Severe	Moderate	Severe	Loblolly pine	90	Loblolly pine, sweetgum.
					Slash pine	90	
					Sweetgum	---	
					Green ash	---	
					Southern red oak	---	
					Water oak	---	
Gy:							
Guyton	2w	Severe	Moderate	Severe	Loblolly pine	90	Loblolly pine, sweetgum.
					Slash pine	90	
					Sweetgum	---	
					Green ash	---	
					Southern red oak	---	
					Water oak	---	
Messer	2w	Moderate	Slight	Moderate	Loblolly pine	95	Loblolly pine, slash pine.
					Slash pine	95	
					Longleaf pine	75	
					Sweetgum	90	
Ju: Judice	2w	Severe	Severe	Severe	---	---	Eastern cottonwood, American sycamore.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity		Trees to plant
		Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
Kd:							
Kinder	2w	Severe	Slight	Severe	Slash pine Loblolly pine	90 90	Slash pine, loblolly pine.
Messer	2w	Moderate	Slight	Moderate	Loblolly pine Slash pine Longleaf pine Sweetgum	95 95 75 90	Loblolly pine, slash pine.
Lt Leton	2w	Severe	Moderate	Severe	---	---	Eastern cottonwood, American sycamore.
Mb Malbis	2o	Slight	Slight	Moderate	Loblolly pine Slash pine Longleaf pine	90 90 80	Loblolly pine, slash pine.
Mg Messer	2w	Moderate	Slight	Moderate	Loblolly pine Slash pine Longleaf pine Sweetgum	95 95 75 90	Loblolly pine, slash pine.
Mh:							
Messer	2w	Moderate	Slight	Moderate	Loblolly pine Slash pine Longleaf pine Sweetgum	95 95 75 90	Loblolly pine, slash pine.
Guyton	2w	Severe	Moderate	Severe	Loblolly pine Slash pine Sweetgum Green ash Southern red oak Water oak	90 90 --- --- --- ---	Loblolly pine, sweetgum.
Mn Midland	2w	Severe	Moderate	Severe	Green ash Water oak Sweetgum Eastern cottonwood	--- 90 90 ---	Eastern cottonwood, American sycamore.
Mr Morey	2w	Severe	Severe	Severe	Loblolly pine Longleaf pine Southern red oak	90 80 80	Loblolly pine, slash pine.
Mt:							
Mowata	2w	Severe	Moderate	Severe	Loblolly pine Slash pine Sweetgum	90 90 90	Loblolly pine, slash pine.
Vidrine	2w	Severe	Slight	Severe	Loblolly pine Slash pine Sweetgum	90 90 ---	Loblolly pine, slash pine.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns			Potential productivity		Trees to plant
		Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
UN: Una	2w	Moderate	Severe	Severe	Sweetgum Eastern cottonwood Green ash Cherrybark oak Nuttall oak Water oak Willow oak Water tupelo	90 85 75 90 95 90 90 80	Sweetgum, green ash, Nuttall oak, water tupelo.
Ur: Urbo	1w	Moderate	Moderate	Severe	Green ash Eastern cottonwood Cherrybark oak Sweetgum	93 108 99 98	Eastern cottonwood, loblolly pine, sweetgum, American sycamore, yellow-poplar.
Vn: Vidrine	2w	Severe	Slight	Severe	Loblolly pine Slash pine Sweetgum	90 90 ---	Loblolly pine, slash pine.

TABLE 8.--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. The flooding limitation shown in this table is based on the frequency of flooding on a yearly basis]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ac------------------- Acadia	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
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					
AR------------------- Arat	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
BA------------------- Barbary	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.
BB:					
Basile---------------	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Guyton---------------	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Bh------------------- Bienville	Slight----------	Slight----------	Moderate: slope.	Slight----------	Moderate: droughty.
Bn:					
Bienville------------	Slight----------	Slight----------	Moderate: slope.	Slight----------	Moderate: droughty.
Cahaba---------------	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
Guyton---------------	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Bo------------------- Brimstone	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Cd:					
Caddo----------------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Cd:					
Messer	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight	Slight.
Ch Cahaba	Slight	Slight	Moderate: slope.	Slight	Slight.
CO Clovelly	Severe: flooding, ponding, percs slowly.	Severe: ponding, excess humus, percs slowly.	Severe: flooding, excess humus, ponding.	Severe: ponding, flooding, excess humus.	Severe: flooding, ponding, excess humus.
Cr:					
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.
Dm. Dumps					
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.
Ge Glenmora	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight	Slight.
Gg Gore	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight	Slight.
Go Guyton	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
GU Guyton	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Gy:					
Guyton	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Messer	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight	Slight.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ju------------------- Judice	Severe: wetness, percs slowly, flooding.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
Kd:					
Kinder---------------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Messer---------------	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight----------	Slight.
LE------------------- Larose	Severe: flooding, percs slowly, too clayey.	Severe: flooding, too clayey, percs slowly.	Severe: excess humus, flooding, percs slowly.	Severe: ponding, too clayey, excess humus.	Severe: flooding, ponding, excess humus.
Lt------------------- Leton	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Mb------------------- Malbis	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
Mg------------------- Messer	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight----------	Slight.
Mh:					
Messer---------------	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight----------	Slight.
Guyton---------------	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
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: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
Vidrine--------------	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Slight----------	Moderate: wetness.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Pt. Pits					
UA. Udifluvents					
UN------------------- Una	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Up. Urban land					
Ur------------------- Urbo	Severe: flooding, wetness, percs slowly.	Severe: percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
Vn------------------- Vidrine	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Slight----------	Moderate: wetness.

TABLE 9.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Ac: Acadia	Fair	Good	Good	Fair	Good	Fair	Fair	Fair	Good	Good	Fair
AE: Allemands	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Very poor.	Very poor.	Very poor.	Good
AN. Aquents											
AR: Arat	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Fair	Very poor.	Very poor.	Good
BA: Barbary	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Fair	Poor	Very poor.	Very poor.	Fair
BB:											
Basile	Poor	Fair	Fair	Fair	Poor	Fair	Good	Good	Fair	Fair	Good
Guyton	Poor	Fair	Fair	Fair	Poor	Fair	Good	Good	Poor	Fair	Good
Bh: Bienville	Fair	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Bn:											
Bienville	Fair	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Cahaba	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Guyton	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good
Bo: Brimstone	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good
Cd:											
Caddo	Fair	Fair	Fair	Fair	Fair	Good	Good	Good	Fair	Fair	Good
Messer	Good	Good	Good	Fair	Good	Fair	Poor	Poor	Good	Good	Poor
Ch: Cahaba	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CO: Clovelly	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good
Cr:											
Crowley	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good
Vidrine	Fair	Good	Good	Fair	Good	Good	Fair	Fair	Good	Good	Fair
Dm. Dumps											
GB: Ged	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Fair	Very poor.	Very poor.	Good

TABLE 9.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
GC: Gentilly	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Fair	Fair	Very poor.	Very poor.	Fair
Ge: Glenmora	Good	Good	Good	Fair	Good	Good	Poor	Poor	Good	Good	Poor
Gg: Gore	Poor	Good	Good	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Go: Guyton	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good
GU: Guyton	Poor	Fair	Fair	Fair	Poor	Fair	Good	Good	Poor	Fair	Good
Gy:											
Guyton	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good
Messer	Good	Good	Good	Fair	Good	Fair	Poor	Poor	Good	Good	Poor
Ju: Judice	Fair	Fair	Fair	Good	Poor	Fair	Good	Good	Poor	Good	Good
Kd:											
Kinder	Fair	Fair	Fair	Good	Good	Fair	Good	Good	Fair	Good	Good
Messer	Good	Good	Good	Fair	Good	Fair	Poor	Poor	Good	Good	Poor
LE: Larose	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good
Lt: Leton	Poor	Fair	Fair	Fair	Poor	Fair	Good	Good	Fair	Fair	Good
Mb: Malbis	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Mg: Messer	Good	Good	Good	Fair	Good	Fair	Poor	Poor	Good	Good	Poor
Mh:											
Messer	Good	Good	Good	Fair	Good	Fair	Poor	Poor	Good	Good	Poor
Guyton	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good
Mn: Midland	Poor	Fair	Fair	Fair	Poor	Fair	Good	Good	Fair	Fair	Good
Mr: Morey	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good
Mt:											
Mowata	Poor	Fair	Good	Fair	Fair	Good	Good	Good	Fair	Fair	Good
Vidrine	Fair	Good	Good	Fair	Good	Good	Fair	Fair	Good	Good	Fair
Pt. Pits											

TABLE 9.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
UA. Udifluvents											
UN----------------- Una	Poor	Fair	Fair	Fair	Poor	Fair	Good	Good	Fair	Fair	Good
Up. Urban land											
Ur----------------- Urbo	Fair	Good	Fair	Good	Fair	Good	Good	Good	Fair	Good	Good
Vn----------------- Vidrine	Fair	Good	Good	Fair	Good	Good	Fair	Fair	Good	Good	Fair

TABLE 10.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for deinitions 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. The flooding limitation in this table is based on the frequency of flooding on a yearly basis]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Ac----------------- Acadia	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, shrink-swell.	Severe: wetness, shrink-swell.
AE----------------- Allemands	Severe: excess humus, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding.	Severe: flooding, ponding, excess humus.
AN. Aquents					
AR----------------- Arat	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, flooding.
BA----------------- Barbary	Severe: excess humus, ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding, excess humus.
BB:					
Basile-----------	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
Guyton-----------	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
Bh----------------- Bienville	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Moderate: droughty.
Bn:					
Bienville--------	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Moderate: droughty.
Cahaba-----------	Slight---------	Slight---------	Slight---------	Slight---------	Slight.
Guyton-----------	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: wetness.
Bo----------------- Brimstone	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, low strength.	Severe: wetness.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Cd:					
Caddo	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Messer	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: low strength, wetness.	Slight.
Ch Cahaba	Slight	Slight	Slight	Slight	Slight.
CO Clovelly	Severe: excess humus, ponding.	Severe: flooding, shrink-swell, low strength.	Severe: flooding, ponding, low strength.	Severe: flooding, low strength, ponding.	Severe: flooding, ponding, excess humus.
Cr:					
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.
Dm. Dumps					
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.
Ge Glenmora	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: low strength.	Slight.
Gg Gore	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
Go Guyton	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
GU Guyton	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Gy:					
Guyton	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: wetness.
Messer	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: low strength, wetness.	Slight.
Ju: Judice	Severe: wetness.	Severe: wetness, shrink-swell, flooding.	Severe: wetness, shrink-swell, flooding.	Severe: low strength, wetness, shrink-swell.	Severe: wetness.
Kd:					
Kinder	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
Messer	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: low strength, wetness.	Slight.
LE: Larose	Severe: too clayey, excess humus, ponding.	Severe: flooding, shrink-swell, low strength.	Severe: flooding, shrink-swell, low strength.	Severe: low strength, ponding, shrink-swell.	Severe: flooding, ponding, excess humus.
Lt: Leton	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, low strength.	Severe: wetness.
Mb: Malbis	Moderate: wetness.	Slight	Slight	Moderate: low strength.	Slight.
Mg: Messer	Severe: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: low strength, wetness.	Slight.
Mh:					
Messer	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: low strength, wetness.	Slight.
Guyton	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: wetness.
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.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Mt:					
Mowata-----------	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.
Pt. Pits					
UA. Udifluvents					
UN---------------- Una	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
Up. Urban land					
Ur---------------- Urbo	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding.	Moderate: wetness, flooding.
Vn---------------- Vidrine	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.

TABLE 11.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation. The flooding limitation in this table is based on the frequency of flooding on a yearly basis]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ac: Acadia	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
AE: Allemands	Severe: flooding, ponding, percs slowly.	Severe: flooding, seepage, excess humus.	Severe: flooding, ponding, excess humus.	Severe: flooding, seepage, ponding.	Poor: too clayey, ponding, excess humus.
AN. Aquents					
AR: Arat	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
BA: Barbary	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.
BB:					
Basile	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Guyton	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Bh: Bienville	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness.	Severe: seepage.	Fair: too sandy.
Bn:					
Bienville	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness.	Severe: seepage.	Fair: too sandy.
Cahaba	Slight	Severe: seepage.	Severe: seepage.	Slight	Fair: thin layer.
Guyton	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Bo: Brimstone	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Cd:					
Caddo	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Messer	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
Ch Cahaba	Slight	Severe: seepage.	Severe: seepage.	Slight	Fair: thin layer.
CO Clovelly	Severe: flooding, ponding, percs slowly.	Severe: ponding, seepage, excess humus.	Severe: ponding, too clayey, excess humus.	Severe: flooding, seepage, ponding.	Poor: too clayey, ponding, excess humus.
Cr:					
Crowley	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Vidrine	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Dm. Dumps					
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.
Ge Glenmora	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
Gg Gore	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
Go, GU Guyton	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Gy:					
Guyton	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Gy:					
Messer	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
Ju Judice	Severe: wetness, percs slowly.	Severe: wetness, flooding.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Kd:					
Kinder	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Messer	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
LE Larose	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding, excess humus.	Severe: flooding, ponding, excess humus.	Severe: flooding, ponding.	Poor: too clayey, ponding, excess humus.
Lt Leton	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Mb Malbis	Severe: wetness, percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: wetness.
Mg Messer	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
Mh:					
Messer	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
Guyton	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Mn Midland	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Mr Morey	Severe: wetness, percs slowly.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Mt:					
Mowata	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Mt:					
Vidrine------------	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Pt. Pits					
UA. Udifluvents					
UN------------------ Una	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
Up. Urban land					
Ur------------------ Urbo	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
Vn------------------ Vidrine	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.

TABLE 12.--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	Gravel	Topsoil
Ac: Acadia	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
AE: Allemands	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
AN. Aquents				
AR: Arat	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
BA: Barbary	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
BB:				
Basile	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Guyton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Bh: Bienville	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
Bn:				
Bienville	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
Cahaba	Good	Probable	Improbable: excess fines.	Good.
Guyton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Bo: Brimstone	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Cd:				
Caddo	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Messer	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
Ch: Cahaba	Good	Probable	Improbable: excess fines.	Good.
CO: Clovelly	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
Cr:				
Crowley	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
Vidrine	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Dm. Dumps				
GB: Ged	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
GC: Gentilly	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
Ge: Glenmora	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Gg: Gore	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Go, GU: Guyton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Gy:				
Guyton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Messer	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Ju: Judice	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Kd:				
Kinder	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Messer	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
LE-------------------- Larose	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, excess humus, wetness.
Lt-------------------- Leton	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Mb-------------------- Malbis	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Mg-------------------- Messer	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Mh:				
Messer---------------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Guyton---------------	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Mn-------------------- Midland	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
Mr-------------------- Morey	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Mt:				
Mowata---------------	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
Vidrine--------------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Pt. Pits				
UA. Udifluvents				
UN-------------------- Una	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Up. Urban land				
Ur-------------------- Urbo	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Vn-------------------- Vidrine	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.

TABLE 13.--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. The flooding limitation in this table is based on the frequency of flooding shown on a yearly basis]

Map symbol and soil name	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions
Ac----------------- Acadia	Slight---------	Severe: hard to pack, wetness.	Severe: no water.	Percs slowly---	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.
AE----------------- Allemands	Severe: seepage.	Severe: ponding, excess humus.	Slight---------	Flooding, percs slowly, ponding.	Flooding, ponding, percs slowly.	Ponding, percs slowly.
AN. Aquents						
AR----------------- Arat	Moderate: seepage.	Severe: ponding.	Moderate: slow refill.	Ponding, flooding.	Ponding, flooding.	Erodes easily, ponding.
BA----------------- Barbary	Slight---------	Severe: excess humus, hard to pack, ponding.	Severe: slow refill.	Ponding, percs slowly, flooding.	Ponding, percs slowly, flooding.	Erodes easily, ponding, percs slowly.
BB: Basile-----------	Moderate: seepage.	Severe: wetness.	Severe: slow refill.	Percs slowly, flooding.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.
Guyton-----------	Moderate: seepage.	Severe: piping, wetness.	Severe: no water.	Percs slowly, flooding.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.
Bh----------------- Bienville	Severe: seepage.	Severe: piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake.	Favorable.
Bn: Bienville---------	Severe: seepage.	Severe: piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake.	Favorable.
Cahaba-----------	Moderate: seepage.	Moderate: thin layer, piping.	Severe: no water.	Deep to water	Favorable------	Favorable.
Guyton-----------	Moderate: seepage.	Severe: piping, wetness.	Severe: no water.	Percs slowly---	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.
Bo----------------- Brimstone	Slight---------	Severe: wetness.	Severe: no water.	Percs slowly---	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.
Cd: Caddo------------	Moderate: seepage.	Severe: wetness.	Severe: slow refill.	Percs slowly---	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.
Messer-----------	Slight---------	Moderate: piping, wetness.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, slope.	Erodes easily, wetness, percs slowly.

TABLE 13.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions
Ch----------------- Cahaba	Moderate: seepage.	Moderate: thin layer, piping.	Severe: no water.	Deep to water	Favorable-------	Favorable.
CO----------------- Clovelly	Slight----------	Severe: piping, ponding, excess humus.	Slight----------	Flooding, percs slowly, subsides.	Flooding, ponding, percs slowly.	Ponding, percs slowly.
Cr: Crowley-----------	Slight----------	Severe: wetness.	Severe: no water.	Percs slowly---	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.
Vidrine-----------	Slight----------	Moderate: hard to pack, wetness.	Severe: no water.	Percs slowly---	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.
Dm. Dumps						
GB----------------- Ged	Slight----------	Severe: ponding, hard to pack.	Severe: slow refill.	Percs slowly, flooding, ponding.	Ponding, slow intake, percs slowly.	Ponding, percs slowly.
GC----------------- Gentilly	Slight----------	Severe: hard to pack, ponding.	Severe: slow refill.	Ponding, percs slowly, flooding.	Ponding, percs slowly, flooding.	Erodes easily, ponding, percs slowly.
Ge----------------- Glenmora	Moderate: seepage.	Moderate: piping, wetness.	Severe: slow refill.	Percs slowly---	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.
Gg----------------- Gore	Moderate: slope.	Moderate: thin layer, hard to pack.	Severe: no water.	Deep to water	Percs slowly, slope.	Erodes easily, percs slowly.
Go, GU------------- Guyton	Moderate: seepage.	Severe: piping, wetness.	Severe: no water.	Percs slowly, flooding.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.
Gy: Guyton------------	Moderate: seepage.	Severe: piping, wetness.	Severe: no water.	Percs slowly---	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.
Messer------------	Slight----------	Moderate: piping, wetness.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, slope.	Erodes easily, wetness, percs slowly.
Ju----------------- Judice	Slight----------	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly---	Wetness, percs slowly.	Wetness, percs slowly.
Kd: Kinder------------	Slight----------	Severe: wetness.	Severe: no water.	Percs slowly---	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.
Messer------------	Slight----------	Moderate: piping, wetness.	Severe: no water.	Percs slowly---	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.

TABLE 13.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions
LE: Larose	Slight	Severe: excess humus, hard to pack, ponding.	Severe: slow refill.	Percs slowly, flooding, subsides.	Slow intake, percs slowly, flooding.	Ponding, percs slowly.
Lt: Leton	Moderate: seepage.	Severe: wetness.	Severe: slow refill.	Percs slowly	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.
Mb: Malbis	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable	Favorable.
Mg: Messer	Slight	Moderate: piping, wetness.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, slope.	Erodes easily, wetness, percs slowly.
Mh:						
Messer	Slight	Moderate: piping, wetness.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, slope.	Erodes easily, wetness, percs slowly.
Guyton	Moderate: seepage.	Severe: piping, wetness.	Severe: no water.	Percs slowly	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.
Mn: Midland	Slight	Severe: wetness.	Severe: slow refill.	Percs slowly	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.
Mr: Morey	Slight	Severe: wetness.	Severe: slow refill.	Percs slowly	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.
Mt:						
Mowata	Slight	Severe: wetness.	Severe: slow refill.	Percs slowly	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.
Vidrine	Slight	Moderate: hard to pack, wetness.	Severe: no water.	Percs slowly	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.
Pt. Pits						
UA. Udifluvents						
UN: Una	Slight	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly, flooding.	Wetness, percs slowly.	Wetness, percs slowly.
Up. Urban land						
Ur: Urbo	Slight	Severe: wetness.	Severe: slow refill.	Percs slowly, flooding.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.
Vn: Vidrine	Slight	Moderate: hard to pack, wetness.	Severe: no water.	Percs slowly	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.

TABLE 14.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated. Some soils may have Unified classifications and USDA textures in addition to those shown. In general, the dominant classifications and textures are shown]

Map symbol and soil name	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
Ac---------------- Acadia	0-14	Silt loam--------	ML, CL-ML	A-4	100	100	95-100	85-100	15-30	NP-7
	14-19	Silt loam, silty clay loam.	CL	A-6	100	100	95-100	85-100	30-40	11-18
	19-33	Clay, silty clay	CH, CL	A-7-6	100	100	95-100	90-100	42-70	20-43
	33-63	Clay, silty clay, silty clay loam.	CH, CL	A-7-6, A-6	100	100	95-100	85-100	35-65	15-38
AE---------------- Allemands	0-29	Peat, muck-------	PT	A-8	---	---	---	---	---	---
	29-80	Clay, mucky clay	MH, OH	A-7-5	100	100	95-100	80-100	65-90	30-50
AN. Aquents										
AR---------------- Arat	3-0	Peat-------------	PT	A-8	---	---	---	---	---	---
	0-6	Mucky silt loam, silt loam, silty clay loam.	ML, CL-ML, CL, OL	A-4, A-6	100	100	90-100	75-95	<40	NP-22
	6-60	Silty clay loam, silt loam, mucky silty clay loam.	CL, CL-ML, ML, OL	A-6, A-4, A-7-6	100	100	90-100	80-95	22-45	6-25
BA---------------- Barbary	0-80	Mucky clay, clay	OH, MH	A-7-5, A-8	100	100	100	95-100	70-90	35-45
BB: Basile-----------	0-30	Silt loam--------	ML, CL, CL-ML	A-4	100	100	90-100	75-95	<30	NP-10
	30-62	Silt loam, silty clay loam	CL	A-6, A-7-6	100	100	95-100	80-95	30-42	12-20
	62-70	Silt loam, silty clay loam.	CL	A-6, A-4, A-7-6	100	100	95-100	80-95	28-42	8-20
Guyton-----------	0-29	Silt loam--------	ML, CL-ML	A-4	100	100	95-100	65-90	<27	NP-7
	29-62	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-6, A-4	100	100	94-100	75-95	22-40	6-18
Bh---------------- Bienville	0-40	Loamy fine sand	SM	A-2-4, A-4	100	100	90-100	25-50	<25	NP-3
	40-75	Loamy fine sand, fine sandy loam, fine sand.	SM, ML	A-2-4, A-4	100	100	90-100	30-55	<25	NP-3
Bn: Bienville--------	0-48	Loamy fine sand	SM	A-2-4, A-4	100	100	90-100	25-50	<25	NP-3
	48-64	Loamy fine sand, fine sandy loam, fine sand.	SM, ML	A-2-4, A-4	100	100	90-100	30-55	<25	NP-3
Cahaba-----------	0-16	Fine sandy loam	SM	A-4, A-2-4	95-100	95-100	65-90	30-45	---	NP
	16-44	Sandy clay loam, loam, clay loam.	SC, CL	A-4, A-6	90-100	80-100	75-90	40-75	22-35	8-15
	44-60	Sand, loamy sand, sandy loam.	SM, SP-SM	A-2-4	95-100	90-100	60-85	10-35	---	NP

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
Bn:										
Guyton----------	0-18	Very fine sandy loam.	ML, CL-ML	A-4	100	100	95-100	65-90	<27	NP-7
	18-46	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-6, A-4	100	100	94-100	75-95	22-40	6-18
	46-62	Silt loam, silty clay loam, sandy clay loam.	CL, CL-ML, ML	A-6, A-4	100	100	95-100	50-95	<40	NP-18
Bo--------------- Brimstone	0-16	Silt loam--------	CL-ML, CL	A-4, A-6	100	100	90-100	70-90	15-38	6-17
	16-39	Silt loam, silty clay loam.	CL	A-6, A-7-6	100	100	95-100	80-95	26-48	11-33
	39-70	Silty clay loam, silt loam.	CL	A-6, A-7-6	100	100	95-100	80-95	26-48	11-33
Cd:										
Caddo-----------	0-29	Silt loam--------	ML, CL-ML	A-4	100	100	95-100	70-95	<27	NP-7
	29-74	Silt loam, loam, silty clay loam.	CL	A-6	100	100	85-100	50-90	30-40	11-18
Messer----------	0-6	Silt loam--------	ML, CL-ML	A-4	100	100	95-100	80-95	<27	NP-7
	6-31	Silt loam, loam, very fine sandy loam.	CL, CL-ML	A-6, A-4	100	100	95-100	80-95	25-33	5-12
	31-62	Silty clay loam, clay loam, loam.	CL	A-6, A-7-6	100	100	95-100	80-95	32-45	11-21
Ch--------------- Cahaba	0-19	Fine sandy loam	SM	A-4, A-2-4	95-100	95-100	65-90	30-45	---	NP
	19-56	Sandy clay loam, loam, clay loam.	SC, CL	A-4, A-6	90-100	80-100	75-90	40-75	22-35	8-15
	56-64	Sand, loamy sand, sandy loam.	SM, SP-SM	A-2-4	95-100	90-100	60-85	10-35	---	NP
CO--------------- Clovelly	0-36	Muck-------------	PT	A-8	---	---	---	---	---	---
	36-80	Clay, silty clay, mucky clay.	CH, CL, MH	A-7-6, A-7-5	100	100	95-100	85-95	47-87	25-45
Cr:										
Crowley---------	0-25	Silt loam--------	ML, CL-ML, CL	A-4	100	100	95-100	80-100	<30	NP-10
	25-41	Silty clay, silty clay loam.	CH, CL	A-7-6	100	100	95-100	85-100	41-60	20-35
	41-65	Clay loam, silty clay.	CL, CH	A-7-6, A-6	100	100	95-100	85-100	38-60	18-35
Vidrine---------	0-20	Silt loam--------	ML, CL-ML	A-4	100	100	100	90-100	<27	NP-7
	20-51	Silty clay, silty clay loam.	CH, CL	A-7-6	100	100	100	90-100	41-60	19-32
	51-60	Silt loam, silty clay loam, silty clay.	CL, CH	A-4, A-6, A-7-6	90-100	85-100	85-100	70-100	28-55	8-28
Dm. Dumps										

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
GB: Ged	0-5	Clay	CH	A-7-5, A-7-6	100	100	100	80-95	50-75	23-43
	5-9	Clay, mucky clay, silty clay.	CH	A-7-5, A-7-6	100	100	98-100	80-95	53-85	30-52
	9-60	Clay, silty clay	CH	A-7-5, A-7-6	100	100	98-100	85-95	55-85	30-52
GC: Gentilly	6-0	Muck	PT	A-8	---	---	---	---	---	---
	0-31	Clay loam, clay	MH	A-7-5	100	100	100	95-100	70-90	35-45
	31-64	Clay, silty clay loam.	MH, CH	A-7-5	100	100	100	95-100	60-90	30-45
Ge: Glenmora	0-4	Silt loam	ML, CL-ML	A-4	100	100	90-100	75-85	<27	NP-7
	4-26	Silty clay loam, silt loam.	CL	A-6, A-4	100	100	95-100	80-95	25-38	8-16
	26-56	Silty clay loam	CL	A-6	100	100	95-100	80-95	30-40	12-18
	56-65	Silty clay loam, silty clay, clay.	CL, CH	A-6, A-7-6	100	100	95-100	80-95	30-60	12-40
Gg: Gore	0-5	Silt loam	ML, CL-ML	A-4	100	100	95-100	60-90	<27	NP-7
	5-45	Clay, silty clay	CH	A-7-6, A-7-5	100	100	95-100	85-100	53-65	28-40
	45-60	Clay, silty clay	CH	A-7-6, A-7-5	100	100	95-100	85-100	51-83	25-53
Go: Guyton	0-18	Silt loam	ML, CL-ML	A-4	100	100	95-100	65-90	<27	NP-7
	18-50	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-6, A-4	100	100	94-100	75-95	22-40	6-18
	50-65	Silt loam, silty clay loam, sandy clay loam.	CL, CL-ML, ML	A-6, A-4	100	100	95-100	50-95	<40	NP-18
GU: Guyton	0-28	Silt loam	ML, CL-ML	A-4	100	100	95-100	65-90	<27	NP-7
	28-51	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-6, A-4	100	100	94-100	75-95	22-40	6-18
	51-62	Silt loam, silty clay loam, sandy clay loam.	CL, CL-ML, ML	A-6, A-4	100	100	95-100	50-95	<40	NP-18
Gy: Guyton	0-26	Silt loam	ML, CL-ML	A-4	100	100	95-100	65-90	<27	NP-7
	26-55	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-6, A-4	100	100	94-100	75-95	22-40	6-18
	55-67	Silt loam, silty clay loam, clay loam.	CL, CL-ML, ML	A-6, A-4	100	100	95-100	50-95	<40	NP-18
Messer	0-6	Silt loam	ML, CL-ML	A-4	100	100	95-100	80-95	<27	NP-7
	6-28	Silt loam, loam, very fine sandy loam.	CL, CL-ML	A-6, A-4	100	100	95-100	80-95	25-33	5-12
	28-60	Silty clay loam, clay loam, loam.	CL	A-6, A-7-6	100	100	95-100	80-95	32-45	11-21
	63-90	Silty clay loam, clay loam, loam.	CL	A-6, A-7-6	100	100	95-100	80-95	32-45	11-21

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
Ju---------------- Judice	0-5	Silty clay loam	CL, CH	A-7-6	100	100	100	95-100	47-58	22-30
	5-60	Silty clay, silty clay loam, clay loam.	CH, CL	A-7-6, A-7-5	95-100	95-100	90-100	75-100	47-80	32-48
Kd: Kinder-----------	0-17	Silt loam--------	ML, CL-ML, CL	A-4	100	100	95-100	60-100	<28	NP-8
	17-60	Silty clay loam, loam, silt loam.	CL	A-6, A-7-6	100	100	95-100	70-100	32-43	11-20
	60-70	Silt loam, loam, very fine sandy loam.	CL-ML, CL	A-6, A-4	100	100	95-100	70-100	25-38	5-16
Messer-----------	0-8	Silt loam--------	ML, CL-ML	A-4	100	100	95-100	80-95	<27	NP-7
	8-32	Silt loam, loam, very fine sandy loam.	CL, CL-ML	A-6, A-4	100	100	95-100	80-95	25-33	5-12
	32-68	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7-6	100	100	95-100	80-95	32-45	11-21
LE---------------- Larose	0-5	Mucky clay--------	OH, MH, CH	A-7-5, A-7-6	100	100	100	90-100	60-87	30-52
	5-12	Muck--------------	PT	A-8	100	100	100	90-100	60-87	30-52
	12-80	Clay, silty clay, mucky clay.	OH, MH, CH	A-7-5, A-7-6	100	100	100	90-100	60-87	30-52
Lt---------------- Leton	0-34	Silt loam, loam	CL, CL-ML, SM-SC, SC	A-4, A-6	100	98-100	95-100	45-98	21-30	5-12
	34-62	Clay loam, silty clay loam, loam.	CL	A-6, A-7-6	100	98-100	95-100	51-98	30-43	14-26
Mb---------------- Malbis	0-9	Fine sandy loam	SM, ML	A-4	100	97-100	92-97	40-62	<30	NP-5
	9-26	Loam, sandy clay loam, clay loam.	CL-ML, CL	A-4, A-6	99-100	95-100	91-100	55-70	25-35	5-11
	26-35	Sandy clay loam, clay loam.	ML, CL	A-4, A-5, A-6, A-7	98-100	96-100	90-100	56-80	29-49	4-15
	35-65	Sandy clay loam, clay loam.	ML, CL	A-4, A-5, A-6, A-7	98-100	96-100	90-100	56-80	30-49	4-15
Mg---------------- Messer	0-7	Silt loam--------	ML, CL-ML	A-4	100	100	95-100	80-95	<27	NP-7
	7-44	Silt loam, loam, very fine sandy loam.	CL, CL-ML	A-6, A-4	100	100	95-100	80-95	25-33	5-12
	44-60	Silty clay loam, clay loam, loam.	CL	A-6, A-7-6	100	100	95-100	80-95	32-45	11-21
Mh: Messer-----------	0-8	Silt loam--------	ML, CL-ML	A-4	100	100	95-100	80-95	<27	NP-7
	8-46	Silt loam, loam, very fine sandy loam.	CL, CL-ML	A-6, A-4	100	100	95-100	80-95	25-33	5-12
	46-70	Silty clay loam, clay loam, loam.	CL	A-6, A-7-6	100	100	95-100	80-95	32-45	11-21

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
Mh: Guyton----------	0-21	Silt loam--------	ML, CL-ML	A-4	100	100	95-100	65-90	<27	NP-7
	21-60	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-6, A-4	100	100	94-100	75-95	22-40	6-18
	60-70	Silt loam, silty clay loam, sandy clay loam.	CL, CL-ML, ML	A-6, A-4	100	100	95-100	50-95	<40	NP-18
Mn--------------- Midland	0-10	Silty clay loam	CL	A-6, A-7-6	100	100	90-100	75-100	30-42	12-22
	10-60	Silty clay, clay, silty clay loam.	CH, CL	A-7-6	100	100	100	95-100	41-65	20-40
Mr--------------- Morey	0-18	Loam-------------	CL, CL-ML	A-4, A-6	100	95-100	90-100	75-95	23-40	5-18
	18-39	Silty clay loam, clay loam.	CL	A-6, A-7	100	95-100	90-100	85-95	34-50	14-30
	39-60	Clay loam, silty clay, silty clay loam.	CL, CH	A-6, A-7	98-100	95-100	90-100	85-95	35-60	15-36
Mt: Mowata----------	0-21	Silt loam--------	ML, CL-ML, CL	A-4	100	100	95-100	90-100	22-30	NP-10
	21-60	Silty clay loam, silty clay, clay loam.	CL, CH	A-7-6	100	100	95-100	75-95	41-60	22-37
Vidrine---------	0-15	Silt loam--------	ML, CL-ML	A-4	100	100	100	90-100	<27	NP-7
	15-50	Silty clay, silty clay loam.	CH, CL	A-7-6	100	100	100	90-100	41-60	19-32
	50-74	Silt loam, silty clay loam, silty clay.	CL, CH	A-4, A-6, A-7-6	90-100	85-100	85-100	70-100	28-55	8-28
Pt. Pits										
UA. Udifluvents										
UN--------------- Una	0-5	Silty clay loam	CL	A-7-6, A-6	100	100	90-100	75-95	30-50	15-30
	5-65	Silty clay loam, clay loam.	CL	A-7-6, A-6	100	100	90-100	75-95	30-50	15-30
Up. Urban land										
Ur--------------- Urbo	0-4	Silty clay loam	CL	A-6	100	100	95-100	95-100	30-40	15-25
	4-60	Silty clay, clay loam, silty clay loam.	CL, CH	A-7	100	100	95-100	80-98	44-62	20-36
Vn--------------- Vidrine	0-16	Silt loam--------	ML, CL-ML	A-4	100	100	100	90-100	<27	NP-7
	16-46	Silty clay, silty clay loam.	CH, CL	A-7-6	100	100	100	90-100	41-60	19-32
	46-60	Silt loam, silty clay loam, silty clay.	CL, CH	A-4, A-6, A-7-6	90-100	85-100	85-100	70-100	28-55	8-28

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "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	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	mmho/cm				Pct
Ac----------------- Acadia	0-14	14-27	1.35-1.70	0.6-2.0	0.16-0.23	3.6-6.0	<2	Low----------	0.49	5	.5-2
	14-19	20-39	1.35-1.70	0.6-2.0	0.16-0.22	4.5-5.5	<2	Moderate----	0.32		
	19-33	40-55	1.20-1.60	<0.06	0.15-0.18	4.5-6.0	<2	High--------	0.32		
	33-60	30-55	1.20-1.70	<0.2	0.15-0.20	4.5-6.0	<2	High--------	0.32		
AE----------------- Allemands	0-29	---	0.05-0.25	>2.0	0.20-0.50	5.1-7.8	<4	Low----------	----	---	---
	29-80	20-95	0.25-1.00	<0.6	0.12-0.18	4.5-7.8	<4	High--------	0.37		
AN. Aquents											
AR----------------- Arat	3-0	---	0.05-0.25	2.0-6.0	0.20-0.50	5.1-6.5	<2	Low----------	----	---	---
	0-6	10-32	0.25-1.00	0.6-2.0	0.18-0.23	5.1-7.3	<2	Low----------	0.43		
	6-60	14-35	0.25-1.00	0.06-0.2	0.18-0.20	5.6-7.8	<2	Moderate----	0.37		
BA----------------- Barbary	0-80	60-95	0.60-1.50	<0.06	0.18-0.20	5.1-6.5	<2	Very high	0.32	5	---
BB: Basile-----------	0-30	10-27	1.35-1.65	0.6-2.0	0.18-0.20	4.5-7.3	<2	Low----------	0.43	5	.5-2
	30-62	28-35	1.35-1.70	0.06-0.2	0.20-0.22	5.6-8.4	<2	Moderate----	0.37		
	62-70	14-35	1.35-1.70	0.06-0.2	0.18-0.20	6.1-8.4	<2	Low----------	0.43		
Guyton-----------	0-29	7-25	1.35-1.65	0.6-2.0	0.20-0.23	3.6-6.0	<2	Low----------	0.43	5	.5-2
	29-62	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-6.0	<2	Low----------	0.37		
Bh----------------- Bienville	0-40	5-15	1.35-1.60	2.0-6.0	0.08-0.11	4.5-6.5	<2	Low----------	0.20	5	.5-2
	40-75	5-20	1.35-1.80	2.0-6.0	0.08-0.13	4.5-6.0	<2	Low----------	0.20		
Bn: Bienville--------	0-48	5-15	1.35-1.60	2.0-6.0	0.08-0.11	4.5-6.5	<2	Low----------	0.20	5	.5-2
	48-64	5-20	1.35-1.80	2.0-6.0	0.08-0.13	4.5-6.0	<2	Low----------	0.20		
Cahaba-----------	0-16	7-17	1.35-1.60	2.0-6.0	0.10-0.14	3.6-6.0	<2	Low----------	0.24	5	.5-2
	16-44	18-35	1.35-1.60	0.6-2.0	0.12-0.15	4.5-6.0	<2	Low----------	0.28		
	44-60	4-20	1.40-1.70	2.0-20	0.05-0.10	4.5-6.0	<2	Low----------	0.24		
Guyton-----------	0-18	7-25	1.35-1.65	0.6-2.0	0.20-0.23	3.6-6.0	<2	Low----------	0.43	5	.5-2
	18-46	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-6.0	<2	Low----------	0.37		
	46-62	20-35	1.35-1.70	0.06-2.0	0.15-0.22	3.6-6.0	<2	Low----------	0.37		
Bo----------------- Brimstone	0-16	5-14	1.35-1.65	0.6-2.0	0.13-0.20	4.5-7.8	<2	Low----------	0.49	3	.5-2
	16-39	17-32	1.35-1.70	0.06-0.2	0.10-0.16	6.6-8.4	<2	Moderate----	0.43		
	39-70	20-35	1.35-1.70	0.06-0.2	0.10-0.16	6.6-8.4	<2	Moderate----	0.43		
Cd: Caddo------------	0-29	14-27	1.35-1.70	0.6-2.0	0.18-0.23	4.5-6.0	<2	Low----------	0.49	5	.5-2
	29-74	18-35	1.35-1.70	0.06-0.2	0.20-0.22	4.5-6.0	<2	Low----------	0.37		
Messer-----------	0-6	10-15	1.35-1.65	0.6-2.0	0.15-0.21	3.6-6.0	<2	Low----------	0.49	5	.5-2
	6-31	10-18	1.35-1.70	0.2-0.6	0.20-0.22	4.5-6.0	<2	Low----------	0.43		
	31-62	20-30	1.35-1.70	0.06-0.2	0.15-0.20	4.5-6.0	<2	Low----------	0.37		

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Organic matter
									K	T	
	In	Pct	G/cc	In/hr	In/in	pH	mmho/cm				Pct
Ch---------------- Cahaba	0-19	7-17	1.35-1.60	2.0-6.0	0.10-0.14	3.6-6.0	<2	Low----------	0.24	5	.5-2
	19-56	18-35	1.35-1.60	0.6-2.0	0.12-0.15	4.5-6.0	<2	Low----------	0.28		
	56-64	4-20	1.40-1.70	2.0-20	0.05-0.10	4.5-6.0	<2	Low----------	0.24		
CO---------------- Clovelly	0-36	---	0.05-0.25	>2.0	0.10-0.45	6.1-8.4	4-8	Low----------	----	---	---
	36-80	50-90	0.15-1.00	<0.06	0.11-0.18	6.6-8.4	4-8	Very high	0.28		
Cr: Crowley----------	0-25	10-27	1.30-1.65	0.2-0.6	0.20-0.23	4.5-6.0	<2	Low----------	0.49	5	.5-2
	25-41	35-50	1.20-1.65	<0.06	0.19-0.21	4.5-6.5	<2	High---------	0.32		
	41-65	27-55	1.30-1.65	0.06-0.2	0.20-0.22	4.5-6.5	<2	Moderate-----	0.32		
Vidrine----------	0-20	10-27	1.30-1.65	0.6-2.0	0.20-0.23	4.5-6.0	<2	Low----------	0.49	5	.5-2
	20-51	27-50	1.18-1.65	0.06-0.2	0.18-0.20	4.5-6.0	<2	High---------	0.32		
	51-60	20-50	1.25-1.65	0.06-0.2	0.18-0.22	5.6-8.4	<2	Moderate-----	0.32		
Dm. Dumps											
GB---------------- Ged	0-5	35-55	0.60-1.35	<0.06	0.14-0.18	5.6-7.8	<2	High---------	0.28	5	8-20
	5-9	45-75	1.15-1.35	<0.06	0.14-0.18	5.6-7.8	<2	High---------	0.24		
	9-60	60-80	1.20-1.50	<0.06	0.14-0.18	6.1-8.4	<2	High---------	0.24		
GC---------------- Gentilly	6-0	45-90	0.15-0.60	>2.0	0.20-0.50	5.6-7.8	2-8	Low----------	----	---	---
	0-31	60-95	0.25-1.20	<0.06	0.12-0.15	6.6-7.8	2-8	Very high	0.37		
	31-64	60-95	0.25-1.50	<0.06	0.12-0.15	6.6-7.8	2-8	Very high	0.37		
Ge---------------- Glenmora	0-4	8-22	1.35-1.65	0.6-2.0	0.20-0.23	3.6-6.0	<2	Low----------	0.49	5	.5-2
	4-26	18-35	1.35-1.65	0.6-2.0	0.18-0.20	4.5-6.0	<2	Low----------	0.43		
	26-56	27-35	1.35-1.70	0.06-0.2	0.18-0.20	4.5-6.0	<2	Moderate-----	0.43		
	56-65	35-45	1.35-1.70	0.06-0.2	0.14-0.20	4.5-6.0	<2	High---------	0.37		
Gg---------------- Gore	0-5	5-15	1.30-1.50	0.6-2.0	0.20-0.22	4.5-6.0	<2	Low----------	0.49	5	.5-4
	5-45	40-60	1.20-1.70	<0.06	0.14-0.18	4.5-7.3	<2	High---------	0.32		
	45-60	40-80	1.20-1.70	<0.06	0.14-0.18	4.5-8.4	<2	High---------	0.32		
Go---------------- Guyton	0-18	7-25	1.35-1.65	0.6-2.0	0.20-0.23	3.6-6.0	<2	Low----------	0.43	5	<2
	18-50	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-6.0	<2	Low----------	0.37		
	50-65	20-35	1.35-1.70	0.06-2.0	0.15-0.22	3.6-6.0	<2	Low----------	0.37		
GU---------------- Guyton	0-28	7-25	1.35-1.65	0.6-2.0	0.20-0.23	3.6-6.0	<2	Low----------	0.43	5	<2
	28-51	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-6.0	<2	Low----------	0.37		
	51-62	20-35	1.35-1.70	0.06-2.0	0.15-0.22	3.6-6.0	<2	Low----------	0.37		
Gy: Guyton-----------	0-26	7-25	1.35-1.65	0.6-2.0	0.20-0.23	3.6-6.0	<2	Low----------	0.43	5	<2
	26-55	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-6.0	<2	Low----------	0.37		
	55-67	20-35	1.35-1.70	0.06-2.0	0.15-0.22	3.6-6.0	<2	Low----------	0.37		
Messer-----------	0-5	10-15	1.35-1.65	0.6-2.0	0.15-0.21	3.6-6.0	<2	Low----------	0.49	5	.5-2
	5-28	10-18	1.35-1.70	0.2-0.6	0.20-0.22	4.5-6.0	<2	Low----------	0.43		
	28-60	20-30	1.35-1.70	0.06-0.2	0.15-0.20	4.5-6.0	<2	Low----------	0.37		
Ju---------------- Judice	0-5	27-50	1.20-1.70	0.06-0.2	0.17-0.22	5.1-7.3	<2	High---------	0.32	5	2-4
	5-60	27-50	1.20-1.70	<0.06	0.15-0.19	5.6-8.4	<2	High---------	0.32		
Kd: Kinder-----------	0-17	7-14	1.35-1.65	0.6-2.0	0.15-0.21	4.5-6.0	<2	Low----------	0.49	5	2-4
	17-60	25-34	1.35-1.70	0.06-0.2	0.15-0.20	4.5-6.5	<2	Moderate-----	0.37		
	60-70	15-32	1.35-1.65	0.2-0.6	0.15-0.20	4.5-8.4	<2	Low----------	0.37		

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Organic matter
									K	T	
	In	Pct	G/cc	In/hr	In/in	pH	mmho/cm				Pct
Kd:											
Messer----------	0-8	10-15	1.35-1.65	0.6-2.0	0.15-0.21	4.5-6.0	<2	Low---------	0.49	5	.5-2
	8-32	10-18	1.35-1.70	0.2-0.6	0.20-0.22	4.5-6.0	<2	Low---------	0.43		
	32-68	20-30	1.35-1.70	0.06-0.2	0.15-0.20	4.5-6.0	<2	Low---------	0.37		
LE--------------- Larose	0-5	50-60	0.15-1.00	<0.06	0.14-0.22	5.6-7.8	<4	High--------	0.20	5	15-30
	5-12	---	0.05-0.25	>2.0	0.20-0.50	5.6-7.8	<4	Low---------	---		
	12-80	50-80	0.15-1.00	<0.06	0.14-0.18	6.1-8.4	<4	Very high	0.28		
Lt--------------- Leton	0-34	10-25	1.20-1.50	0.6-2.0	0.15-0.20	4.5-7.3	<2	Low---------	0.43	5	1-3
	34-62	20-35	1.30-1.60	0.06-0.2	0.15-0.20	4.5-7.3	<2	Moderate----	0.37		
Mb--------------- Malbis	0-9	10-25	1.30-1.60	0.6-2.0	0.10-0.15	3.6-6.0	<2	Low---------	0.24	5	.5-2
	9-26	18-33	1.30-1.70	0.6-2.0	0.12-0.20	4.5-5.5	<2	Low---------	0.28		
	26-35	20-35	1.40-1.60	0.6-2.0	0.12-0.17	4.5-5.5	<2	Low---------	0.28		
	35-65	20-35	1.45-1.70	0.2-0.6	0.06-0.12	4.5-5.5	<2	Low---------	0.28		
Mg--------------- Messer	0-19	10-15	1.35-1.65	0.6-2.0	0.15-0.21	3.6-6.0	<2	Low---------	0.49	5	.5-2
	19-44	10-18	1.35-1.70	0.2-0.6	0.20-0.22	4.5-6.0	<2	Low---------	0.43		
	44-60	20-30	1.35-1.70	0.06-0.2	0.15-0.20	4.5-6.0	<2	Low---------	0.37		
Mh:											
Messer----------	0-16	10-15	1.35-1.65	0.6-2.0	0.15-0.21	3.6-6.0	<2	Low---------	0.49	5	.5-2
	16-46	10-18	1.35-1.70	0.2-0.6	0.20-0.22	4.5-6.0	<2	Low---------	0.43		
	46-70	20-30	1.35-1.70	0.06-0.2	0.15-0.20	4.5-6.0	<2	Low---------	0.37		
Guyton----------	0-21	7-25	1.35-1.65	0.6-2.0	0.20-0.23	3.6-6.0	<2	Low---------	0.43	5	<2
	21-60	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-6.0	<2	Low---------	0.37		
	60-70	20-35	1.35-1.70	0.06-2.0	0.15-0.22	3.6-6.0	<2	Low---------	0.37		
Mn--------------- Midland	0-10	27-39	1.30-1.65	0.06-0.2	0.20-0.22	5.1-7.3	<2	Moderate----	0.37	5	1-4
	10-60	35-55	1.19-1.65	<0.06	0.18-0.20	5.6-8.4	<2	High--------	0.32		
Mr--------------- Morey	0-18	15-30	1.25-1.50	0.6-2.0	0.16-0.24	5.1-7.3	<2	Low---------	0.37	5	1-4
	18-39	25-35	1.25-1.50	0.06-0.2	0.18-0.22	5.1-7.8	<2	Moderate----	0.37		
	39-60	30-45	1.40-1.65	0.06-0.2	0.18-0.22	5.6-8.4	<2	High--------	0.37		
Mt:											
Mowata----------	0-21	8-24	1.35-1.65	0.2-0.6	0.21-0.23	4.5-7.3	<2	Low---------	0.49	5	1-4
	21-60	35-50	1.20-1.70	<0.06	0.18-0.20	5.1-8.4	<2	High--------	0.37		
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	.5-2
	15-50	27-50	1.18-1.65	0.06-0.2	0.18-0.20	4.5-6.0	<2	High--------	0.32		
	50-74	20-50	1.25-1.65	0.06-0.2	0.18-0.22	5.6-8.4	<2	Moderate----	0.32		
Pt. Pits											
UA. Udifluvents											
UN--------------- Una	0-5	28-35	1.40-1.60	<0.06	0.15-0.20	4.5-5.5	<2	Moderate----	0.32	5	.5-2
	5-65	28-35	1.40-1.60	<0.06	0.15-0.20	4.5-5.5	<2	Moderate----	0.28		
Up. Urban land											

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cc	In/hr	In/in	pH	mmho/cm				Pct
Ur---------------- Urbo	0-4	12-35	1.40-1.50	0.06-0.2	0.19-0.21	4.5-5.5	<2	Low----------	0.49	5	1-3
	4-60	35-55	1.45-1.55	<0.06	0.18-0.20	4.5-5.5	<2	Moderate----	0.28		
Vn---------------- Vidrine	0-16	10-27	1.30-1.65	0.6-2.0	0.20-0.23	4.5-6.0	<2	Low----------	0.49	5	.5-2
	16-46	27-50	1.18-1.65	0.06-0.2	0.18-0.20	4.5-6.0	<2	High--------	0.32		
	46-60	20-50	1.25-1.65	0.06-0.2	0.18-0.22	5.6-8.4	<2	Moderate----	0.32		

TABLE 16.--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. The flooding frequencies shown in this table are for the period June through November]

Map symbol and soil name	Hydrologic group	Flooding		High water table		
		Frequency	Duration	Depth	Kind	Months
				Ft		
Ac: Acadia	D	None	---	0.5-1.5	Perched	Dec-Apr
AE: Allemands	D	Frequent	Very long	+1-0.5	Apparent	Jan-Dec
AN. Aquents						
AR: Arat	D	Frequent	Very long	+3-0.5	Apparent	Jan-Dec
BA: Barbary	D	Frequent	Brief to very long.	+1-0.5	Apparent	Jan-Dec
BB:						
Basile	D	Frequent	Brief to long	0-1.5	Apparent	Dec-May
Guyton	D	Frequent	Very brief to long.	0-1.5	Perched	Dec-May
Bh: Bienville	A	None	---	4.0-6.0	Apparent	Dec-Apr
Bn:						
Bienville	A	None	---	4.0-6.0	Apparent	Dec-Apr
Cahaba	B	None	---	>6.0	---	---
Guyton	D	Rare	---	0-1.5	Perched	Dec-May
Bo: Brimstone	D	Rare	---	0-1.5	Perched	Dec-Apr
Cd:						
Caddo	D	None	---	0-2.0	Apparent	Dec-Apr
Messer	C	None	---	2.0-4.0	Perched	Dec-May
Ch: Cahaba	B	None	---	>6.0	---	---
CO: Clovelly	D	Frequent	Very long	+1-0.5	Apparent	Jan-Dec
Cr:						
Crowley	D	None	---	0.5-1.5	Perched	Dec-Apr
Vidrine	D	None	---	1.0-2.0	Perched	Dec-Apr
Dm. Dumps						
GB: Ged	D	Frequent	Very long	+1-0	Apparent	Jan-Dec

TABLE 16.--WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding		High water table		
		Frequency	Duration	Depth	Kind	Months
				Ft		
GC: Gentilly	D	Frequent	Very long	+1-0.5	Apparent	Jan-Dec
Ge: Glenmora	C	None	---	2.0-3.0	Apparent	Dec-Apr
Gg: Gore	D	None	---	>6.0	---	---
Go: Guyton	D	Occasional	Very brief to long.	0-1.5	Perched	Dec-May
GU: Guyton	D	Frequent	Very brief to long.	0-1.5	Perched	Dec-May
Gy:						
Guyton	D	Rare	---	0-1.5	Perched	Dec-May
Messer	C	None	---	2.0-4.0	Perched	Dec-May
Ju: Judice	D	Rare	---	0-1.5	Apparent	Dec-Apr
Kd:						
Kinder	C	None	---	0-2.0	Perched	Dec-Apr
Messer	C	None	---	2.0-4.0	Perched	Dec-May
LE: Larose	D	Frequent	Very long	+3-0.5	Apparent	Jan-Dec
Lt: Leton	D	Rare	---	0-1.5	Apparent	Dec-Apr
Mb: Malbis	B	None	---	2.5-4.0	Perched	Dec-Mar
Mg: Messer	C	None	---	2.0-4.0	Perched	Dec-May
Mh:						
Messer	C	None	---	2.0-4.0	Perched	Dec-May
Guyton	D	Rare	---	0-1.5	Perched	Dec-May
Mn: Midland	D	Rare	---	0.5-3.0	Apparent	Dec-Apr
Mr: Morey	D	Rare	---	0-2.0	Apparent	Dec-Feb
Mt:						
Mowata	D	None	---	0-2.0	Apparent	Dec-Apr
Vidrine	D	None	---	1.0-2.0	Perched	Dec-Apr
Pt. Pits						

TABLE 16.--WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding		High water table		
		Frequency	Duration	Depth	Kind	Months
				Ft		
UA. Udifluvents						
UN: Una	D	Frequent	Brief to long	0.5-1.0	Apparent	Nov-Apr
Up. Urban land						
Ur: Urbo	D	Occasional	Brief to long	1.0-2.0	Apparent	Jan-Mar
Vn: Vidrine	D	None	---	1.0-2.0	Perched	Dec-Apr

TABLE 17.--FERTILITY ANALYSES ON SELECTED SOILS

[Analyses by the Soil Fertility Laboratory, Louisiana Agricultural Experiment Station. The symbol < means less than. Dashes indicate analyses were not made]

Soil name and sample number	Depth	Horizon	pH 1:1 H_2O	Organic matter	Extractable P	Exchangeable cations						Total acidity	Effective cation-exchange capacity	Cation-exchange capacity (sum)	Base saturation (sum)	Saturation	
						Ca	Mg	K	Na	Al	H					Effective cation-exchange capacity Al	Sum of cation-exchange capacity Na
	In			Pct	ppm	Meq/100g									Pct	Pct	Pct
Acadia silt loam: (S81LA-19-16)	0-5	A	4.1	0.96	5	0.9	0.2	<0.1	0.1	2.6	0.7	5.2	4.5	6.4	19.0	56.5	1.6
	5-14	E	4.8	0.24	5	1.9	1.2	<0.1	0.1	1.9	0.6	4.7	5.7	7.9	40.0	32.8	1.3
	14-19	BE	5.0	0.10	5	2.6	1.6	0.1	0.2	3.6	0.9	6.8	9.0	11.3	40.0	40.4	1.8
	19-33	Btg	5.1	0.04	5	5.0	3.4	0.2	0.8	9.0	1.4	14.1	20.8	23.5	40.0	45.4	3.4
	33-48	BCg1	5.1	0.04	5	5.3	3.5	0.2	1.1	8.1	1.3	14.2	19.7	24.3	42.0	41.5	4.5
	48-63	BCg2	5.1	0.00	5	7.7	5.1	0.2	1.5	7.2	1.2	12.6	22.9	27.1	54.0	31.4	5.5
Allemands peat: (S82LA19-9)	0-12	Oe	---	26.71	18	22.2	9.7	<0.1	1.8	0.3	0.3	27.0	34.5	60.9	55.7	0.9	3.0
	12-29	Oa	---	36.45	22	29.4	11.6	0.1	1.4	0.3	0.3	37.4	43.0	79.8	53.1	0.7	1.8
	29-44	Abg	4.9	13.95	9	27.0	12.0	0.1	1.0	0.0	0.2	25.9	40.3	66.0	60.8	0.0	1.5
	44-50	Cg1	5.2	1.23	5	15.6	8.4	0.1	0.8	0.0	0.2	11.5	25.1	36.4	68.4	0.0	2.2
	50-60	Cg2	5.5	0.34	<5	13.2	7.1	0.1	0.6	0.0	0.0	6.5	21.0	27.5	76.4	0.0	2.2
	60-80	Cg3	6.0	0.20	<5	14.4	7.4	0.1	0.7	0.0	0.0	5.8	22.6	28.4	79.6	0.0	2.5
Barbary mucky clay: (S83LA19-1)	0-5	A	5.2	6.45	31	13.2	13.5	0.8	1.3	0.4	0.3	19.4	29.5	48.2	59.8	1.4	2.7
	5-42	Cg1	---	2.36	32	4.9	5.7	0.6	2.0	1.0	0.7	8.6	14.9	21.8	60.6	6.7	9.2
	42-80	Cg2	---	1.56	34	4.3	4.3	0.2	2.3	1.0	1.1	8.6	13.3	19.7	56.3	7.6	11.7
Basile silt loam: (S81LA19-17)	0-4	A	4.7	1.25	10	7.7	1.8	0.1	0.1	0.4	0.4	5.2	10.5	14.9	65.0	3.8	<0.1
	4-23	Eg1	5.3	0.53	5	2.9	1.2	<0.1	0.1	0.2	0.4	3.1	4.8	7.3	58.0	4.1	1.4
	23-30	Eg2	6.1	0.04	5	5.4	3.4	<0.1	1.2	0.0	0.0	2.6	10.0	12.6	79.0	0.0	9.5
	30-42	B/E	6.8	0.04	5	5.6	3.8	0.1	1.7	0.0	0.0	0.5	11.2	11.7	96.0	0.0	14.5
	42-62	Btg	7.3	0.10	5	7.6	5.1	0.1	2.2	0.0	0.0	1.0	15.0	16.0	94.0	0.0	13.8
	62-70	BCg	7.2	0.10	7	6.7	4.2	0.1	1.6	0.0	0.0	0.0	12.6	12.6	100.0	0.0	12.7
Bienville loamy fine sand: (S80LA19-118)	0-4	A	4.5	1.64	13	1.4	0.2	0.1	<0.1	0.4	0.4	3.6	2.5	5.3	32.0	15.4	<0.1
	4-16	E	5.3	0.24	5	0.6	0.1	<0.1	0.1	0.1	0.3	1.0	1.2	1.8	44.0	7.7	5.6
	16-40	B/E	5.5	0.04	5	0.6	0.2	<0.1	<0.1	0.0	0.3	0.5	1.1	1.3	62.0	0.0	<0.1
	40-75	Bt	5.5	0.10	9	0.6	0.1	<0.1	<0.1	0.0	0.2	0.5	0.9	1.2	58.0	0.0	<0.1
Cahaba fine sandy loam: (S80LA19-115)	0-4	A	4.3	1.61	<5	<0.1	0.1	<0.1	0.1	1.0	0.6	4.5	1.8	4.7	4.2	55.5	2.1
	4-15	E	5.0	0.19	<5	<0.1	0.1	<0.1	0.1	0.7	0.4	2.4	1.3	2.6	7.6	53.8	3.8
	15-19	E/B	5.2	0.15	<5	0.1	0.2	<0.1	0.1	1.3	0.7	5.2	2.4	5.6	7.1	54.1	1.7
	19-44	Bt1	4.9	0.06	<5	0.2	0.5	0.1	<0.1	5.7	0.2	8.1	6.7	8.9	8.9	85.0	<0.1
	44-56	Bt2	5.0	0.01	<5	<0.1	0.5	0.1	0.1	5.2	0.2	7.1	6.1	7.8	8.9	85.2	1.2
	56-64	C	5.0	0.06	<5	<0.1	0.3	0.1	0.1	4.1	0.3	5.6	4.9	6.1	8.1	83.6	1.6

See footnote at end of table.

TABLE 17.--FERTILITY ANALYSES ON SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	pH 1:1 H_2O	Organic matter	Extractable P	Exchangeable cations						Total acidity	Effective cation-exchange capacity	Cation-exchange capacity (sum)	Base saturation (sum)	Saturation	
						Ca	Mg	K	Na	Al	H					Effective cation-exchange capacity Al	Sum of cation-exchange capacity Na
	In			Pct	ppm	Meq/100g									Pct	Pct	Pct
Glenmora silt loam: (S81LA19-12)	0-4	A	4.3	1.49	5	1.4	0.4	0.1	0.1	1.1	0.3	4.2	3.4	6.2	32.0	32.4	1.6
	4-10	BA	5.1	0.39	5	1.8	1.1	<0.1	0.2	1.2	0.6	2.0	4.9	5.1	61.0	24.0	3.9
	10-15	Bt1	5.1	0.24	5	1.6	1.2	<0.1	0.2	2.6	0.4	6.2	6.0	9.2	33.0	42.6	2.2
	15-26	Bt2	5.4	0.10	5	3.1	2.7	0.1	0.7	2.1	0.5	5.2	9.2	11.8	56.0	22.8	5.9
	26-34	B/E	5.1	0.10	5	1.9	2.0	0.1	0.4	3.3	0.8	7.3	8.5	11.7	38.0	38.8	3.4
	34-56	Btv	5.3	0.15	5	2.4	2.2	0.1	0.6	2.6	0.3	6.3	8.2	11.6	46.0	31.7	5.1
	56-65	BCg	5.5	0.04	5	8.7	6.7	0.2	1.7	0.2	0.3	7.4	17.8	24.7	70.0	1.1	6.9
Gore silt loam: (80LA19-116)	0-2	A	4.9	3.86	<5	3.0	1.0	0.1	0.3	0.8	0.6	9.6	5.8	14.0	31.4	13.7	2.1
	2-5	E	5.1	0.85	<5	1.3	0.6	<0.1	0.4	1.9	0.5	4.0	4.7	6.3	36.5	40.4	6.3
	5-17	Bt	5.0	0.41	<5	2.3	2.6	0.1	0.4	13.3	0.1	20.4	18.8	25.8	20.9	70.7	1.5
	17-45	Btg	4.9	0.10	<5	0.8	2.0	0.1	0.5	12.5	0.4	19.8	16.3	23.2	14.6	76.6	2.1
	45-60	BCg	4.9	0.02	<5	0.4	2.0	0.2	0.6	11.4	0.5	16.3	15.1	19.5	16.4	75.4	3.0
Guyton silt loam: (S81LA19-14)	0-7	A	5.1	1.11	7	6.4	1.6	0.1	0.1	0.0	0.4	4.7	8.6	12.9	64.0	0.0	<1.0
	7-18	Eg1	4.9	0.15	5	0.7	0.3	<0.1	0.1	3.8	0.9	5.8	5.8	6.9	16.0	64.4	1.4
	18-28	Eg2	4.9	0.15	5	0.8	0.6	0.1	0.2	5.2	1.2	8.4	8.1	10.1	17.0	64.2	2.0
	28-39	B/E	5.0	0.10	5	2.2	1.2	0.1	0.6	5.7	1.1	8.8	10.9	12.9	32.0	52.3	4.6
	39-51	Btg	5.1	0.15	5	2.9	1.6	0.1	0.8	5.2	1.1	7.6	11.7	13.0	42.0	44.4	6.2
	51-62	BCg	5.4	0.00	5	5.1	2.6	0.1	1.7	0.3	0.3	1.8	10.1	11.3	84.0	3.0	15.0
Judice silty clay loam: (S80LA19-100)	0-5	Ap	5.4	2.36	27	13.6	7.4	0.3	0.7	0.0	0.2	12.0	22.2	34.0	65.0	0.0	2.0
	5-11	A	5.3	1.01	5	14.8	8.4	0.2	1.0	0.0	0.3	11.5	24.7	35.9	68.0	0.0	2.8
	11-22	Bg1	6.0	0.24	5	8.6	5.2	0.1	0.6	0.0	0.0	2.0	14.5	16.5	88.0	0.0	3.6
	22-36	Bg2	6.2	0.04	5	11.6	7.1	0.2	0.9	0.0	0.0	1.6	19.8	21.4	92.0	0.0	4.2
	36-60	BCg	6.4	0.04	5	12.7	7.5	0.2	0.8	0.0	0.0	2.0	21.2	23.2	91.0	0.0	3.4
Larose mucky clay: (S82LA19-8)	0-5	A	---	---	570	10.2	21.6	0.6	11.2	0.2	0.0	16.6	45.8	60.2	72.4	0.5	18.6
	5-12	Oa	---	---	24	17.4	25.8	0.6	17.5	0.0	0.2	27.7	61.5	89.0	68.9	0.0	19.7
	12-42	A'	---	---	24	18.6	28.4	0.6	16.7	0.0	0.2	25.2	64.5	89.5	71.8	0.0	18.7
	42-80	Cg	---	---	18	16.8	27.5	1.0	18.9	0.0	0.1	18.7	64.3	82.9	77.4	0.0	22.8
Malbis fine sandy loam: (S81LA19-10)	0-5	A	4.1	1.83	9	1.6	0.2	0.1	1.7	0.0	0.0	0.5	3.3	11.7	96.0	0.0	14.5
	5-9	E	4.7	0.48	5	0.6	0.2	<0.1	2.2	0.0	0.0	1.0	1.7	16.0	94.0	0.0	13.8
	9-26	Bt1	4.7	0.19	5	0.9	0.7	<0.1	1.6	0.0	0.0	0.0	4.4	12.6	100.0	0.0	12.7
	26-35	Bt2	4.5	0.19	5	0.5	0.9	<0.1	0.2	2.9	0.4	6.3	4.9	7.9	20.0	55.0	2.5
	35-65	Btv	4.7	0.10	5	0.5	1.2	<0.1	0.3	2.6	0.3	5.8	4.9	7.8	26.0	52.0	3.8

See footnote at end of table.

TABLE 17.--FERTILITY ANALYSES ON SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	pH 1:1 H_2O	Organic matter	Extractable P	Exchangeable cations: Ca	Exchangeable cations: Mg	Exchangeable cations: K	Exchangeable cations: Na	Exchangeable cations: Al	Exchangeable cations: H	Total acidity	Effective cation-exchange capacity	Cation-exchange capacity (sum)	Base saturation (sum)	Saturation: Effective cation-exchange capacity Al	Saturation: Sum of cation-exchange capacity Na
	In			Pct	ppm	Meq/100g									Pct	Pct	Pct
Messer silt loam: (S81LA19-11)	0-3	A	4.3	1.15	5	0.7	0.2	0.1	0.1	0.8	0.4	2.6	2.3	3.7	30.0	34.8	2.7
	3-6	E	4.5	0.67	5	0.4	0.1	0.1	<0.1	1.0	0.3	2.3	1.9	2.9	21.0	50.0	<1.0
	6-31	Bw	4.8	0.04	5	0.4	0.1	0.1	0.1	1.1	0.2	1.8	2.0	2.5	28.0	55.0	4.0
	31-37	B/E	4.7	0.04	5	0.5	0.7	0.1	0.3	2.8	0.6	4.7	5.0	6.3	25.0	56.0	4.8
	37-62	Bt	4.7	0.04	5	0.9	1.0	0.1	0.4	2.8	0.7	4.2	5.9	6.6	36.0	47.4	6.1
Midland silty clay loam: (S81LA19-112)	0-5	Ap	6.0	2.14	10	21.8	3.7	0.2	0.6	0.0	0.2	8.2	26.5	34.5	76.2	0.0	1.7
	5-10	A	7.0	1.30	5	26.1	3.5	0.1	0.7	0.0	0.2	6.1	30.6	36.5	83.3	0.0	1.9
	10-25	Btg1	7.6	0.41	5	31.1	3.0	0.1	1.0	0.0	0.3	4.1	35.5	39.3	89.6	0.0	2.5
	25-54	Btg2	7.5	0.15	5	30.9	2.8	0.2	1.0	0.0	0.3	3.6	35.2	38.5	90.6	0.0	2.6
	54-60	BCg	8.0	0.01	5	35.5	1.8	0.2	0.4	0.0	0.2	2.0	38.1	39.9	95.0	0.0	1.0
Mowata silt loam: (S80LA19-13)	0-6	Ap	4.7	1.06	50	2.1	0.7	0.1	0.1	0.8	0.3	3.1	4.1	6.1	49.0	19.5	1.6
	6-21	Eg	5.1	0.58	5	2.7	1.3	0.1	0.7	1.2	0.3	3.2	6.3	8.0	60.0	19.0	8.8
	21-34	B/E	5.1	0.63	5	6.2	3.4	0.1	1.9	2.8	0.3	11.6	14.2	23.2	50.0	16.2	8.2
	34-45	Btg1	5.4	0.29	5	11.7	6.4	0.2	2.6	0.1	0.4	7.3	21.4	28.2	74.0	<1.0	9.2
	45-60	Btg2	6.1	0.19	5	10.4	5.5	0.2	2.0	0.0	0.0	2.6	18.1	20.7	37.0	0.0	9.7
Urbo silty clay loam: (S81LA19-114)	0-4	A	5.0	2.75	13	4.0	2.3	<0.1	0.1	4.9	0.4	14.2	11.7	20.6	31.0	41.8	0.4
	4-21	Bg1	5.0	1.25	<5	4.8	3.1	0.1	0.2	5.9	0.1	14.2	14.2	22.4	36.6	41.5	0.8
	21-48	Bg2	4.9	0.59	<5	8.0	4.9	0.1	0.6	9.6	0.2	21.4	23.4	35.0	38.8	41.0	1.7
	48-60	Bg3	4.9	0.19	<5	9.6	6.8	0.1	1.8	1.4	0.7	9.6	20.4	27.9	65.5	7.0	6.4
Vidrine silt loam: (S81LA19-113)	0-4	Ap1	5.1	1.47	13	1.4	0.7	0.2	0.1	1.2	0.4	8.1	4.0	10.5	22.8	30.0	0.9
	4-8	Ap2	5.2	0.90	9	1.2	0.5	0.2	0.1	4.7	0.2	6.6	6.9	8.6	23.2	68.1	1.2
	8-20	BA	5.5	0.19	5	0.7	0.4	<0.1	0.1	1.3	0.2	4.6	2.7	5.8	20.7	48.1	1.7
	20-23	B/E	5.7	0.10	5	1.6	1.8	0.1	0.3	0.0	0.3	6.6	4.1	10.4	36.5	0.0	2.9
	23-39	Btg1	6.0	0.28	5	5.2	6.0	0.2	0.8	0.0	0.2	12.8	12.4	25.0	48.8	0.0	3.2
	39-51	Btg2	6.2	0.02	5	6.5	7.2	0.2	1.0	0.0	0.2	7.1	15.1	22.0	67.7	0.0	4.5
	51-60	Btg3	6.3	0.01	5	7.3	7.3	0.2	1.0	0.0	0.3	4.6	16.1	20.4	77.4	0.0	4.9

All of the pedons are typical pedons for the series.

TABLE 18.--PHYSICAL ANALYSES OF SELECTED SOILS

[Dashes indicate analyses were not made or information was not available]

Soil name and sample number	Depth	Horizon	Particle-size distribution (mm): Sand: Very coarse (2.1)	Sand: Coarse (1-0.5)	Sand: Medium (0.5-0.25)	Sand: Fine (0.25-0.1)	Sand: Very fine (0.1-0.05)	Sand: Total (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Water content at tension: 1/3 bar	Water content at tension: 15 bar	Bulk density: Air-dry	Bulk density: Oven-dry
	In		Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	G/cm3	G/cm3
Arat mucky silt loam: (S81LA-19-5)	0-6	A	0.00	1.70	2.40	3.70	6.60	14.40	71.00	14.60	---	---	---	---
	6-36	Cg1	8.30	2.60	2.10	2.20	2.50	17.70	51.70	30.60	---	---	---	---
	36-60	Cg2	22.00	8.20	5.40	7.50	5.20	48.30	29.20	22.50	---	---	---	---
Brimstone silt loam: (S78LA-19-7)	0-6	Ap	0.02	0.22	0.50	1.12	16.75	18.61	73.95	7.44	25.45	3.05	---	---
	6-16	E	0.00	0.00	0.13	0.53	13.59	14.25	75.71	10.04	22.32	3.60	---	---
	16-27	E/Btng	0.03	0.00	0.13	0.38	9.59	10.10	72.18	17.72	24.46	5.81	---	---
	27-39	Btng/E	0.05	0.00	0.00	0.31	8.62	8.98	62.82	28.20	29.56	11.21	---	---
	39-52	Btng1	0.00	0.00	0.00	0.39	11.19	11.58	58.34	30.08	29.56	11.21	---	---
	52-70	Btng2	0.00	0.00	0.00	0.39	8.65	9.04	59.86	31.10	31.36	14.24	---	---
Caddo silt loam: (S79LA-19-8)	0-5	A	0.00	0.60	1.10	11.30	19.10	32.10	62.70	5.20	---	---	---	---
	5-17	Eg1	0.00	0.10	0.20	8.40	19.10	27.80	62.60	9.60	---	---	---	---
	17-29	Eg2	0.00	0.10	0.10	8.50	18.50	27.20	60.30	12.50	---	---	---	---
	29-51	B/E	0.00	0.10	0.10	7.20	15.20	22.60	56.50	20.90	---	---	---	---
	51-64	Btg1	0.00	0.10	0.10	6.10	14.90	21.20	54.40	24.40	---	---	---	---
	64-74	Btg2	0.00	0.10	0.10	6.60	17.70	24.50	53.00	22.50	---	---	---	---
Crowley silt loam: (S81LA-10-4)	0-3	Ap1	0.34	0.27	0.11	3.73	30.47	34.92	57.53	7.55	20.85	4.04	1.52	1.55
	3-10	Ap2	0.33	0.70	0.40	3.30	29.50	34.23	54.95	10.82	18.62	3.73	1.69	1.68
	10-25	E	1.27	1.07	0.34	2.83	25.60	31.11	57.17	11.72	19.42	5.02	1.54	1.56
	25-34	Btg1	0.14	0.47	0.20	1.54	14.79	17.14	40.36	42.50	33.25	17.34	1.82	1.83
	34-41	Btg2	0.05	0.13	0.07	1.18	15.10	16.53	41.59	41.88	34.01	17.12	1.86	1.88
	41-53	Btg3	0.25	0.40	0.18	1.70	18.03	20.56	45.81	33.63	29.92	14.02	1.88	1.91
	53-65	Btg4	0.26	0.49	0.23	1.71	21.05	23.74	44.08	32.18	24.03	13.40	1.73	1.92
Ged clay: (S81LA-19-1)	0-5	A	0.00	0.00	0.12	5.86	24.94	30.92	20.76	48.32	---	---	---	---
	5-9	2A	0.01	0.21	0.19	6.23	25.22	31.86	4.67	63.47	---	---	---	---
	9-24	2Btg1	0.00	0.19	0.38	4.16	15.21	19.94	3.82	76.24	---	---	---	---
	24-48	2Btg2	0.00	0.02	0.12	4.15	16.48	20.77	3.41	75.82	---	---	---	---
	48-60	2Cgy	1.02	1.27	0.92	3.08	10.67	16.96	28.67	54.37	---	---	---	---
Gentilly muck: (S80LA-19-3)	0-19	A	0.00	0.01	0.24	2.45	20.00	22.70	28.40	48.90	---	---	---	---
	19-31	Cg	0.00	0.01	0.06	3.61	21.62	25.30	44.00	30.70	---	---	---	---
	31-54	2Cg1	0.00	0.03	0.11	1.91	8.35	10.40	60.90	28.70	---	---	---	---
	54-64	2Cg2	0.00	0.00	0.00	2.06	21.84	23.90	12.20	63.90	---	---	---	---

See footnote at end of table.

TABLE 18.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution (mm): Sand: Very coarse (2.1)	Sand: Coarse (1-0.5)	Sand: Medium (0.5-0.25)	Sand: Fine (0.25-0.1)	Sand: Very fine (0.1-0.05)	Sand: Total (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Water content: 1/3 bar	Water content: 15 bar	Bulk density: Air-dry	Bulk density: Oven-dry
	In		Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	G/cm^3	G/cm^3
Kinder silt loam: (S78LA-19-6)	0-6	A1	0.00	0.60	1.10	14.90	29.50	46.10	51.10	2.80	---	---	---	---
	6-17	Eg	0.00	0.20	0.20	15.60	27.10	43.10	46.70	10.20	---	---	---	---
	17-36	B/E, Btg1	0.00	0.10	0.10	9.70	21.10	31.00	38.20	30.80	---	---	---	---
	36-60	Btg2	0.00	0.10	0.10	11.80	26.20	38.20	36.30	25.50	---	---	---	---
	60-70	BCg	0.00	0.10	0.10	12.20	37.90	50.30	28.90	20.80	---	---	---	---
Leton silt loam: (S79LA-19-4)	0-5	Ap1	0.10	0.10	0.20	10.70	28.40	39.50	51.70	8.80	---	---	---	---
	5-7	Ap2	0.00	0.00	0.80	15.70	29.70	46.20	40.40	13.40	---	---	---	---
	7-20	Eg1	0.00	0.00	0.00	14.20	27.60	41.80	44.30	13.90	---	---	---	---
	20-26	Eg2	0.00	0.10	0.10	14.20	29.20	43.60	39.10	17.30	---	---	---	---
	26-34	E/B	0.00	0.00	0.10	12.00	24.30	36.40	47.10	16.50	---	---	---	---
	34-42	B/E	0.00	0.10	0.10	13.00	24.20	37.40	40.50	22.10	---	---	---	---
	42-62	Btg	0.20	0.20	0.10	12.40	24.40	37.30	37.00	25.70	---	---	---	---
Morey loam: (S73LA-19-1)	0-9	Ap	---	---	---	---	---	51.50	36.10	12.40	16.40	5.10	---	1.63
	9-11	A	---	---	---	---	---	---	---	---	---	---	---	---
	11-18	BA	---	---	---	---	---	43.20	36.60	20.20	22.60	9.30	---	1.63
	18-28	Btg1	---	---	---	---	---	37.80	33.40	28.80	26.50	14.30	---	1.56
	28-39	Btg2	---	---	---	---	---	35.70	32.80	31.50	29.40	14.80	---	1.56
	39-52	Btg3	---	---	---	---	---	34.30	32.70	33.00	29.60	15.40	---	1.57
	52-60	Btg4	---	---	---	---	---	41.80	29.80	28.40	26.20	13.00	---	1.64
Una silty clay loam: (S81LA-19-2)	0-5	A	0.01	0.34	0.40	3.15	6.93	10.83	55.11	34.06	37.57	16.78	1.63	1.69
	5-17	Bg1	0.09	0.89	0.56	5.81	12.70	20.05	51.90	28.05	28.13	11.33	1.71	1.84
	17-31	Bg2	0.06	0.79	0.53	6.03	12.83	20.24	50.84	28.92	30.50	12.38	1.67	1.68
	31-45	Bg3	0.18	1.35	0.65	4.97	11.98	19.13	50.24	30.63	27.68	12.79	1.67	1.68
	45-65	Bg4	0.12	0.92	0.51	6.46	17.06	25.07	46.52	28.41	26.98	11.44	1.69	1.71

All the pedons are the typical pedons for the series.

TABLE 19.--CHEMICAL ANALYSES OF SELECTED SOILS

[A dash indicates analyses were not made]

Soil name and sample number	Depth	Horizon	Extractable bases: Ca	Extractable bases: Mg	Extractable bases: K	Extractable bases: 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
	In		Meq/100g						Pct	Pct				Pct	Meq/100g		ppm
Arat mucky silt loam: (S81LA-19-5)	3-0	O	---	---	---	---	---	---	---	---	5.7	5.6	5.3	---	---	---	---
	0-6	A	---	---	---	---	---	---	---	---	6.2	6.1	5.8	---	---	---	---
	6-36	Cg1	---	---	---	---	---	---	---	---	6.5	6.3	6.1	---	---	---	---
	36-60	Cg2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Brimstone silt loam: (S78LA-19-7)	0-6	Ap	1.80	0.50	0.20	0.30	4.70	4.30	6.00	0.24	4.5	3.9	4.1	---	0.40	0.50	65.0
	6-16	E	2.90	1.20	0.20	0.80	1.60	4.20	---	0.12	6.0	5.4	5.5	---	---	0.10	2.0
	16-27	E/Btng	5.80	2.80	0.20	1.80	0.30	8.60	---	0.08	7.1	6.1	6.6	---	---	0.10	0.0
	27-39	Btng/E	11.40	5.80	0.30	3.20	2.50	16.30	---	0.08	7.6	6.3	7.0	---	---	0.10	1.0
	39-52	Btng1	11.50	6.00	0.30	3.00	2.70	17.10	---	0.02	7.7	6.4	7.3	---	---	0.10	1.0
	52-70	Btng2	13.80	7.20	0.30	2.60	2.90	18.30	---	0.07	8.1	6.6	7.6	---	---	0.10	2.0
Caddo silt loam: (S79LA-19-8)	0-5	A	0.50	0.30	0.20	0.10	6.20	5.20	21.00	1.40	4.7	3.8	4.0	---	1.50	0.20	5.0
	5-17	Eg1	0.40	0.40	0.20	0.10	5.10	4.70	21.00	0.18	4.9	3.7	4.0	---	2.60	0.40	1.0
	17-29	Eg2	0.50	0.40	0.20	0.10	6.70	5.70	21.00	0.16	4.9	3.6	3.9	---	3.10	0.80	2.0
	29-51	B/E	1.40	0.90	0.20	0.20	10.00	8.80	31.00	0.15	5.1	3.6	4.0	---	4.50	0.90	0.0
	51-64	Btg1	3.20	1.80	0.20	0.30	8.00	10.90	50.00	0.11	5.3	3.6	4.2	---	3.80	0.80	1.0
	64-74	Btg2	4.70	2.40	0.30	0.50	6.20	11.60	68.00	0.10	5.3	3.7	4.3	---	2.00	0.60	1.0
Clovelly muck: (S80LA-19-1)	0-8	Oa1	13.23	25.20	2.42	11.50	---	95.28	---	---	6.4	---	---	---	---	---	---
	8-20	Oa2	14.74	35.08	3.67	16.47	---	50.53	---	---	6.9	---	---	---	---	---	---
	20-36	Oa3	30.14	58.61	3.09	29.49	---	65.34	---	---	6.7	---	---	---	---	---	---
	36-51	Abg	15.45	35.40	1.98	15.11	---	37.07	---	---	6.8	---	---	---	---	---	---
	51-61	Cg	9.19	30.63	2.26	15.18	---	19.84	---	---	7.2	---	---	---	---	---	---
	61-80	Cg	18.00	40.00	1.33	17.39	---	50.36	---	---	6.6	---	---	---	---	---	---
Crowley silt loam: (S81LA-19-4)	0-3	Ap1	1.05	0.38	0.35	0.05	6.87	6.05	30.24	0.91	4.9	4.2	4.4	0.2	0.93	0.04	14.2
	3-10	Ap2	1.51	0.65	0.33	0.10	4.95	5.20	49.80	0.46	4.6	4.5	4.7	0.4	0.39	0.16	0.0
	10-25	E	0.87	0.64	0.28	0.12	5.76	7.00	27.28	0.27	5.3	4.2	4.3	0.3	1.69	0.03	0.0
	25-34	Btg1	3.95	4.40	0.35	0.77	9.60	18.50	50.10	0.29	5.1	4.0	4.3	0.8	4.41	0.00	0.0
	34-41	Btg2	4.83	5.75	0.41	0.92	8.69	24.37	48.87	0.20	5.3	4.0	4.4	0.8	2.89	0.01	0.0
	41-53	Btg3	5.13	6.00	0.36	0.83	4.75	14.87	82.85	0.07	5.6	4.1	4.6	0.6	1.41	0.04	0.0
	53-65	Btg4	6.49	7.31	0.34	0.86	3.33	17.80	84.23	0.04	5.6	4.1	6.6	0.4	0.36	0.03	0.0
Ged clay: (S81LA-19-1)	0-5	A	8.73	7.58	0.50	2.52	0.16	21.68	---	5.20	6.4	5.9	6.2	---	---	---	---
	5-9	2A	12.63	7.07	0.41	1.39	0.22	28.03	---	3.80	7.5	6.6	7.4	---	---	---	---
	9-24	2Btg1	13.30	7.42	0.44	1.30	0.13	23.51	---	0.50	7.5	6.6	7.4	---	---	---	---
	24-48	2Btg2	13.23	6.57	0.27	0.44	0.14	18.92	---	0.30	7.0	6.3	7.0	---	---	---	---
	48-60	2Cgy	51.20	3.18	0.24	0.18	0.15	22.34	---	0.10	6.7	6.3	6.7	---	---	---	---

See footnote at end of table.

TABLE 19.--CHEMICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Extractable bases: Ca	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
	In		Meq/100g						Pct	Pct				Pct	Meq/100g		ppm
Kinder silt loam:	0-6	A1	3.80	0.40	0.10	0.10	2.70	4.90	90.00	---	5.6	4.8	4.8	---	---	0.20	4.0
(S78LA-19-6)	6-17	Eg	0.90	0.40	0.20	0.30	4.90	5.20	35.00	---	5.0	3.8	4.0	---	2.40	0.50	0.0
	17-36	B/E, Btg1	1.40	3.00	0.30	2.70	13.20	21.40	35.00	---	5.1	3.5	4.1	---	7.20	0.70	2.0
	36-60	Btg2	3.30	5.40	0.30	4.60	7.50	16.60	82.00	---	5.1	3.6	4.5	---	2.60	0.80	0.0
	60-70	BCg	4.50	5.00	0.30	4.70	3.00	14.70	99.00	---	6.0	4.5	5.4	---	---	0.30	2.0
Morey loam:	0-9	Ap	5.50	1.30	0.10	0.40	---	8.20	89.00	---	6.2	5.3	5.4	---	---	3.50	---
(S73LA-19-1)	9-11	A	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	11-18	BA	8.30	3.00	0.10	0.90	---	12.90	95.00	---	6.0	5.2	5.4	---	---	4.00	---
	18-28	Btg1	11.30	4.20	0.10	1.20	---	17.80	94.00	---	5.5	4.8	5.0	---	---	6.10	---
	28-39	Btg2	12.20	4.60	0.20	1.00	---	18.80	96.00	---	5.6	4.9	5.2	---	---	6.20	---
	39-52	Btg3	12.80	4.80	0.20	1.00	---	19.60	96.00	---	5.6	4.8	5.3	---	---	5.20	---
	52-60	Btg4	11.90	4.40	0.20	0.80	---	17.00	---	---	5.7	4.9	5.4	---	---	3.80	---
Una silty clay loam:	0-5	A	9.87	4.50	0.43	0.12	10.10	27.80	54.00	0.42	5.0	4.1	4.5	0.7	0.76	0.04	4.5
(S81LA-19-2)	5-17	Bg1	4.48	2.70	0.20	0.21	8.79	14.10	54.00	0.29	4.7	3.8	4.1	0.4	4.64	0.14	---
	17-31	Bg2	4.51	3.00	0.24	0.28	9.09	16.20	50.00	0.21	4.9	3.8	4.1	0.6	4.21	0.15	---
	31-45	Bg3	5.04	3.40	0.30	0.26	9.09	15.00	60.00	0.14	4.9	3.9	4.2	0.4	4.20	0.00	---
	45-65	Bg4	4.11	3.00	0.29	0.31	9.40	15.40	50.00	0.10	4.9	3.8	4.1	0.4	4.79	0.00	---

All of the pedons are the typical pedon for the series.

TABLE 20.--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
*Acadia	Fine, montmorillonitic, thermic Aeric Ochraqualfs
Allemands	Clayey, montmorillonitic, euic, thermic Terric Medisaprists
Arat	Fine-silty, siliceous, nonacid, thermic Typic Hydraquents
*Barbary	Very-fine, montmorillonitic, nonacid, thermic Typic Hydraquents
Basile	Fine-silty, mixed, thermic Typic Glossaqualfs
*Bienville	Sandy, siliceous, thermic Psammentic Paleudalfs
Brimstone	Fine-silty, siliceous, thermic Glossic Natraqualfs
Caddo	Fine-silty, siliceous, thermic Typic Glossaqualfs
*Cahaba	Fine-loamy, siliceous, thermic Typic Hapludults
Clovelly	Clayey, montmorillonitic, euic, thermic Terric Medisaprists
*Crowley	Fine, montmorillonitic, thermic Typic Albaqualfs
Ged	Very-fine, mixed, thermic Typic Ochraqualfs
*Gentilly	Very-fine, montmorillonitic, nonacid, thermic Typic Hydraquents
*Glenmora	Fine-silty, siliceous, thermic Glossaquic Paleudalfs
*Gore	Fine, mixed, thermic Vertic Paleudalfs
Guyton	Fine-silty, siliceous, thermic Typic Glossaqualfs
*Judice	Fine, montmorillonitic, thermic Vertic Haplaquolls
Kinder	Fine-silty, siliceous, thermic Typic Glossaqualfs
Larose	Very-fine, montmorillonitic, nonacid, thermic Typic Hydraquents
*Leton	Fine-silty, mixed, thermic Typic Glossaqualfs
*Malbis	Fine-loamy, siliceous, thermic Plinthic Paleudults
*Messer	Coarse-silty, siliceous, thermic Haplic Glossudalfs
Midland	Fine, montmorillonitic, thermic Typic Ochraqualfs
*Morey	Fine-silty, mixed, thermic Typic Argiaquolls
*Mowata	Fine, montmorillonitic, thermic Typic Glossaqualfs
*Una	Fine, mixed, acid, thermic Typic Haplaquepts
Urbo	Fine, mixed, acid, thermic Aeric Haplaquepts
Vidrine	Coarse-silty over clayey, mixed, thermic Glossaquic Hapludalfs

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