United States Department of Agriculture

Natural Resources Conservation Service

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

Soil Survey of Sabine Parish, Louisiana

How To Use This Soil Survey

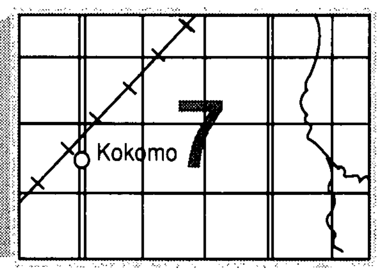
General Soil Map

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

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

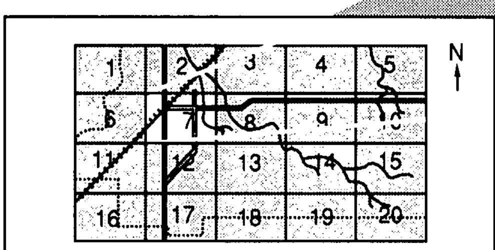
Detailed Soil Maps

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



MAP SHEET

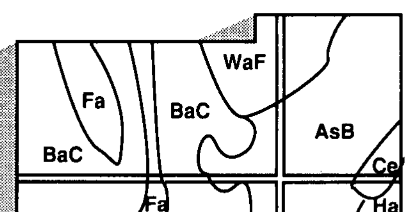
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

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

MAP SHEET



AREA OF INTEREST

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

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

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

Major fieldwork for this soil survey was completed in 1988. Soil names and descriptions were approved in 1988. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1988. This soil survey was made cooperatively by the Natural Resources Conservation Service, the Louisiana Agricultural Experiment Station, the Louisiana Soil and Water Conservation Committee, and the Sabine Parish Police Jury. It is part of the technical assistance furnished to the Sabine Soil and Water Conservation District.

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

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

Cover: Hodges Gardens, located in the southern part of Sabine Parish, is a popular tourist attraction. Tourism is an important industry in Sabine Parish. The trees are in an area of Betis loamy fine sand, 5 to 12 percent slopes. (Photograph is courtesy of Hodges Gardens, Many, Louisiana.)

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Issued July 1997

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Foreword

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

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

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

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

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Soil Survey of
Sabine Parish, Louisiana

By Charles M. Guillory, Natural Resources Conservation Service

Soils surveyed by Charles M. Guillory, Edward D. Scott, and Cynthia Corkern, Natural Resources Conservation Service, and Michael A. Mariano and Emile Williams, Jr., Louisiana Soil and Water Conservation Committee

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

SABINE PARISH is in the west-central part of Louisiana (fig. 1). It is bounded on the north by De Soto Parish, on the east by Natchitoches Parish, on the south by Vernon Parish, and on the west by the Toledo Bend Reservoir. The parish has a total area of 647,400 acres. About 547,300 acres is land, and 100,100 acres is the Toledo Bend Reservoir. In 1980, the parish had a population of 27,414. Many, the parish seat, has a population of 4,022 and is the largest city in the parish.

Most of the larger creeks and bayous in the parish drain into the Sabine River. The major bayous are LaNana, Toro, Scie, Negreet, San Patricio, and San Miguel. A few streams, such as Bayou Dupont, Bayou Adois, Bayou Bonna Vista, Middle Creek, and Kisatchie Bayou, drain into the Red River. Elevations are as much as about 380 feet in the northern part of the parish, 480 feet in the southern part, and 178 feet in the western part along the Toledo Bend Reservoir.

The survey area generally consists of flood plains, uplands, and stream terraces. The soils in Sabine Parish that are best suited to crops are on flood plains. Most of the soils, however, are used as woodland. The flood plains make up about 30 percent of the land area in the parish.

The gently sloping to steep soils on uplands and the level to gently sloping soils on stream terraces make up about 70 percent of the land area in the parish. They are loamy or sandy, and many have a clayey subsoil. They are generally low in natural fertility. Most areas

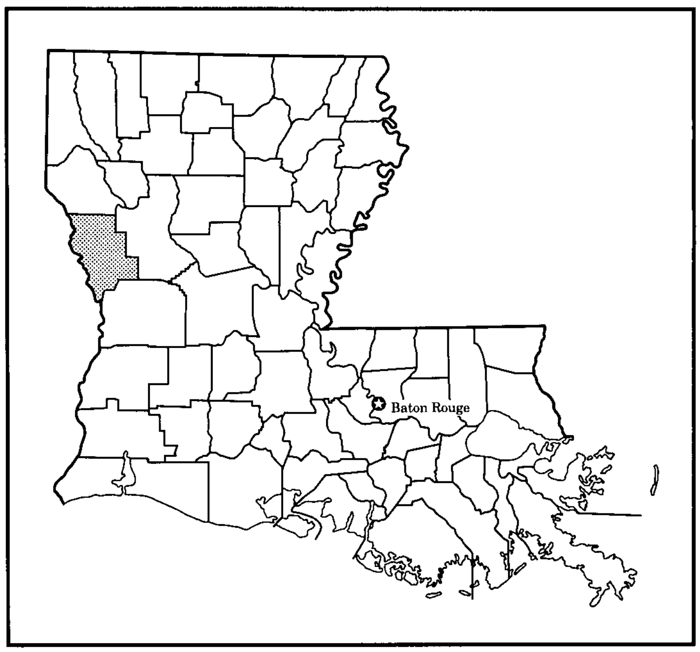

Figure 1.—Location of Sabine Parish in Louisiana.

are used as woodland. A small acreage is used as pasture or cropland. In most areas the uplands and terraces are dissected by well defined drainageways. The slopes of watersheds that drain toward the Red

River are shorter and steeper than those of watersheds that drain toward the Sabine River.

This soil survey updates the survey of Sabine Parish published in 1919 *(30)*. It provides additional information and has larger maps, which show the soils in greater detail.

General Nature of the Parish

This section gives general information concerning the parish. It discusses climate, history and development, agriculture, the Toledo Bend Reservoir, Hodges Gardens, minerals, transportation facilities, and water resources.

Climate

Sabine Parish is characterized by a mild, wet climate resulting from the geographical relationship between land and water mass and latitude. Moist tropical air from the Gulf of Mexico persistently covers the area. Winters are cool and fairly short and only rarely include a cold wave, which moderates in 1 or 2 days. Precipitation is fairly heavy throughout the year, and prolonged droughts are rare. Summer precipitation, consisting mainly of afternoon thundershowers, is adequate for all crops.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Converse, Louisiana, in the period 1953 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 47 degrees F and the average daily minimum temperature is 34 degrees. The lowest temperature on record, which occurred at Converse on January 12, 1962, is 5 degrees. In summer, the average temperature is 79 degrees and the average daily maximum temperature is 91 degrees. The highest recorded temperature, which occurred at Converse on August 13, 1962, is 108 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 about 49 inches. Of this, 24 inches, or about 50 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 18 inches. The heaviest 1-day rainfall during the period of record was 8.10 inches at Converse on April 29, 1953. Thunderstorms occur on about 50 days each year.

The average seasonal snowfall is about 1 inch. The greatest snow depth at any one time during the period of record was 5 inches. There is seldom a day when as much as 1 inch of snow is on the ground. Freezing rain, which can interfere with utility line services and damage forests, occurs several times per decade. Major ice storms occur about once every 5 years.

Severe local storms, including tornadoes, occur occasionally in or near the survey area. They are of short duration and cause variable amounts of damage in spots. Every few years in summer or autumn, a tropical depression or remnant of a hurricane that has moved inland causes extremely heavy rains for 1 to 3 days. The heaviest 3-day rainstorm occurred at Many in July 1933 when the remnant of a tropical storm, moving slowly northward along the Sabine River, produced about 20 inches of rainfall.

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 70 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 10 miles per hour, in spring.

History and Development

On March 7, 1843, during the administration of Governor Alexandre Mouton, Sabine Parish was established from part of Natchitoches Parish by the State Legislature. It was named for the Sabine River, which forms the western boundary of the parish. The Spanish called the river Rio Adaes, after the Indian tribe Adai that inhabited the area.

Many, the parish seat, began as a town in 1844. A place called Baldwin's Store was chosen as the parish seat because it was centrally located and near the intersection of the San Antonio Road and other roads north and south. The town was named in honor of Colonel John B. Many, the commandant at Fort Jessup. Fort Jessup was the most important settlement in the parish at that time, the focal point of the American expansionist movement, and the "cradle" of the Mexican War.

Agriculture was the leading industry for the early settlers in Sabine Parish. The principal crops were corn, tobacco, sugarcane, rice, sweet potatoes, and other vegetables. Crop production has since been replaced by the production of timber, poultry, beef cattle, and dairies *(18)*. Other areas of development are oil and gas exploration and the tourist industry, including the attractions of Hodges Gardens, Toro Hills Resort, and the Toledo Bend Reservoir.

Agriculture

Agriculture, including the production of timber and wood pulp, is the main industry in Sabine Parish. A large acreage of "hill-farm" land was converted to pine tree plantations in the early 1950's. Cattle and poultry are the most important enterprises. Feed crops, especially hay, are also important.

In 1987, Sabine Parish had 468 farms, which covered a total of 58,112 acres. The average size of a farm was about 124 acres. Most farms are privately owned and operated. In 1987, the sale of poultry and poultry products totalled 32,390,000 dollars, the sale of cattle and calves totalled 2,141,000 dollars, the sale of dairy products totalled 1,076,000 dollars, and the sale of all crops totalled 214,000 dollars. Although not a major industry, small to large gardens of truck crops are grown in communities and rural areas throughout the parish.

Toledo Bend Reservoir

Rapid industrial development and the changing economy have emphasized the need to efficiently use the waters of the Sabine River Basin. In 1949, the Texas State Legislature created the Sabine River Authority of Texas, and, in 1950, the Louisiana State Legislature created the Sabine River Authority of Louisiana. The authorities are charged by their respective States with the duties of using and conserving the waters of the Sabine River.

Land acquisition for the project began in May 1963, and construction of the dam, spillway, and power plant began in April 1964. Construction of the closure section of the earthen embankment and the impoundment of water began in October 1966. The power plant began operating in early 1969. The Toledo Bend Reservoir is the only public water conservation and hydroelectric power project in the Nation to be undertaken without Federal participation in its permanent financing.

The Toledo Bend Reservoir forms a portion of the boundary between Louisiana and Texas. From the dam site, it extends up the river about 65 miles to Logansport, Louisiana. The reservoir inundates land in Sabine, Shelby, Panola, and Newton Counties, Texas, and Sabine and De Soto Parishes, Louisiana.

The Toledo Bend Reservoir is the largest manmade body of water in the South and the fifth largest in surface acres in the United States. The impoundment usually covers an area of about 100,100 acres, and the reservoir has a controlled storage capacity of about 4,477,000 acre-feet.

The project was constructed primarily to provide a water supply, hydroelectric power, and recreational opportunities. It also minimizes sedimentation and reduces maintenance costs for downstream navigation channels in the area of Orange, Texas.

The project provides a dependable yield of 1,430 million gallons per day, which is shared equally by Texas and Louisiana. Most of this water passes through turbines for the generation of electric power and is available for municipal, industrial, and agricultural purposes.

The Toledo Bend Reservoir has about 1,200 miles of shoreline and offers several opportunities for recreational development. Both private and public facilities are available for swimming, boating, picnicking, fishing, camping, hunting, and sightseeing.

Hodges Gardens

In the early 1900's, the area that is presently the main garden and lake area of Hodges Gardens was used as a stone quarry. Stonemasons cut blocks of stone from the hardened sandstone layer of the Catahoula Formation. These stone blocks were used to build the jetties at Port Arthur, Texas. In the early 1940's, A.J. Hodges purchased this area of land. He started a reforestation program and an experimental arboretum. Today, Hodges Gardens cover 4,700 acres of fertile land and are often called the "Garden in the Forest." They are owned by a private foundation and are one of the largest privately operated garden and wildlife refuges in the United States. A 10-mile trail loops through the gardens and around the 225-acre lake. Buffalo and mouflon sheep graze the areas of pasture, and deer, wild turkeys, squirrels, and other wildlife species inhabit the surrounding woods.

Minerals

The chief mineral resources in Sabine Parish are petroleum and gas, but gravel, rock, and lignitic clays also are important.

Sabine Parish has five producing oil fields: Converse, Many, Pleasant Hill, Zwolle, and Kilgore Slough fields. The only field that produces natural gas is Pleasant Hill, which is partly in De Soto Parish.

The gravel deposits in the parish are of two mineral types. They are silica gravel, which is composed of chert, quartz, and related silica minerals, and ironstone gravel, which is composed of iron oxides, principally hematite. The ironstone gravel is much more abundant in the parish than the silica gravel *(14, 35)*.

The silica gravel is associated with the Montgomery Formation and the higher terrace formations along the eastern margin of the Sabine River valley. It occurs near the base of these formations and as lenses and scattered pebbles in the overlying sand. In most places the gravel cannot be feasibly separated for most commercial uses because the sand ratio is too high. The silica gravel is used mainly as surfacing material for local roads.

The ironstone gravel, or "native gravel," formed in the weathered zone of greensand or glauconitic Tertiary deposits. Ironstone occurs as residual gravel, as boulder-sized accumulations on hilltops, and as ledges. The ironstone is crushed and used extensively in Sabine Parish as surfacing material for roads. Vehicular traffic further reduces the size of the particles and sufficiently packs the gravel for lightly travelled roads, including highway shoulders.

Surface outcrops of lignite occur in almost all of the formations of the Wilcox and Claiborne Groups in Sabine Parish. The outcrops of the Wilcox beds are the most thoroughly studied and utilized. Originally, these beds of lignite were used as fuel. Later, the lignite was used to manufacture various chemicals and dyes. Geologists and other scientists can determine the relative age of the lignite by studying the fossilized spores and pollen contained in the lignite. Because the beds of lignite are only 1 to 5 feet thick and are covered by thick overburdens of soil material, they are no longer commercially mined.

Transportation Facilities

Sabine Parish is served by railroads, highways, and air transportation. The Kansas City Southern Railway Company maintains the principal rail system in the parish. Its north-south line runs the length of the parish and provides freight service to all consumer and market areas in the parish.

U.S. Highway 171 runs the length of the parish approximately parallel to the Kansas City Railroad. It provides access to such towns as Converse, Zwolle, Many, and Florien. Construction to change this highway into a 4-lane highway has begun. Louisiana State Highway 6, which runs east and west from Natchitoches Parish through Fort Jessup and Many, is a major route to Texas and the Toledo Bend Reservoir.

The parish also is served by several other State and local roads and highways and by two airfields. The U.S. Army maintains several minor roads in the Peason Ridge Artillery Range, which is partly in Sabine Parish. Hart Airport, south of Many, accommodates light air traffic. Another, privately owned landing facility is located near Hodges Gardens.

Water Resources

Surface water. Sabine Parish has about 100,100 acres of surface water. The largest source of surface water is the Toledo Bend Reservoir. Other small lakes include Loring Lake, Hodges Garden Lake, and the 12 lakes resulting from floodwater-control structures in the Bayou Dupont Watershed. Important streams are Bayou San Patricio, Bayou San Miguel, Bayou LaNana, Bayou Negreet, and Bayou Toro. All of these streams drain south and southwest into the Sabine River. Bayou Dupont, Bayou Pedros, and Kisatchie Bayou drain east into the Red River.

Ground water. Most of the water supplies in Sabine Parish are obtained from wells ranging in depth from 10 to 500 feet *(19, 24)*. In the northwestern two-thirds of the parish, water is obtained from sands of the Wilcox Formation of Eocene age. In the southeastern part, water is obtained from younger formations of the Claiborne Group of Eocene age and the Grand Gulf Group of Miocene age. The average maximum depth of fresh water in Sabine Parish is 400 feet. Below a depth of 400 feet, the water generally is salty. In a few places, however, fresh water has been found at much greater depths. In Sabine Parish, it is unlikely that fresh water can be obtained from any formation south of where that formation outcrops because the formations occur deeper toward the south and are covered by younger formations.

Sands of the Wilcox Formation have low permeability, and wells in areas of these sands generally yield small or moderate quantities of water. Some of these wells yield as much as 250 gallons per minute. The thickness of individual sand beds averages about 30 feet and ranges from 5 to 250 feet.

Although the largest water supplies in the parish have been obtained from the Wilcox Formation, formations of the Claiborne and Grand Gulf Groups are probably capable of providing larger quantities of water in local areas. In the Claiborne Group, freshwater-bearing sands occur in the Sparta Sands and in the Cook Mountain and Cockfield Formations, which outcrop southeast of where the Wilcox Formation outcrops.

The Sparta Sands aquifer is the most important aquifer in several parishes of northern Louisiana. Wells screened in the Sparta Sands in Natchitoches Parish yield as much as 250 gallons of water a minute. Because the Sparta Sands in Sabine Parish underlie a sparsely populated area where water demands are small, withdrawals from this aquifer for use in the parish have been small. Sand beds range in thickness from 5 to 55 feet and are separated by clay beds that are 10 to 30 feet thick. The Cook Mountain Formation contains some sand beds but is predominantly clay. The largest yielding well in this formation supplies water to the school in Florien.

The Cockfield Formation is thick and sandy. Water in this formation, like that in the Sparta Sands, is relatively untapped in Sabine Parish. Available data indicates that in some areas in this formation fresh water occurs to a depth of about 1,500 feet.

The rugged topography of the Kisatchie Wold, along the southeastern margin of Sabine Parish, is underlain by resistant sandstone of the Catahoula Formation of the Grand Gulf Group. The Catahoula Formation yields moderate quantities of water to wells in neighboring parishes to the south. Water for domestic and livestock use is mainly obtained from wells in terrace deposits of Pleistocene age and in sands of alluvial deposits of the Sabine River.

Water from wells in Sabine Parish differs in quality from one formation to another and from one well to another in the same formation. Generally, water from the Wilcox Formation is soft to moderately hard and has an amount of iron ranging from negligible to highly objectionable. Water from some wells has hardness of more than 6 parts per million. Concentrations of fluoride have been as much as 3.6 parts per million in water taken from the Wilcox Formation. Water from sands of the Claiborne Group is moderately hard or hard and commonly has a high content of iron. Water from one well screened in sandstone of the Catahoula Formation is soft and has a high content of iron.

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

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

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

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. 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 interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

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

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

Map Unit Composition

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

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

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

General Soil Map Units

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

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

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

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

Each map unit is rated for *cultivated crops, pasture, woodland, urban uses,* and *recreational areas.* Cultivated crops are those grown extensively in the survey area. Pasture refers to areas of native and improved grasses. Woodland refers to areas of native or introduced trees. Urban uses include residential, commercial, and industrial developments. Intensive recreational areas are campsites, picnic areas, ballfields, and other areas that are subject to heavy foot traffic.

The boundaries of the general soil map units in Sabine Parish were matched, where possible, with those of the previously completed surveys of De Soto and Natchitoches Parishes. In a few places, however, the lines do not join and the names of the map units differ. These differences resulted mainly from changes in soil series concepts, differences in map unit design, and changes in soil patterns near survey area boundaries.

The general soil map units in this survey have been grouped according to general landscapes. Descriptions of each of the broad groups and the map units in each group follow.

Level Soils on Flood Plains

These are frequently flooded and rarely flooded, poorly drained to moderately well drained, loamy soils. These soils make up about 14 percent of Sabine Parish. Most of the acreage is woodland. Seasonal wetness and flooding are the main limitations affecting most uses.

1. Guyton-luka

Frequently flooded, poorly drained and moderately well drained soils that are loamy throughout; formed in alluvium

This map unit consists of soils on narrow flood plains along streams that drain the uplands. Flooding is frequent. It occurs mainly in winter and spring but can occur during any part of the year. Slopes are less than 1 percent.

This map unit makes up about 13 percent of the parish. It is about 55 percent Guyton soils, 20 percent luka soils, and 25 percent soils of minor extent.

The Guyton soils are poorly drained and on low flats. They have a surface layer of brown, mottled silt loam. The subsurface layer is grayish brown, mottled silt loam. The subsoil is light brownish gray and gray, mottled silt loam and silty clay loam.

The luka soils are moderately well drained. They are on the slightly convex natural levees and on microhighs. They have a surface layer of dark brown, mottled silt loam. The underlying material is dark yellowish brown, yellowish brown, and light brownish gray, mottled silt loam.

Of minor extent in this map unit are Latonia, Kenefick, and Sardis soils. Latonia and Kenefick soils are well drained. They are on terraces along major drainageways. Sardis soils are somewhat poorly drained. They are on the slightly convex natural levees and on microhighs on the flood plains.

Most areas of this map unit are used as woodland. A small acreage is used as pasture. Most of the woodland consists of hardwoods or mixed hardwoods and pines.

The soils in this map unit are moderately well suited to woodland. The dominant trees are loblolly pine, sweetgum, green ash, eastern cottonwood, southern red oak, and water oak. Seasonal wetness and the flooding limit the use of equipment in winter and spring and cause moderate or severe seedling mortality. The soils easily become compacted if heavy equipment is used during wet periods.

These soils are poorly suited to pasture and are generally not suited to crops because of the flooding and the seasonal wetness. Droughtiness in summer in areas of the Iuka soils and low fertility in areas of both soils are additional limitations affecting pasture and cropland.

These soils are poorly suited to urban and intensive recreational uses because of the seasonal wetness and the frequent flooding.

2. Sardis-Guyton

Rarely flooded, somewhat poorly drained and poorly drained soils that are loamy throughout; formed in alluvium

This map unit consists of soils on the flood plains along the major and minor streams that drain the uplands. Most areas are protected from flooding by water-control structures, but flooding can occur during unusually wet periods. Slopes are less than 1 percent.

This map unit makes up about 1 percent of the parish. It is about 65 percent Sardis soils, 30 percent Guyton soils, and 5 percent soils of minor extent.

The Sardis soils are somewhat poorly drained. They have a surface layer of brown loam. The upper part of the subsoil is brown, mottled loam and yellowish brown, mottled silty clay loam. The next part is yellowish brown and light brownish gray silty clay loam. The lower part is mottled dark yellowish brown, light brownish gray, and strong brown silty clay loam.

The Guyton soils are poorly drained. They have a surface layer of brown, mottled silt loam. The subsurface layer is grayish brown, mottled silt loam. The subsoil is light brownish gray and gray, mottled silt loam and silty clay loam.

Of minor extent in this map unit are Iuka, Latonia, and Kenefick soils. Iuka soils are moderately well drained. They are on the slightly convex natural levees and on microhighs on the flood plains. Latonia and Kenefick soils are well drained. They are on stream terraces.

Most areas of this map unit are used as woodland. A small acreage is used as pasture or for crops. Most of the woodland consists of mixed hardwoods and pines.

The soils in this map unit are moderately well suited to woodland. The dominant trees are loblolly pine, sweetgum, and water oak. Green ash and southern red oak also are common on the Guyton soils. Because of seasonal wetness, the use of equipment is limited in winter and spring and seedling mortality is moderate. The soils easily become compacted if heavy equipment is used during wet periods.

These soils are moderately well suited to crops and pasture. The seasonal wetness, low fertility, and high levels of exchangeable aluminum are the main limitations.

These soils are poorly suited to urban and intensive recreational uses because of the seasonal wetness, the flooding, slow permeability, and low strength on sites for roads and streets.

Gently Sloping Soils on Terraces

These are well drained, loamy and sandy soils. These soils make up about 6 percent of Sabine Parish. Most of the acreage is used as woodland or pasture. Low fertility, droughtiness, and the hazard of erosion are the main limitations affecting agricultural uses. Moderately slow permeability and a moderate shrink-swell potential are the main limitations affecting urban uses.

3. Latonia

Well drained soils that are loamy throughout; formed in old stream deposits

This map unit consists of soils on terraces parallel to the flood plains along the major streams. Slopes are mostly convex and range from 1 to 5 percent.

This map unit makes up about 6 percent of the parish. It is about 80 percent Latonia soils and 20 percent soils of minor extent.

The Latonia soils are gently sloping. They have a surface layer of brown fine sandy loam. The subsurface layer is yellowish brown very fine sandy loam. The subsoil is mottled loam. It is yellowish brown in the upper part and brownish yellow in the lower part. The substratum is brownish yellow, mottled fine sandy loam.

Of minor extent in this map unit are Guyton, Iuka, and Sardis soils on flood plains along drainageways; Kenefick soils on terraces; Keithville soils on uplands; Niwana soils on circular mounds; and Gessner soils on flats and in swales.

Most areas of this map unit are used as woodland or pasture. A small acreage is used for crops or homesite development.

The Latonia soils are well suited to woodland. They have few limitations affecting this use. The dominant trees are loblolly pine, shortleaf pine, longleaf pine, sweetgum, and southern red oak.

These soils are well suited to pasture and cropland. The main limitations are low fertility, droughtiness, potentially toxic levels of aluminum, and a hazard of erosion. Minimum tillage, contour farming, and grassed waterways can reduce the hazard of erosion. Lime and fertilizer are needed for crops and pasture.

These soils are moderately well suited to urban uses and well suited to intensive recreational uses. The main limitations are moderately rapid permeability and the slope. Seepage is a hazard affecting sanitary facilities, such as sewage lagoons and sanitary landfills.

Gently Sloping to Strongly Sloping Soils on Uplands

These are somewhat excessively drained to poorly drained, loamy and sandy soils. These soils make up about 74 percent of Sabine Parish. Most of the acreage is woodland. A few large areas and many small areas are used as pasture or for homesite development. Erosion, seasonal wetness, a moderate or high shrink-swell potential, droughtiness, and low fertility are the main limitations affecting most uses.

4. Sacul-Kirvin-Keithville

Moderately well drained and well drained soils that have a loamy surface layer and a clayey and loamy or a clayey subsoil; formed in marine deposits

This map unit consists of soils on the narrow to broad ridgetops and side slopes of interstream divides. These soils are dominantly gently sloping but in some areas, around the head of small drainageways, are moderately sloping or strongly sloping. Slopes are generally long and smooth, but some are short and convex. They range from 1 to 12 percent.

This map unit makes up about 25 percent of the parish. It is about 69 percent Sacul soils, 11 percent Kirvin soils, 10 percent Keithville soils, and 10 percent soils of minor extent.

The Sacul soils are gently sloping to strongly sloping and are moderately well drained. They are on broad ridgetops and on side slopes. The surface layer is dark grayish brown or brown fine sandy loam. The subsurface layer is yellowish brown fine sandy loam. The subsoil is red, mottled clay in the upper part and mottled light brownish gray, dark yellowish brown, and light yellowish brown silty clay loam in the lower part. The substratum is stratified light brownish gray, red, and yellowish brown sandy clay loam and clay loam.

The Kirvin soils are gently sloping to strongly sloping and are well drained. They are on narrow to broad ridgetops and on side slopes. The surface layer is very dark grayish brown or brown fine sandy loam. The subsurface layer is light yellowish brown, mottled fine sandy loam. The subsoil is red, mottled clay in the upper part and mottled red, strong brown, and light gray silty clay in the lower part. The substratum is stratified layers of red and strong brown clay loam and gray soft shale that has a texture of clay.

The Keithville soils are gently sloping and moderately well drained. They are on broad ridgetops and on side slopes. The surface layer is brown very fine sandy loam. The subsurface layer is yellowish brown, mottled very fine sandy loam. In sequence downward, the subsoil is strong brown, mottled silty clay loam; brownish yellow, mottled loam; strong brown, mottled loam and light brownish gray silt; mottled light brownish gray, brownish yellow, and red clay; and light brownish gray, mottled silty clay. The substratum is light brownish gray, mottled clay.

Of minor extent in this map unit are Bowie and Saucier soils on some of the broad ridgetops and on the lower side slopes and Guyton and Iuka soils on narrow flood plains along streams.

Most areas of this map unit are used as woodland. A few large areas and many small areas are used as pasture or for homesite development.

The soils in this map unit are well suited to woodland. The dominant trees are loblolly pine, shortleaf pine, and sweetgum. Logging is limited in areas of the Sacul and Keithville soils during winter and early spring because of wetness and the clayey subsoil.

The gently sloping soils in this map unit are poorly suited or moderately well suited to crops and well suited or moderately well suited to pasture. The moderately sloping and strongly sloping soils are poorly suited to pasture and generally are not suited to crops. The main limitations are low fertility and potentially toxic levels of aluminum. Erosion is the main hazard. Lime and fertilizer are needed for crops and pasture. Minimum tillage, terraces, contour farming, and grassed waterways can reduce the hazard of erosion.

These soils are dominantly poorly suited to most urban uses and moderately well suited to intensive recreational uses. The main limitations are moderately slow or very slow permeability, the slope, the seasonal wetness, a high shrink-swell potential in the subsoil, and low strength on sites for roads and streets.

5. Oktibbeha-Nacogdoches

Moderately well drained and well drained soils that have a loamy surface layer and a clayey or a clayey and loamy subsoil; formed in marine deposits

This map unit consists of soils on the narrow to broad ridgetops and side slopes of interstream divides. These soils are dominantly gently sloping but in some areas, around the head of small drainageways, are moderately sloping or strongly sloping. Slopes on ridgetops are generally long and smooth and range from 1 to 5 percent. Slopes around the head of drainageways are long and smooth or short and complex and range from 1 to 12 percent.

This map unit makes up about 2 percent of the parish. It is about 53 percent Oktibbeha soils, 20 percent Nacogdoches soils, and 27 percent soils of minor extent.

The Oktibbeha soils are moderately well drained and gently sloping to strongly sloping. They are on broad ridgetops and on side slopes. The surface layer is dark grayish brown or dark brown loam. The subsurface layer is light yellowish brown loam. In sequence downward, the subsoil is yellowish red, mottled clay; olive brown, mottled clay; olive brown, mottled silty clay; and mottled light olive brown and light brownish gray clay loam.

The Nacogdoches soils are well drained and gently sloping. They are on convex ridgetops and on side slopes. The surface layer is dark reddish brown gravelly sandy loam. The upper part of the subsoil is dark red clay. The next part is dark red clay and ironstone. The lower part is red, mottled clay.

Of minor extent in this map unit are Eastwood and Keiffer soils on some side slopes and ridgetops and Kirvin soils on high convex ridgetops and on side slopes.

Most areas of this map unit are used as woodland. A small acreage is used as pasture.

The Oktibbeha soils are moderately well suited to woodland, and the Nacogdoches soils are well suited to this use. Loblolly pine, shortleaf pine, southern red oak, and sweetgum are dominant on the Oktibbeha soils. Loblolly pine, shortleaf pine, southern red oak, and eastern red cedar are dominant on the Nacogdoches soils. The use of equipment and the rate of seedling survival are limited by the gravelly surface layer of the Nacogdoches soils and the clayey subsoil of both soils. Logging during the drier periods helps to minimize rutting and compaction.

These soils dominantly are moderately well suited to crops and pasture. The main limitations are the slope, low and medium fertility, and droughtiness. Erosion is a severe hazard. The moderately sloping and strongly sloping soils are generally not suited to crops and poorly suited to pasture because of the severe hazard of erosion. Lime and fertilizer are needed for crops and pasture. Minimum tillage, terraces, contour farming, and grassed waterways can reduce the hazard of erosion.

The Oktibbeha soils are poorly suited to urban and intensive recreational uses. The Nacogdoches soils are moderately well suited to these uses. The main limitations are low strength on sites for roads and streets, moderately slow or very slow permeability, the slope, a moderate or high shrink-swell potential, and small stones on the surface.

6. Bellwood-Bowie-Keithville

Somewhat poorly drained and moderately well drained soils that have a loamy surface layer and a clayey, a loamy, or a loamy and clayey subsoil; formed in marine deposits

This map unit consists of soils on the narrow to broad ridgetops and side slopes of interstream divides. These soils are dominantly gently sloping but in some areas, around the head of small drainageways, are moderately sloping or strongly sloping. Slopes on ridgetops are generally long and range from 1 to 5 percent. Slopes around the head of drainageways are long and smooth or short and complex and range from 1 to 12 percent.

This map unit makes up about 6 percent of the parish. It is about 65 percent Bellwood soils, 20 percent Bowie soils, 10 percent Keithville soils, and 5 percent soils of minor extent.

The Bellwood soils are somewhat poorly drained and gently sloping to strongly sloping. They have a surface layer of reddish brown or brown silty clay loam. The subsoil is mottled clay. It is yellowish red in the upper part, grayish brown in the next part, and light brownish gray in the lower part. The substratum is light brownish gray clay.

The Bowie soils are moderately well drained and gently sloping to strongly sloping. They have a surface layer of dark brown or brown fine sandy loam. The subsurface layer is light yellowish brown, mottled fine sandy loam. The subsoil is sandy clay loam. In sequence downward, it is strong brown, strong brown and mottled, brownish yellow and mottled, and yellowish brown and mottled.

The Keithville soils are moderately well drained and gently sloping. They have a surface layer of brown very fine sandy loam. The subsurface layer is yellowish brown, mottled very fine sandy loam. In sequence downward, the subsoil is strong brown, mottled silty clay loam; brownish yellow, mottled loam; strong brown, mottled loam and light brownish gray silt; and light brownish gray, mottled silty clay. The substratum is light brownish gray, mottled clay.

Of minor extent in this map unit are Herty and Oktibbeha soils on some ridgetops and side slopes.

Most areas of this map unit are used as woodland or pasture. A small acreage is used for homesite development.

The Bellwood soils are moderately well suited to woodland, and the Bowie and Keithville soils are well suited to this use. Loblolly pine, shortleaf pine, white oak, and southern red oak are dominant on the Bellwood soils. Loblolly pine and shortleaf pine are dominant on the Bowie soils. Loblolly pine, shortleaf pine, and sweetgum are dominant on the Keithville soils. In areas of the Bellwood and Keithville soils, the use of equipment is limited by seasonal wetness and the clayey subsoil. Logging only during the drier periods helps to minimize compaction.

The gently sloping soils are poorly suited or moderately well suited to crops and are moderately well suited or well suited to pasture. The moderately sloping and strongly sloping soils are generally not suited to crops and poorly suited or moderately well suited to pasture because of the slope and a severe hazard of erosion. The slope, low fertility, poor tilth, and potentially toxic levels of exchangeable aluminum are additional limitations affecting crops and pasture. Lime and fertilizer are needed for crops and pasture. Minimum tillage, terraces, contour farming, and grassed waterways can reduce the hazard of erosion.

The Bellwood soils are poorly suited to urban and intensive recreational uses, and the Bowie and Keithville soils are moderately well suited to these uses. The gently sloping Bowie soils are well suited to intensive recreational areas. The main limitations are moderately slow or very slow permeability, the seasonal wetness, the slope, low strength on sites for roads and streets, and a high shrink-swell potential.

7. Letney-Briley-Betis

Well drained and somewhat excessively drained soils that have a sandy surface layer and a loamy or a sandy subsoil; formed in marine deposits

This map unit consists of soils on the broad ridgetops of interstream divides and on gentle side slopes around the head of small drainageways. Slopes are long and smooth and range from 1 to 5 percent.

This map unit make up about 2 percent of the parish. It is about 45 percent Letney soils, 20 percent Briley soils, 18 percent Betis soils, and 17 percent soils of minor extent.

The Letney soils are well drained. They have a surface layer of dark brown or brown loamy sand. The subsurface layer is loamy sand. It is brown in the upper part and light yellowish brown and mottled in the lower part. The subsoil is mottled sandy clay loam. It is yellowish brown in the upper part and brownish yellow in the lower part.

The Briley soils are well drained. They have a surface layer of dark grayish brown loamy fine sand. The subsurface layer is loamy fine sand. It is brown in the upper part and light yellowish brown and mottled in the lower part. The subsoil is yellowish red and light yellowish brown, mottled fine sandy loam in the upper part and red, mottled sandy clay loam in the lower part.

The Betis soils are somewhat excessively drained. They have a surface layer of brown loamy fine sand. The subsurface layer is light yellowish brown loamy fine sand. The subsoil is loamy fine sand. It is yellowish brown and mottled in the upper part and light yellowish brown and yellowish red in the lower part.

Of minor extent in this map unit are Bowie, Mayhew, and Corrigan soils on some ridgetops and side slopes.

Most areas of this map unit are used as woodland or pasture. A small acreage is used for homesite development.

The Letney and Briley soils are well suited to woodland. The Betis soils are moderately well suited to this use. Loblolly pine, shortleaf pine, and longleaf pine are dominant on the Letney soils. Loblolly pine and shortleaf pine are dominant on the Briley and Betis soils. The main concerns in producing and harvesting timber are droughtiness, seedling mortality, and restricted use of equipment caused by the sandy texture. Trafficability is poor when these soils are dry.

These soils are moderately well suited to crops and pasture. The droughtiness, low fertility, and potentially toxic levels of exchangeable aluminum are the main limitations. Erosion is the main hazard. Lime and fertilizer are needed for crops and pasture. Minimum tillage, contour farming, and grassed waterways can reduce the hazard of erosion.

These soils are moderately well suited to urban and intensive recreational areas. The main limitations are moderate, moderately rapid, or rapid permeability, the droughtiness, and the sandy texture. Seepage is a problem on sites for sanitary facilities. Where shallow excavations are made, cutbanks cave easily.

8. Sacul-Saucier-Kirvin

Moderately well drained and well drained soils that have a loamy surface layer and a clayey and loamy, a clayey, or a loamy subsoil; formed in marine deposits

This map unit consists of gently sloping soils on narrow to broad ridgetops and gently sloping to strongly sloping soils on side slopes along entrenched drainageways. Many well defined, branching streams drain areas of these soils. Slopes range from 1 to 5 percent on ridgetops and from 1 to 12 percent on side slopes. They are long and smooth or short and convex.

This map unit makes up about 6 percent of the parish. It is about 50 percent Sacul soils, 35 percent Saucier soils, 10 percent Kirvin soils, and 5 percent soils of minor extent.

The Sacul soils are moderately well drained and gently sloping to strongly sloping. They are on broad ridgetops and on side slopes. The surface layer is dark grayish brown or brown fine sandy loam. The subsurface layer is yellowish brown fine sandy loam. The subsoil is red, mottled clay in the upper part and mottled light brownish gray, dark yellowish brown, and light yellowish brown silty clay loam in the lower part. The substratum is stratified light brownish gray, red, and yellowish brown sandy clay loam and clay loam.

The Saucier soils are moderately well drained and gently sloping. They are on the lower side slopes along drainageways. The surface layer is dark brown fine sandy loam. The subsurface layer is pale brown, mottled fine sandy loam. In sequence downward, the subsoil is pale brown and brownish yellow, mottled fine sandy loam; yellowish brown, mottled sandy clay loam; yellowish brown, mottled silty clay loam; and mottled light brownish gray and brownish yellow silty clay.

The Kirvin soils are well drained and gently sloping to strongly sloping. They are on narrow to broad ridgetops and on side slopes. The surface layer is very dark grayish brown or brown fine sandy loam. The subsurface layer is light yellowish brown, mottled fine sandy loam. The subsoil is red, mottled clay in the upper part and mottled red, strong brown, and light gray silty clay in the lower part. The substratum consists of stratified layers of red and strong brown clay loam and gray soft shale that has a texture of clay.

Of minor extent in this map unit are Bowie, Keithville, and Saucier soils on some of the broad ridgetops and the lower side slopes and Sardis and Guyton soils on narrow flood plains.

Most areas of this map unit are used as woodland. A few small areas are used as pasture or for homesite development.

The soils in this map unit are well suited to woodland. Loblolly pine and shortleaf pine are dominant on the Sacul and Kirvin soils. Loblolly pine, shortleaf pine, and longleaf pine are dominant on the Saucier soils. The main limitation is seasonal wetness, which limits the use of equipment in areas of the Sacul and Saucier soils. Logging only during the drier periods helps to minimize compaction.

The gently sloping soils in this map unit are poorly suited or moderately well suited to crops and moderately well suited or well suited to pasture. The moderately sloping and strongly sloping soils are generally not suited to crops and poorly suited to pasture. The main limitations are the slope, low fertility, and potentially toxic levels of exchangeable aluminum. Erosion is a severe hazard. Lime and fertilizer are needed for crops and pasture. Minimum tillage, terraces, contour farming, and grassed waterways can reduce the hazard of erosion.

These soils dominantly are poorly suited to urban development and moderately well suited to intensive recreational areas. The Saucier soils and the gently sloping Kirvin soils are moderately well suited to urban uses. The Saucier soils are well suited to intensive recreational areas. The main limitations are the seasonal wetness, the slope, moderately slow or slow permeability, a moderate or high shrink-swell potential, and low strength on sites for roads and streets.

9. Eastwood-Keithville-Bowie

Moderately well drained soils that have a loamy surface layer and a clayey and loamy or a loamy subsoil; formed in marine deposits

This map unit consists of gently sloping soils on narrow to broad ridgetops and gently sloping to strongly sloping soils on side slopes. Slopes are generally long and smooth, but some are short and smooth or short and convex. Well defined, branching streams drain areas of these soils. Slopes on ridgetops range from 1 to 5 percent, and slopes on side slopes range from 1 to 12 percent.

This map unit makes up about 24 percent of the parish. It is about 75 percent Eastwood soils, 13 percent Keithville soils, 7 percent Bowie soils, and 5 percent soils of minor extent.

The Eastwood soils are gently sloping to strongly sloping. They have a surface layer of dark grayish brown fine sandy loam. The subsurface layer is light yellowish brown, mottled fine sandy loam. In sequence downward, the subsoil is red, mottled clay; mottled red, light brownish gray, and olive yellow clay; and yellowish red clay and light brownish gray loam. The substratum is stratified strong brown fine sandy loam and light brownish gray clay.

The Keithville soils are gently sloping. They have a surface layer of brown very fine sandy loam. The subsurface layer is yellowish brown, mottled very fine sandy loam. In sequence downward, the subsoil is strong brown, mottled silty clay loam; brownish yellow, mottled loam; strong brown, mottled loam and light brownish gray silt; and light brownish gray, mottled silty clay. The substratum is light brownish gray, mottled clay.

The Bowie soils are gently sloping to strongly sloping. They have a surface layer of dark brown or brown fine sandy loam. The subsurface layer is light yellowish brown, mottled fine sandy loam. The subsoil is sandy clay loam. In sequence downward, it is strong brown, strong brown and mottled, brownish yellow and mottled, and yellowish brown and mottled.

Of minor extent in this map unit are Kirvin and Trep soils on some of the ridgetops and side slopes, Saucier soils on side slopes along drainageways, and Guyton and Sardis soils on narrow flood plains.

Most areas of this map unit are used as woodland or pasture. A few small areas are used for homesite development.

The soils in this map unit are well suited to woodland. Loblolly pine, shortleaf pine, sweetgum, southern red oak, and hickory are dominant on the Eastwood soils. Loblolly pine, shortleaf pine, and sweetgum are dominant on the Keithville and Bowie soils. The use of equipment is limited in winter and spring because of wetness. Erosion is a hazard in moderately sloping and strongly sloping areas of the Eastwood soils.

The gently sloping soils are poorly suited or moderately well suited to crops and moderately well suited or well suited to pasture. The moderately sloping and strongly sloping soils are poorly suited or generally not suited to crops and poorly suited or moderately well suited to pasture because of a severe hazard of erosion. The main limitations are low fertility, the slope, and potentially toxic levels of exchangeable aluminum. Lime and fertilizer are needed for crops and pasture. Terraces, minimum tillage, contour farming, and grassed waterways can reduce the hazard of erosion.

The Eastwood soils are poorly suited to urban development and intensive recreational uses. The Keithville and Bowie soils are dominantly moderately well suited to these uses. The gently sloping Bowie soils are well suited to intensive recreational areas. The main limitations are the slope, the wetness, moderately slow or very slow permeability, a high shrink-swell potential, and low strength on sites for roads and streets.

10. Mayhew-Letney-Corrigan

Poorly drained, well drained, and somewhat poorly drained soils that have a loamy or a sandy surface layer and a clayey or a loamy subsoil; formed in marine deposits

This map unit consists of gently sloping soils on broad or slightly convex ridgetops and moderately sloping and strongly sloping soils on side slopes. Slopes are generally long and smooth, but some are short and choppy or short and convex. The landscape is dissected by a well defined, branching drainage system. Slopes range from 1 to 5 percent on the ridgetops from 5 to 12 percent on the side slopes.

This map unit makes up about 3 percent of the parish. It is about 34 percent Mayhew soils, 32 percent Letney soils, 10 percent Corrigan soils, and 24 percent soils of minor extent.

The Mayhew soils are poorly drained and gently sloping. They are on broad ridgetops. The surface layer is very dark gray loam. The subsoil is mottled clay. It is grayish brown in the upper part and pale olive in the lower part.

The Letney soils are well drained. They are on broad, gently sloping ridgetops and on moderately sloping and strongly sloping side slopes. The surface layer is dark brown or brown loamy sand. The subsurface layer is loamy sand. It is brown in the upper part and light yellowish brown and mottled in the lower part.

The Corrigan soils are somewhat poorly drained and gently sloping. They are on the slightly convex ridgetops. The surface layer is dark grayish brown fine sandy loam. The subsurface layer is grayish brown, mottled loam. The subsoil is mottled clay. It is grayish brown in the upper part and light brownish gray in the lower part. Below this is light brownish gray sandstone.

Of minor extent in this map unit are Briley and Betis soils on some ridgetops and Rayburn soils on some ridgetops and side slopes.

Most areas of this map unit are used as woodland or pasture. A few small areas are used for homesite development. One large area is used as a military reservation.

The Mayhew soils in this map unit are moderately well suited to woodland, and the Letney and Corrigan soils are well suited to this use. Loblolly pine, sweetgum, water oak, and white oak are dominant on the Mayhew soils. Loblolly pine, shortleaf pine, and longleaf pine are dominant on the Letney and Corrigan soils. The main concerns in producing and harvesting timber are restricted use of equipment and seedling mortality caused by the seasonal wetness in areas of the Mayhew and Corrigan soils and by the sandy surface layer and droughtiness in areas of the Letney soils. Erosion is a hazard in areas of the Corrigan soils. The sandy Letney soils have poor trafficability when dry, and the Mayhew and Corrigan soils have poor trafficability when wet.

These soils are dominantly moderately well suited to crops and pasture. The Corrigan soils and the moderately sloping and strongly sloping Letney soils are poorly suited to crops because of the slope and a severe hazard of erosion. Low fertility, the seasonal wetness, and the droughtiness are additional limitations. Lime and fertilizer are needed for crops and pasture. Minimum tillage, terraces, contour farming, and grassed waterways can reduce the hazard of erosion.

These soils are dominantly poorly suited to urban development and intensive recreational uses. The Letney soils are moderately well suited to these uses. The main limitations are the seasonal wetness, very slow permeability, the slope, and a high shrink-swell potential in areas of the Mayhew and Corrigan soils and the sandy texture, the droughtiness, moderately rapid permeability, and the slope in areas of the Letney soils.

11. Trep-Briley-Betis

Moderately well drained, well drained, and somewhat excessively drained soils that have a sandy surface layer and a loamy and clayey, a loamy, or a sandy subsoil; formed in marine deposits

This map unit consists of gently sloping soils on broad ridgetops and gently sloping to strongly sloping soils on side slopes. The landscape is dissected by deeply incised streams and a well defined, branching drainage system. Slopes on ridgetops generally are long and smooth and range from 1 to 5 percent. Slopes on side slopes generally are short and convex and range from 1 to 12 percent.

This map unit makes up about 6 percent of the parish. It is about 38 percent Trep soils, 25 percent Briley soils, 14 percent Betis soils, and 23 percent soils of minor extent.

The Trep soils are moderately well drained. They have a surface layer of dark grayish brown or brown loamy fine sand. The subsurface layer is light yellowish brown loamy fine sand. The subsoil is yellowish brown, mottled sandy clay loam in the upper part; mottled brownish yellow, red, and light brownish gray sandy clay loam in the next part; and mottled light brownish gray, yellowish brown, and red sandy clay in the lower part.

The Briley soils are well drained. They have a surface layer of dark grayish brown loamy fine sand. The subsurface layer is loamy fine sand. It is brown in the upper part and light yellowish brown and mottled in the lower part. The subsoil is yellowish red and light yellowish brown, mottled fine sandy loam in the upper part and red, mottled sandy clay loam in the lower part.

The Betis soils are somewhat excessively drained. They have a surface layer of brown loamy fine sand. The subsurface layer is light yellowish brown loamy fine sand. The subsoil is loamy fine sand. It is yellowish brown and mottled in the upper part and light yellowish brown and yellowish red in the lower part.

Of minor extent in this map unit are Bowie soils on some broad ridgetops, Attoyac soils on stream terraces, and Saucier soils on side slopes along drainageways.

Most areas of this map unit are used as woodland or pasture. A small acreage is used for homesite development.

The Trep and Briley soils are well suited to woodland, and the Betis soils are moderately well suited to this use. The dominant trees are loblolly pine and shortleaf pine. The main concerns in producing and harvesting timber are restricted use of equipment and seedling mortality caused by the sandy texture and droughtiness. Trafficability is poor when the surface layer is dry.

These soils are dominantly moderately well suited to crops and pasture. The moderately sloping and strongly sloping soils are poorly suited to crops because of a severe hazard of erosion. The slope, the droughtiness, low fertility, and potentially toxic levels of exchangeable aluminum are the main limitations. Lime and fertilizer are needed for crops and pasture. Minimum tillage, contour farming, and grassed waterways can reduce the hazard of erosion.

These soils are moderately well suited to urban development and intensive recreational uses. The main limitations are moderately slow to rapid permeability, the sandy texture, the droughtiness, and the slope. Seasonal wetness is an additional limitation in areas of the Trep soils. Seepage is a problem on sites for sanitary facilities.

Moderately Sloping to Steep Soils on Uplands

These are moderately well drained, well drained, and poorly drained, loamy soils. These soils make up about 6 percent of Sabine Parish. Most of the acreage is woodland. A few small areas are used as pasture or for homesite development. The slope is the main limitation affecting most uses. Seasonal wetness, a high shrink-swell potential, and low fertility are additional limitations.

12. Sacul

Moderately well drained soils that have a loamy surface layer and a clayey and loamy subsoil; formed in marine deposits

This map unit consists of moderately sloping to steep soils on side slopes. The landscape consists of narrow flood plains that border incised, meandering, mostly intermittent streams. It is dissected by a well defined, branching drainage system. Slopes are short and range from 5 to 30 percent.

This map unit makes up about 3 percent of the parish. It is about 90 percent Sacul soils and 10 percent soils of minor extent.

The Sacul soils have a surface layer of dark grayish brown or brown fine sandy loam. The subsurface layer is yellowish brown fine sandy loam. The subsoil is red, mottled clay in the upper part and mottled light brownish gray, dark yellowish brown, and light yellowish brown silty clay loam in the lower part. The substratum is stratified light brownish gray, red, and yellowish brown sandy clay loam and clay loam.

Of minor extent in this map unit are Guyton and Sardis soils on narrow flood plains and Keithville and Kirvin soils on some side slopes.

Most areas of this map unit are used as woodland. A few small areas are used as pasture.

The moderately sloping and strongly sloping Sacul soils are well suited to woodland, and the moderately steep and steep Sacul soils are moderately well suited to this use. The dominant trees are loblolly pine and shortleaf pine. Because of seasonal wetness, the use of equipment is limited in winter and early spring. Erosion is a hazard along logging roads and skid trails.

These soils generally are not suited to crops and are poorly suited to pasture because of the slope and a severe hazard of erosion. Low fertility and potentially toxic levels of exchangeable aluminum are additional limitations.

The soils are poorly suited to urban development and intensive recreational uses. The main limitations are the slope, slow permeability, the seasonal wetness, a high shrink-swell potential, and low strength on sites for roads and streets.

13. Kisatchie-Mayhew-Rayburn

Well drained, poorly drained, and moderately well drained soils that have a loamy surface layer and a clayey subsoil; formed in marine deposits

This map unit consists of moderately sloping to moderately steep soils on side slopes. The landscape is deeply incised by a well defined, branching drainage system. Ledges and boulders of sandstone and siltstone bedrock are prominent features. Slopes generally are short and convex, but some are long and smooth. They range from 5 to 20 percent.

This map unit makes up about 3 percent of the parish. It is about 39 percent Kisatchie soils, 28 percent Mayhew soils, 19 percent Rayburn soils, and 14 percent soils of minor extent.

The Kisatchie soils are well drained. They are mainly on the convex upper and middle side slopes. Slopes range from 5 to 20 percent. The surface layer is dark grayish brown silt loam. In sequence downward, the subsoil is yellowish brown silty clay, light olive brown silty clay, light olive gray silty clay, and light olive gray and light gray silty clay. Below this is light gray sandstone.

The Mayhew soils are poorly drained. They are mainly on the concave lower side slopes. Slopes range from 5 to 12 percent. The surface layer is brown loam. The subsoil is mottled clay. It is grayish brown in the upper part and pale olive in the lower part.

The Rayburn soils are moderately well drained. They are on the convex upper and middle side slopes. The surface layer is brown fine sandy loam. The subsoil is red clay in the upper part and reddish brown, mottled silty clay in the lower part. Below this is light brownish gray, mottled siltstone.

Of minor extent in this map unit are Herty and Letney soils on side slopes and Guyton and Sardis soils on narrow flood plains.

Most areas of this map unit are used as woodland. A few small areas are used as pasture.

The soils in this map unit are moderately well suited to woodland. Loblolly pine is dominant on the Mayhew soils, and loblolly pine, longleaf pine, and shortleaf pine are dominant on the Kisatchie and Rayburn soils. Sweetgum, water oak, and white oak are also common on the Mayhew soils. The main concerns in producing and harvesting timber are a slight to severe hazard of erosion caused by the slope, restricted use of equipment, and seedling mortality caused by the seasonal wetness, the clayey subsoil, and droughtiness in summer and autumn. The slope, rock outcrops, and gullies limit the use of equipment.

Because of the slope and a severe hazard of erosion, these soils generally are not suited to crops and are poorly suited to pasture. Low fertility, the rock outcrops, the gullies, and the seasonal wetness are additional limitations.

These soils are poorly suited to most urban and intensive recreational uses. The main limitations are the slope, very slow permeability, a high shrink-swell potential, the seasonal wetness, the rock outcrops, depth to bedrock, and low strength on sites for roads and streets.

Detailed Soil Map Units

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

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

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

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

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, 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, Sacul fine sandy loam, 1 to 5 percent slopes, is a phase of the Sacul series.

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

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. Niwana-Gessner loams are an example.

A *soil association* is made up of two or more geographically associated soils that are shown as one unit on the maps. Because of present or anticipated soil uses in the survey area, it was not considered practical or necessary to map the soils separately. The pattern and relative proportion of the soils are somewhat similar. Guyton-luka association, frequently flooded, is an example.

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

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.

The boundaries of map units in Sabine Parish were matched, where possible, with those of the previously completed surveys of Natchitoches and De Soto Parishes. In a few places, however, the lines do not join and the names of the map units differ. These differences resulted mainly from changes in soil series concepts, differences in map unit design, and changes in soil patterns near survey area boundaries.

All of the soils in Sabine Parish were mapped at the same level of detail, except for some soils on side slopes and soils on flood plains. A higher level of mapping is not needed in these areas because of projected land uses, which are forestry and pasture.

AtC—Attoyac fine sandy loam, 1 to 5 percent slopes. This gently sloping, well drained soil is on broad terraces along major streams. Areas are irregular in shape and range from 10 to 200 acres in size.

Typically, the surface layer is brown fine sandy loam about 9 inches thick. The subsurface layer is pale brown fine sandy loam about 5 inches thick. The next layer, to a depth of about 21 inches, is red and light yellowish brown fine sandy loam. The subsoil, between depths of 21 and 66 inches, is red sandy clay loam. In places the subsoil is yellowish brown or brownish yellow.

Included with this soil in mapping are a few small areas of Bowie and Briley soils. Bowie soils are lower on the landscape than the Attoyac soil and are on the less convex slopes. They have a yellowish and brownish subsoil that contains more than 5 percent plinthite. Briley soils are in the higher areas. They have a sandy surface layer and subsurface layer. Included soils make up about 15 percent of the map unit.

This Attoyac soil is characterized by low fertility and moderately high levels of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some crops. Water and air move through this soil at a moderate rate. Water runs off the surface at a medium rate, and the hazard of water erosion is moderate. The surface layer dries quickly after rains. The shrink-swell potential is low. Plants are damaged by a lack of water during dry periods in the summer and fall of some years.

Most of the acreage is used as woodland or pasture. A small acreage is used for homesite development.

This soil is well suited to loblolly pine and shortleaf pine. Southern red oak and sweetgum also grow on this soil. The soil has few limitations affecting woodland use and management. The site index for loblolly pine is 90.

This soil is well suited to habitat for woodland and openland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey. In areas of pasture, grasses and legumes that mature in different seasons can be planted in separate fields to improve habitat for rabbits, quail, doves, and turkey.

This soil is well suited to pasture. The main limitations are the low fertility and a moderate or high available water capacity. Erosion is a hazard until plants are established. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, crimson clover, and ryegrass. Seedbeds should be prepared on the contour or across the slope where practical. Additions of lime and fertilizer help to overcome the low fertility and increase the production of forage. Proper stocking rates and pasture rotation help to keep the pasture in good condition.

This soil is moderately well suited to most cultivated crops. It is limited mainly by the low fertility and the moderate or high available water capacity. Erosion is the main hazard. The main crops are soybeans, corn, cotton, and vegetables. This soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material can improve fertility and help to maintain tilth and the content of organic matter. Erosion can be controlled by seeding cover crops in early fall, minimizing tillage, and establishing terraces, diversions, and grassed waterways. Areas should always be tilled on the contour or across the slope. Crops respond well to applications of lime and fertilizer, which help to overcome the low fertility and the moderately high levels of exchangeable aluminum. Crops can be damaged by a lack of moisture during dry periods. Where water of adequate quality is available, irrigation can provide supplemental water during dry periods to prevent crop damage.

This soil is well suited to homesite development and other urban uses. Few limitations affect these uses. Erosion, however, is a hazard and increases if the soil is left exposed during site development. Plans for homesite development should preserve as many trees as possible. Mulch, fertilizer, and irrigation can help to establish and maintain lawn grasses and ornamentals. Seepage is a limitation affecting some sanitary facilities.

This soil is well suited to recreational development. The slope is a limitation on playgrounds. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer, irrigating, and controlling traffic.

The capability subclass is IIIe. The woodland ordination symbol is 9A.

BlC—Bellwood silty clay loam, 1 to 5 percent slopes. This gently sloping, somewhat poorly drained soil is on narrow to broad ridgetops and side slopes in the uplands. Slopes are generally long and smooth, but some are short and convex. Areas are irregular is shape and range from about 20 to 300 acres in size.

Typically, the surface layer is reddish brown silty clay loam about 6 inches thick. The subsoil, to a depth of about 53 inches, is mottled clay. It is yellowish red in the upper part, grayish brown in the next part, and light brownish gray in the lower part. The substratum extends to a depth of about 72 inches. It is light brownish gray clay.

Included with this soil in mapping are a few small areas of Bowie and Keithville soils. Bowie soils are higher on the landscape than the Bellwood soil. They are loamy throughout. Keithville soils are in the slightly higher landscape positions. They have a subsoil that is loamy in the upper part and clayey in the lower part. Included soils make up about 15 percent of the map unit.

This Bellwood soil is characterized by low fertility and high levels of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some crops. Water and air move through this soil at a very slow rate. Water runs off the surface at a medium or rapid rate. A seasonal high water table is at a depth of about 2 to 4 feet from December through April. The shrink-swell potential of the subsoil is high. The surface layer is sticky when wet and dries slowly once wetted.

Most of the acreage is used as woodland. A small acreage is used as pasture or for homesite development.

This soil is moderately well suited to loblolly pine and shortleaf pine. Other common trees are white oak and southern red oak. The site index for loblolly pine is 78. The main concerns in producing and harvesting timber are a severe equipment limitation and compaction because of the wetness and the sticky surface layer. Plant competition is moderate. Seedling mortality also is moderate because of the surface layer of silty clay loam and the clayey subsoil. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from December through April. Logging roads require suitable surfacing for year-round use. Compaction can be minimized by using suitable logging systems, laying out skid trails in advance, and harvesting during the drier periods. Controlled burning or proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, or trees.

This soil is well suited to habitat for woodland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey.

This soil is moderately well suited to pasture. The main limitations are the low fertility and a hazard of erosion during the establishment of pasture grasses. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, and crimson clover. Grazing when the soil is wet can cause puddling and compaction of the surface layer and can reduce forage production. Seedbeds should be prepared on the contour or across the slope where practical. Additions of lime and fertilizer help to overcome the low fertility and increase the production of forage. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is poorly suited to cultivated crops. It is limited mainly by a severe hazard of erosion, the low fertility, and poor tilth. Close-sown crops, such as small grains, are the most suitable, but soybeans and grain sorghum are also suitable crops if conservation practices are used. This soil is difficult to keep in good tilth and can be worked only within a narrow range in moisture content. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Erosion also can be controlled by seeding winter cover crops, minimizing tillage, and establishing terraces, diversions, and grassed waterways. Areas should always be tilled on the contour or across the slope. Most crops respond well to applications of fertilizer and lime, which help to overcome the low fertility and reduce the high levels of exchangeable aluminum in the root zone.

This soil is poorly suited to urban development. It has severe limitations affecting building sites, local roads and streets, and most sanitary facilities because of the very slow permeability, the wetness, and the high shrink-swell potential. Also, low strength is a severe limitation affecting roads. Properly designing foundations and footings and diverting runoff away from buildings help to prevent structural damage caused by shrinking and swelling. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the very slow permeability. Lagoons or self-contained disposal units can be used to dispose of sewage. Roads and streets should be designed to overcome the low load-supporting capacity of the subsoil. Revegetating disturbed areas around construction sites as soon as possible helps to control erosion.

Because of the very slow permeability and the hazard of erosion, this soil is poorly suited to recreational development. A good drainage system should be provided in intensively used areas, such as playgrounds and camp areas. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer and controlling traffic.

The capability subclass is IVe. The woodland ordination symbol is 8C.

BLE—Bellwood silty clay loam, 5 to 12 percent slopes. This moderately sloping and strongly sloping, somewhat poorly drained soil is on side slopes in the uplands. Well defined drainageways cross most areas of this soil. Areas are irregular in shape and range from 20 to 200 acres in size. Slopes are generally short and convex. The number of observations was fewer in areas of this map unit than in most other areas of the parish. The detail in mapping, however, is adequate for the expected use of the soil.

Typically, the surface layer is brown silty clay loam about 4 inches thick. The subsoil, to a depth of about 50 inches, is clay. It is reddish brown in the upper part, grayish brown and mottled in the next part, and light brownish gray and mottled in the lower part. The substratum extends to a depth of about 72 inches. It is light brownish gray and brownish yellow, mottled clay.

Included with this soil in mapping are a few small areas of Bowie and Keithville soils. Bowie soils are higher on the landscape than the Bellwood soil. They are loamy throughout. Keithville soils are in the lower areas. They have a subsoil that is loamy in the upper part and clayey in the lower part. Included soils make up about 15 percent of the map unit.

This Bellwood soil is characterized by low fertility and high levels of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some crops. Water and air move through this soil at a very slow rate. Water runs off the surface at a rapid rate. A seasonal high water table is at a depth of about 2 to 4 feet from December through April. The shrink-swell potential of the subsoil is high. The surface layer is sticky when wet and dries slowly once wetted.

Most of the acreage is used as woodland. A small acreage is used as pasture or for homesite development.

This soil is moderately well suited to loblolly pine and shortleaf pine. Other common trees are white oak and southern red oak. The site index for loblolly pine is 78. The main concerns in producing and harvesting timber are compaction and a severe equipment limitation because of the wetness and the sticky surface layer. Also, seedling mortality is moderate because of the surface layer of silty clay loam and the clayey subsoil. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from December through April. Logging roads require suitable surfacing for year-round use. Compaction can be minimized by harvesting during dry seasons and laying out skid trails in advance. Proper site preparation and spraying, cutting, burning, or girdling can eliminate unwanted weeds, brush, or trees.

This soil is well suited to habitat for woodland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey.

This soil is poorly suited to pasture. The main limitations are the low fertility and a severe hazard of erosion during the establishment of pasture grasses. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, and crimson clover. Grazing when the soil is wet can puddle and compact the surface layer and reduce forage production. Seedbeds should be prepared on the contour or across the slope where practical. Additions of lime and fertilizer help to overcome the low fertility and increase the production of forage. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is generally not suited to cultivated crops. It is limited mainly by the severe hazard of erosion, the low fertility, poor tilth, and the slope. If conservation practices are used, close-sown crops, such as small grains, are suitable. This soil is difficult to keep in good tilth and can be worked only within a narrow range in moisture content. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Seeding in early fall, minimizing tillage, and establishing terraces, diversions, and grassed waterways help to control erosion. Areas should always be tilled on the contour or across the slope. Most crops respond well to applications of fertilizer and lime, which improve fertility and reduce the high levels of exchangeable aluminum in the root zone.

This soil is poorly suited to urban uses. It has severe limitations affecting building sites, local roads and streets, and most sanitary facilities because of the slope, the very slow permeability, the wetness, low strength, and the high shrink-swell potential. Erosion is a hazard in the steeper areas. Only the part of the site used for construction should be disturbed. Disturbed areas around construction sites can be protected against erosion by revegetating as soon as possible. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the very slow permeability. Lagoons or self-contained disposal units can be used to dispose of sewage. Low strength is a limitation affecting local roads and streets. Roads can be designed to overcome the limited ability of the soil to support a load. Properly designing foundations and footings and diverting runoff away from buildings help to prevent structural damage caused by shrinking and swelling. The effects of shrinking and swelling also can be minimized by backfilling with material that has low shrink-swell potential.

Because of the severe hazard of erosion and the very slow permeability, this soil is poorly suited to recreational development. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. A good drainage system should be provided in intensively used areas, such as playgrounds and camp areas.

The capability subclass is VIe. The woodland ordination symbol is 8C.

Figure 2.—A profile of Betis loamy fine sand, 1 to 5 percent slopes. The dark wavy lines in the subsoil are accumulations of clay, or lamellae.

BtC—Betis loamy fine sand, 1 to 5 percent slopes. This gently sloping, somewhat excessively drained soil is on ridgetops and side slopes in the uplands. Areas are irregular in shape and range from 10 to 150 acres in size. Slopes are long and smooth.

Typically, the surface layer is brown loamy fine sand about 4 inches thick. The subsurface layer is light yellowish brown loamy fine sand about 24 inches thick. The subsoil, to a depth of about 72 inches, is loamy fine sand. It is yellowish brown and mottled in the upper part and light yellowish brown and yellowish red in the lower part. It has thin lamellae (fig. 2).

Included with this soil in mapping are a few small areas of Briley and Trep soils. These soils have a loamy subsoil. Briley soils are in landscape positions similar to those of the Betis soil. Trep soils are on ridges at the lower elevations. Included soils make up about 10 percent of the map unit.

This Betis soil is characterized by low fertility and moderately high levels of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some crops. Water and air move through this soil at a rapid rate. Water runs off the surface at a very slow rate. The shrink-swell potential is low. The surface layer dries quickly after rains. Plants generally are damaged by a lack of water during dry periods in the summer and fall of most years.

Most of the acreage is used as woodland. A small acreage is used as pasture, as cropland, or for homesite development.

This soil is moderately well suited to loblolly pine and shortleaf pine. The site index for loblolly pine is 70. The main concerns in producing and harvesting timber are a moderate equipment limitation and severe seedling mortality caused by the sandy surface layer and the droughtiness. The sandy surface layer hinders the use of wheeled equipment, especially when the soil is saturated or very dry. The low available water capacity generally reduces the seedling survival rate, especially in areas where understory plants are numerous. Restricting burning and leaving slash well distributed help to maintain the content of organic matter. The survival rate of pine seedlings can be increased by planting only during wet periods. Natural regeneration may be preferable on the driest sites.

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

This soil is moderately well suited to pasture. The main limitations are the droughtiness and the low fertility. The low available water capacity limits the production of forage. Suitable pasture plants are improved bermudagrass, bahiagrass, and weeping lovegrass. Additions of lime and fertilizer help to overcome the low fertility and increase the production of forage. Proper stocking rates and pasture rotation help to keep the pasture in good condition.

This soil is moderately well suited to most cultivated crops. It is limited mainly by the low fertility, the droughtiness, and poor trafficability. The main crops are soybeans, wheat, grain sorghum, watermelons, peanuts, and other vegetables. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material help to conserve moisture, maintain tilth and the content of organic matter, and control erosion. Areas should be tilled on the contour or across the slope when the soil is moist. Most crops respond well to applications of fertilizer and lime, which help to overcome the low fertility and the moderately high levels of exchangeable aluminum.

This soil is moderately well suited to homesite development and other urban uses. It has slight limitations affecting building sites and local roads and streets and severe limitations affecting most sanitary facilities. The main limitations are the rapid permeability and the sandy surface layer. Because of the rapid permeability, effluent from onsite sewage disposal systems may seep in downslope areas. If the density of housing is moderate or high, community sewage systems are needed to prevent the contamination of water supplies by seepage. Selection of adapted vegetation is critical in areas used for lawns, shrubs, trees, and vegetable gardens. Plants that can tolerate the droughtiness should be selected unless irrigation water is provided. Where shallow excavations are made, special measures are needed to support cutbanks because of the instability of the soil and its tendency to cave.

This soil is moderately well suited to recreational development. It is limited mainly by the sandy surface layer, which is loose when dry and provides poor traction for vehicles and foot traffic. The droughtiness can limit the establishment of grasses on golf fairways. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer, irrigating, and controlling traffic. Adding loamy material to the surface layer can improve the suitability of the soil for intensively used areas, such as playgrounds and camp areas.

The capability subclass is IIIs. The woodland ordination symbol is 7S.

BTE—Betis loamy fine sand, 5 to 12 percent slopes. This moderately sloping and strongly sloping, somewhat excessively drained soil is on side slopes in the uplands. Areas are irregular in shape and range from 10 to 100 acres in size. Slopes are short and convex. The number of observations was fewer in areas of this map unit than in most other areas of the parish. The detail in mapping, however, is adequate for the expected use of the soil.

Typically, the surface layer is brown loamy fine sand about 5 inches thick. The subsurface layer is light yellowish brown loamy fine sand about 45 inches thick. The subsoil extends to a depth of about 72 inches. It is light yellowish brown and yellowish red loamy fine sand. In places the soil has slopes of 12 to 20 percent.

Included with this soil in mapping are a few small areas of Briley soils. These soils are in landscape positions similar to those of the Betis soil. They have a loamy subsoil. They make up about 10 percent of the map unit.

This Betis soil is characterized by low fertility and moderately high levels of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some crops. Water and air move through this soil at a rapid rate. Water runs off the surface at a very slow rate. The surface layer dries quickly after rains. Plants generally are damaged by a lack of water during dry periods in the summer and fall of most years. The shrink-swell potential is low.

Most of the acreage is used as woodland. A small acreage is used as pasture.

This soil is moderately well suited to loblolly pine and shortleaf pine (fig. 3). The site index for loblolly pine is 70. The main concerns in producing and harvesting timber are a moderate equipment limitation and severe seedling mortality caused by the sandy texture and the droughtiness. Trafficability is poor when the soil is dry. The low available water capacity generally reduces the seedling survival rate, especially in areas where understory plants are numerous. Planting seedlings that are larger than normal and planting when the soil is wet or moist can improve seedling survival. Natural regeneration may be preferable on the driest sites. Restricting burning and leaving slash well distributed help to maintain the content of organic matter.

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

This soil is moderately well suited to pasture. The main limitations are the low fertility, a limited choice of plants, and the droughtiness. Erosion is the main hazard. The low available water capacity limits the production of forage. Suitable pasture plants are improved bermudagrass, bahiagrass, weeping lovegrass, and crimson clover. Additions of lime and fertilizer help to overcome the low fertility and increase the production of forage. Proper stocking rates and pasture rotation help to keep the pasture in good condition and control erosion.

This soil is poorly suited to most cultivated crops. It is limited mainly by the slope, the low fertility, the droughtiness, and a severe hazard of erosion. If adequate conservation practices are used,

Figure 3.—Loblolly pine in a well managed area of Betis loamy fine sand, 5 to 12 percent slopes.

watermelons, peanuts, and other vegetables can be grown. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material help to control erosion, improve fertility, and help to maintain tilth and the content of organic matter. Areas should always be tilled on the contour or across the slope. Most crops respond well to applications of fertilizer and lime, which improve fertility and reduce the moderately high levels of exchangeable aluminum.

This soil is moderately well suited to homesite development and other urban uses. It has moderate or severe limitations affecting building sites and severe limitations affecting most sanitary facilities. The main limitations are the slope, the sandy texture, and the rapid permeability. Because of the rapid permeability, effluent from onsite sewage disposal systems can seep in downslope areas. Community sewage disposal systems are needed to prevent the contamination of water supplies by seepage. Selection of adapted vegetation is critical in areas used for lawns, shrubs, trees, and vegetable gardens. Plants that can tolerate the droughtiness should be selected unless irrigation water is provided. Because erosion is a hazard in the steeper areas, only the part of the site that is used for construction should be disturbed. Cutbanks cave easily where shallow excavations are made.

This soil is moderately well suited to intensively used recreational areas. The sandy surface layer and the slope are the main limitations affecting most recreational uses. Also, the droughtiness can limit the growth of grasses on golf fairways. The sandy surface layer is loose when dry and provides poor traction for vehicles and foot traffic. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer, irrigating, and controlling traffic. Adding loamy material to the surface layer can improve the suitability of the soil for playgrounds and camp areas.

The capability subclass is IVe. The woodland ordination symbol is 7S.

BwC—Bowie fine sandy loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on broad ridgetops and on side slopes in the uplands. Areas are irregular in shape and range from 5 to 150 acres in size. Slopes are generally long and smooth.

Typically, the surface layer is dark brown fine sandy loam about 5 inches thick. The subsurface layer is light yellowish brown, mottled fine sandy loam about 10 inches thick. The subsoil extends to a depth of about 62 inches. It is sandy clay loam. The upper 8 inches of the subsoil is strong brown. The next 22 inches is strong brown and mottled in the upper part and brownish yellow and mottled in the lower part. It contains nodules of plinthite. The lower part of the subsoil, between depths of 45 and 62 inches, is yellowish brown and mottled. In places the subsoil is silty clay or clay below a depth of 40 inches. In an area near the North Toledo Bend State Park, the soil contains pebbles of quartz throughout.

Included with this soil in mapping are a few small areas of Saucier and Trep soil. Saucier soils are lower on the landscape than the Bowie soil. They have gray mottles within a depth of 30 inches. Trep soils are in the higher landscape positions. They have a sandy surface layer and subsurface layer that have a combined thickness of more 20 inches. Also included, in one large area near the North Toledo Bend State Park, are a few small areas of Latonia soils on stream terraces and Attoyac soils in landscape positions higher and more convex than those of the Bowie soil. Latonia and Attoyac soils do not contain plinthite in the subsoil. Included soils make up about 15 percent of the map unit.

This Bowie soil is characterized by low fertility and moderately high levels of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some 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 at a depth of about 3.5 to 5.0 feet from January through April. The surface layer dries quickly after rains. The shrink-swell potential is low.

Most of the acreage is used as woodland or pasture. A small acreage is used for homesite development.

This soil is well suited to loblolly pine and shortleaf pine. It has few limitations affecting timber production. The site index for loblolly pine is 86.

This soil is well suited to habitat for woodland and openland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey. In areas of pasture, grasses and legumes that mature in different seasons can be planted in separate strips to improve habitat for rabbits, quail, doves, and nongame animals and birds.

This soil is well suited to pasture. The main limitation is the low fertility. Erosion is a hazard in tilled areas until pasture plants are established. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, crimson clover, ball clover, and ryegrass. Seedbeds should be prepared on the contour or across the slope where practical. Additions of lime and fertilizer help to overcome the low fertility and increase the production of forage. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is moderately well suited to most cultivated crops. It is limited mainly by the slope, the low fertility, and a hazard of erosion. The main crops are soybeans, corn, cotton, and grain sorghum. This soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material help to improve fertility and help to maintain tilth and the content of organic matter. Erosion can be controlled by seeding cover crops in fall, minimizing tillage, and establishing terraces, diversions, and grassed waterways. Areas should always be tilled on the contour or across the slope. Most crops respond well to applications of fertilizer and lime, which improve fertility and reduce the levels of exchangeable aluminum in the root zone.

This soil is moderately well suited to homesite development and other urban uses. It has slight or moderate limitations affecting building sites and local roads and streets and moderate or severe limitations affecting sanitary facilities. The slope, the moderately slow permeability, the wetness, and low strength are the main limitations. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the moderately slow permeability. Seepage can be a hazard on sites for sanitary facilities, such as sewage lagoons. Self-contained disposal units can be used to dispose of sewage. Preserving the existing plant cover during construction helps to control erosion. The design of roads and streets can offset the limited ability of the soil to support a load. Excess surface water can be removed by shallow ditches and proper grading.

This soil is well suited to recreational development. It is limited mainly by the slope. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer and controlling traffic.

The capability subclass is IIIe. The woodland ordination symbol is 9A.

BwD—Bowie fine sandy loam, 5 to 8 percent slopes. This moderately sloping, moderately well drained soil is on side slopes in the uplands. Areas are irregular in shape and range from 5 to 100 acres in size. Slopes are short and smooth.

Typically, the surface layer is brown fine sandy loam about 5 inches thick. The subsurface layer is light yellowish brown, mottled fine sandy loam about 11 inches thick. The subsoil extends to a depth of about 67 inches. It is yellowish brown sandy clay loam in the upper part; strong brown, mottled sandy clay loam in the next part; and brownish yellow, mottled fine sandy loam in the lower part. The lower part of the subsoil contains nodules of plinthite. In places the subsoil contains little or no plinthite.

Included with this soil in mapping are a few small areas of Trep soils. These soils are higher on the landscape than the Bowie soil. They have a sandy surface and subsurface layer that have a combined thickness of more than 20 inches. They make up about 10 percent of the map unit.

This Bowie soil is characterized by low fertility and moderately high levels of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some 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 at a depth of about 3.5 to 5.0 feet from January through April. The surface layer dries quickly after rains. The shrink-swell potential is low.

Most of the acreage is used as woodland or pasture. A small acreage is used for homesite development.

This soil is well suited to loblolly pine and shortleaf pine. It has few limitations affecting timber production. The site index for loblolly pine is 86.

This soil is well suited to habitat for woodland and openland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey. In areas of pasture, grasses and legumes that mature in different seasons can be planted in separate strips to improve habitat for rabbits, quail, doves, and nongame animals and birds.

This soil is moderately well suited to pasture. The main limitations are the slope, the low fertility, and a hazard of erosion during the establishment of pasture grasses. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, crimson clover, ball clover, and ryegrass. Seedbeds should be prepared on the contour or across the slope where practical. Additions of lime and fertilizer help to overcome the low fertility and increase the production of forage. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

Mainly because of the slope and a severe hazard of erosion, this soil is poorly suited to most cultivated crops. The low fertility is an additional limitation. Close-sown crops, such as small grains, are the most suitable, but soybeans, corn, cotton, and grain sorghum are also suitable crops if conservation practices are used. This soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material can improve fertility and help to maintain tilth and the content of organic matter. Erosion can be controlled by seeding cover crops in fall, minimizing tillage, and establishing terraces, diversions, and grassed waterways. Areas should always be tilled on the contour or across the slope. Most crops respond well to applications of fertilizer and lime, which improve fertility and reduce the levels of exchangeable aluminum in the root zone.

This soil is moderately well suited to urban development. It has slight or moderate limitations affecting building sites and local roads and streets and moderate or severe limitations affecting sanitary facilities. The main limitations are the slope, the wetness, the moderately slow permeability, and low strength. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the moderately slow permeability. During rainy periods, effluent from onsite sewage disposal systems may seep in downslope areas. Seepage can be a hazard on sites for sewage lagoons. Self-contained disposal units may be used to dispose of sewage. Preserving the existing plant cover during construction helps to control erosion. The design of local roads and streets can offset the limited ability of the soil to support a load.

This soil is moderately well suited to recreational development. It is limited mainly by the slope. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer and controlling traffic.

The capability subclass is IVe. The woodland ordination symbol is 9A.

ByC—Briley loamy fine sand, 1 to 5 percent slopes. This gently sloping, well drained soil is on broad ridgetops in the uplands. Areas are irregular in shape and range from 10 to 200 acres in size. Slopes are long and smooth.

Typically, the surface layer is dark grayish brown loamy fine sand about 5 inches thick. The subsurface layer is loamy fine sand about 15 inches thick. It is brown in the upper part and light yellowish brown and mottled in the lower part. The next layer, to a depth of about 29 inches, is yellowish red and light yellowish brown, mottled fine sandy loam. The subsoil extends to a depth of about 60 inches. It is red, mottled sandy clay loam.

Included with this soil in mapping are a few small areas of Attoyac, Bowie, and Trep soils. Attoyac soils are lower on the landscape than the Briley soil. Attoyac and Briley soils are loamy throughout. Bowie soils are on the less convex slopes. Trep soils are in the slightly lower positions. They have a yellowish subsoil. Included soils make up about 15 percent of the map unit.

This Briley soil is characterized by low fertility. Water and air move through the upper part of this soil at a rapid rate and through the lower part at a moderate rate. Water runs off the surface at a slow rate. The surface layer dries quickly after rains. The shrink-swell potential is low. Plants generally are damaged by a lack of water during dry periods in the summer and fall of most years.

Most of the acreage is used as woodland. A small acreage is used as pasture or for homesite development.

This soil is well suited to loblolly pine and shortleaf pine. The site index for loblolly pine is 80. The main concerns in producing and harvesting timber are a moderate equipment limitation and seedling mortality caused by the sandy texture and the droughtiness. Trafficability is poor when the soil is saturated or very dry. The seedling mortality rate may be high in summer because of inadequate soil moisture. Restricting burning and leaving slash well distributed help to maintain the content of organic matter.

This soil is well suited to habitat for woodland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the natural establishment of desirable plants. Preserving existing oaks and promoting the growth of suitable understory plants can improve habitat for deer, squirrels, and turkey.

This soil is moderately well suited to pasture. The main limitations are the low fertility and the droughtiness. The low available water capacity limits the production of pasture plants. Suitable pasture plants are improved bermudagrass, bahiagrass, and crimson clover. Additions of lime and fertilizer help to overcome the low fertility and increase the production of forage. Proper stocking rates and pasture rotation help to keep the pasture in good condition.

This soil is moderately well suited to most cultivated crops. It is limited mainly by the low fertility and the droughtiness. Erosion is a hazard in the more sloping areas. The main crops are cotton, corn, soybeans, grain sorghum, watermelons, and other vegetables. This soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material help to improve fertility, conserve moisture, and maintain tilth and the content of organic matter. Areas should always be tilled on the contour or across the slope. Most crops respond well to applications of fertilizer and lime, which help to overcome the low fertility.

This soil is moderately well suited to urban uses. It has slight limitations affecting building sites and local roads and streets and slight to severe limitations affecting sanitary facilities. Seepage is a hazard affecting sewage lagoons because of the rapid and moderate permeability and the sandy texture. Septic tank absorption fields can adequately dispose of sewage effluent. Sewage lagoons can be lined with impervious material to control seepage. Revegetating disturbed areas around construction sites as soon as possible helps to control erosion. Plants that can tolerate the droughtiness should be selected unless irrigation water is provided. Mulching, applying fertilizer, and irrigating help to establish lawn grasses and other small-seeded plants. Where shallow excavations are made, cutbanks cave easily.

This soil is moderately well suited to recreational development. It is limited mainly by the sandy texture, which provides poor traction when the surface layer is dry. The slope is an additional limitation on playgrounds. Also, the droughtiness can limit the growth of grasses on golf fairways. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer, irrigating, and controlling traffic.

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

BYE—Briley loamy fine sand, 5 to 12 percent slopes. This moderately sloping and strongly sloping, well drained soil is on side slopes in the uplands. Areas are irregular in shape and range from 10 to 80 acres in size. Well defined drainageways cross most areas of this soil. Slopes are short and convex. The number of observations was fewer in areas of this map unit than in most other areas of the parish. The detail in mapping, however, is adequate for the expected use of the soil.

Typically, the surface layer is dark grayish brown loamy fine sand about 5 inches thick. The subsurface layer is light yellowish brown loamy fine sand about 17 inches thick. The subsoil extends to a depth of about 60 inches. It is yellowish red and light yellowish brown loam in the upper part, red sandy clay loam in the next part, and yellowish red fine sandy loam in the lower part.

Included with this soil in mapping are a few small areas of Attoyac and Bowie soils. These soils are loamy throughout. Attoyac soils are slightly lower on the landscape than the Briley soil. Bowie soils are on the less convex slopes. Included soils make up about 15 percent of the map unit.

This Briley soil is characterized by low fertility. Water and air move through the upper part of this soil at a rapid rate and through the lower part at a moderate rate. Water runs off the surface at a slow rate. The shrink-swell potential is low. Plants generally are damaged by a lack of water during dry periods in the summer and fall of most years.

Most of the acreage is used as woodland or pasture. A small acreage is used for homesite development.

This soil is well suited to loblolly pine and shortleaf pine. The site index for loblolly pine is 80. The main concerns in producing and harvesting timber are a moderate equipment limitation and moderate seedling mortality caused by the sandy texture and the droughtiness. Trafficability is poor when the soil is saturated or very dry. The seedling mortality rate may be high in summer because of inadequate soil moisture. Natural regeneration may be preferable on the driest sites. Restricting burning and leaving slash well distributed help to maintain the content of organic matter.

This soil is well suited to habitat for woodland wildlife and moderately well suited to habitat for openland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. In areas of pasture, grasses and legumes that mature in different seasons can be planted in separate strips to improve habitat for doves, quail, rabbits, and nongame birds and animals.

This soil is moderately well suited to pasture. The main limitations are the low fertility and the droughtiness. Erosion is a hazard in tilled areas until pasture grasses are established. The low available water capacity limits the production of most pasture plants. Suitable pasture plants are improved bermudagrass, bahiagrass, and crimson clover. Seedbeds should be prepared on the contour or across the slope. Additions of lime and fertilizer help to overcome the low fertility and increase the production of forage. Proper stocking rates and pasture rotation help to keep the pasture in good condition.

This soil is poorly suited to cultivated crops. It is limited mainly by the low fertility, the droughtiness, the slope, and a severe hazard of erosion. Cotton, corn, soybeans, grain sorghum, watermelons, and other vegetables can be grown if conservation practices are used. This soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material help to conserve moisture, control erosion, improve fertility, and maintain tilth and the content of organic matter. All areas should be tilled on the contour or across the slope when the soil is moist. Most crops respond well to applications of fertilizer and lime.

This soil is moderately well suited to homesite development and other urban uses. It has moderate or severe limitations affecting most urban uses. The main limitations are the slope, the droughtiness, the rapid and moderate permeability, and the sandy texture. Seepage and the slope are limitations affecting sanitary facilities, such as sewage lagoons and sanitary landfills. Septic tank absorption fields can adequately dispose of sewage effluent if absorption lines are placed on the contour. Selection of adapted vegetation is critical in areas used for lawns, shrubs, trees, and vegetable gardens. Plants that can tolerate the droughtiness should be selected unless irrigation water is provided. Excavations for buildings and roads increase the hazard of erosion. Revegetating disturbed areas around construction sites as soon as possible helps to control erosion.

This soil is moderately well suited to recreational development. It is limited mainly by the slope, the droughtiness, and the sandy surface layer, which provides poor traction when dry. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by irrigating, applying fertilizer, and controlling traffic.

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

CoC—Corrigan fine sandy loam, 1 to 5 percent slopes. This gently sloping, somewhat poorly drained soil is moderately deep over sandstone bedrock. It is on slightly convex ridgetops in the uplands. Areas are irregular in shape and range from 20 to 200 acres in size. Slopes are generally long and smooth, but some are short and complex.

Typically, the surface layer is dark grayish brown fine sandy loam about 7 inches thick. The subsurface layer is grayish brown, mottled fine sandy loam about 5 inches thick. The subsoil, to a depth of about 36 inches, is mottled clay. It is grayish brown in the upper part and light brownish gray the lower part. The substratum extends to a depth of about 60 inches. It is light brownish gray sandstone bedrock.

Included with this soil in mapping are a few small areas of Letney, Mayhew, and Rayburn soils. Letney soils are higher on the landscape than the Corrigan soil. They have a thick sandy surface layer and subsurface layer and a loamy subsoil. Mayhew soils are in the slightly higher landscape positions. They are not underlain by sandstone bedrock. Rayburn soils are in the lower areas. They have a subsoil that is red in the upper part. Included soils make up about 15 percent of the map unit.

This Corrigan soil is characterized by low fertility and high levels of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some crops. Water and air move through this soil at a very slow rate. Water runs off the surface at a medium or rapid rate. The surface layer dries slowly after heavy rains. A seasonal high water table ranges from a depth of about 3 feet to the surface from December through March. The shrink-swell potential of the subsoil is high. The rooting depth is restricted by the sandstone bedrock. Plants generally are damaged by a lack of water during dry periods in the summer and fall of most years.

Almost all of the acreage is used as woodland.

This soil is moderately well suited to loblolly pine, shortleaf pine, and longleaf pine. The site index for loblolly pine is 84. The main concerns in producing and harvesting timber are a moderate hazard of erosion because of the slope and the slow rate of water intake, a moderate equipment limitation because of the wetness, and moderate seedling mortality caused by the droughtiness. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from December through March. Logging roads require suitable surfacing for year-round use. Roads and landings can be protected against erosion by constructing diversions and by seeding cuts and fills. Compaction can be minimized by using suitable logging systems, laying out skid trails in advance, and harvesting during the drier periods. The low available water capacity generally reduces the seedling survival rate, especially in areas where understory plants are numerous. Seedling mortality rates can be reduced by planting in bedded rows and using special planting stock that is larger than normal.

This soil is well suited to habitat for woodland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey.

This soil is moderately well suited to pasture. The main limitations are the low fertility, the wetness, and a severe hazard of erosion during the establishment of pasture plants. Also, the low available water capacity limits the production of forage. Suitable pasture plants are improved bermudagrass, common bermudagrass, bahiagrass, and ryegrass. Seedbeds should be prepared on the contour or across the slope where practical. Fertilizer and lime are needed for the optimum growth of grasses and legumes. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is poorly suited to cultivated crops. It is limited mainly by the low fertility, the wetness, and the severe hazard of erosion. Close-sown crops, such as small grains, are the most suitable, but soybeans and grain sorghum are also suitable crops if conservation practices are used. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. The risk of sheet and rill erosion on the steeper slopes can be reduced by establishing terraces and farming on the contour. Most crops respond well to applications of lime and fertilizer, which help to overcome the low fertility and reduce the high levels of exchangeable aluminum in the root zone.

This soil is poorly suited to urban development. It has severe limitations affecting building sites, local roads and streets, and most sanitary facilities because of the very slow permeability, the wetness, the high shrink-swell potential, the depth to bedrock, and low strength. Preserving the existing plant cover during construction helps to control erosion. Roads and streets should be designed to overcome the low load-supporting capacity and the high shrink-swell potential of the subsoil. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the very slow permeability. The bedrock substratum is a severe limitation affecting most sanitary facilities. Self-contained disposal units can be used to dispose of sewage. The high shrink-swell potential is a severe limitation on sites for dwellings. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. A plant cover can be established and maintained by properly applying fertilizer, seeding, mulching, and land shaping.

Because of the wetness and the very slow permeability, this soil is poorly suited to intensively used recreational areas. A good drainage system should be provided for playgrounds and camp areas. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer and controlling traffic.

The capability subclass is IVe. The woodland ordination symbol is 8C.

EdC—Eastwood fine sandy loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on narrow to broad ridgetops and on side slopes in the uplands. Areas are irregular in shape and range from 20 to 300 acres in size. Slopes are generally long and smooth, but some are short and convex.

Typically, the surface layer is dark grayish brown fine sandy loam about 3 inches thick. The subsurface layer is light yellowish brown, mottled fine sandy loam about 4 inches thick. The subsoil to a depth of about 36 inches is red, mottled clay. The subsoil between depths of 36 and 48 inches is mottled red, light brownish gray, and olive yellow clay. The lower part of the subsoil is yellowish red clay and light brownish gray loam. The substratum to a depth of about 70 inches is stratified strong brown fine sandy loam and light brownish gray clay. In places the subsoil is yellowish brown in the upper part.

Included with this soil in mapping are a few small areas of Bowie and Keithville soils. These soils are at the higher elevations and are on the less convex slopes. Bowie soils are loamy throughout. Keithville soils have a subsoil that is loamy in the upper part and clayey in the lower part. Included soils make up about 15 percent of the map unit.

This Eastwood soil is characterized by low fertility and moderately high levels of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some crops. Water and air move through this soil at a very slow rate. Water runs off the surface at a medium or rapid rate. The surface layer dries slowly after heavy rains. The shrink-swell potential of the subsoil is high.

Most of the acreage is used as woodland. A small acreage is used as pasture or for homesite development.

This soil is well suited to loblolly pine. Other common trees are shortleaf pine, sweetgum, southern red oak, and hickory. The site index for loblolly pine is 93. The main concern in producing and harvesting timber is a moderate equipment limitation because of the wetness. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from December through February. Logging roads require suitable surfacing for year-round use. Compaction can be minimized by using suitable logging systems, laying out skid trails in advance, and harvesting during the drier periods.

This soil is well suited to habitat for woodland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey.

This soil is moderately well suited to pasture. The main limitations are the low fertility and a severe hazard of erosion during the establishment of pasture plants. Suitable pasture plants are common bermudagrass, bahiagrass, improved bermudagrass, crimson clover, and ryegrass. Seedbeds should be prepared on the contour or across the slope where practical. Additions of fertilizer and lime are needed for optimum production of forage. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is poorly suited to cultivated crops. It is limited mainly by the low fertility, the slope, and the severe hazard of erosion. Close-sown crops, such as small grains, are the most suitable, but soybeans and grain sorghum are also suitable crops if conservation practices are used. The surface layer is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. The risk of sheet and rill erosion on the steeper slopes can be reduced by establishing terraces and farming on the contour. Most crops respond well to applications of fertilizer and lime, which help to overcome the low fertility and reduce the moderately high levels of exchangeable aluminum in the root zone.

This soil is poorly suited to urban uses. It has severe limitations affecting building sites, local roads and streets, and most sanitary facilities because of the very slow permeability, low strength, the high shrink-swell potential, and the severe hazard of erosion. Preserving the existing plant cover during construction helps to control erosion. Roads and streets should be designed to overcome the instability of the subsoil. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the very slow permeability. Sewage lagoons or self-contained disposal systems can be used to dispose of sewage. The high shrink-swell potential is a limitation on sites for dwellings. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. A plant cover can be established and maintained by properly applying fertilizer, seeding, mulching, and land shaping.

This soil is poorly suited to intensively used recreational areas. The main limitations are the very slow permeability and the hazard of erosion. A good drainage system should be provided in intensively used areas, such as playgrounds and camp areas. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer and controlling traffic. If areas of this soil are used for sanitary facilities, sewage lagoons or self-contained disposal systems are better suited than septic tank absorption fields.

The capability subclass is IVe. The woodland ordination symbol is 10C.

EDE—Eastwood fine sandy loam, 5 to 12 percent slopes. This moderately sloping and strongly sloping, moderately well drained soil is on side slopes in the uplands. Well defined drainageways cross most areas of this soil. Areas are irregular in shape and range from 20 to 400 acres in size. Slopes are generally short and convex. The number of observations was fewer in areas of this map unit than in most other areas of the parish. The detail in mapping, however, is adequate for the expected use of the soil.

Typically, the surface layer is dark grayish brown fine sandy loam about 7 inches thick. The subsurface layer is light yellowish brown, mottled fine sandy loam about 4 inches thick. The subsoil to a depth of about 30 inches is red, mottled clay. The lower part of the subsoil to a depth of about 49 inches is red, mottled clay loam. The substratum to a depth of about 60 inches is stratified red, gray, and strong brown shaly clay. In places the upper part of the subsoil is clay loam or silty clay loam.

Included with this soil in mapping are a few small areas of Bowie and Keithville soils. These soils are on the less convex slopes and at the higher elevations. Bowie soils are loamy throughout. Keithville soils are loamy in the upper part of the subsoil and clayey in the lower part. Included soils make up about 15 percent of the map unit.

This Eastwood soil is characterized by low fertility and moderately high levels of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some crops. Water and air move through this soil at a very slow rate. Water runs off the surface at a rapid rate. The shrink-swell potential of the subsoil is high.

Most of the acreage is used as woodland. A small acreage is used as pasture.

This soil is well suited to loblolly pine. Other common trees are shortleaf pine, sweetgum, southern red oak, and hickory. The site index for loblolly pine is 86. The main concerns in producing and harvesting timber are a moderate equipment limitation because of the clayey subsoil and a moderate hazard of erosion because of the slope and the slow rate of water intake. Logging roads require suitable surfacing for year-round use. Management that reduces the hazard of erosion is essential in harvesting timber. Roads and landings can be protected against erosion by constructing diversions and seeding cuts and fills. Rills and gullies can develop on yarding paths, skid trails, and firebreaks unless adequate water bars, plant cover, or both are provided. Planting trees on the contour helps to control erosion. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from December through February. Compaction can be minimized by using suitable logging systems, laying out skid trails in advance, and harvesting during the drier periods.

This soil is well suited to habitat for woodland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey.

This soil is poorly suited to pasture. The main limitations are the low fertility and the slope. Erosion is a severe hazard until pasture plants are established. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, crimson clover, and ryegrass. Seedbeds should be prepared on the contour or across the slope where practical. Additions of fertilizer and lime are needed for optimum production of forage. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

Because of the slope and the severe hazard of erosion, this soil is generally not suited to cultivated crops. The low fertility is an additional limitation. Close-sown crops, such as small grains, are suitable crops if conservation practices are used. The risk of sheet and rill erosion on the steeper slopes can be reduced by establishing terraces and farming on the contour. Most crops respond well to applications of lime and fertilizer, which help to overcome the low fertility and reduce the moderately high levels of exchangeable aluminum in the root zone.

This soil is poorly suited to urban uses. It has severe limitations affecting building sites, local roads and streets, and most sanitary facilities. The main limitations are the very slow permeability, the slope, the high shrink-swell potential, and low strength. Preserving the existing plant cover during construction helps to control erosion. Roads and streets should be designed to overcome the instability of the subsoil. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the very slow permeability. Properly designed self-contained disposal units can be used to dispose of sewage. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential.

Because of the very slow permeability and the slope, this soil is poorly suited to intensively used recreational areas. Recreational uses are mainly limited to a few paths and trails, which should be established across the slope. Drainage should be provided in intensively used areas, such as playgrounds and camp areas. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer and controlling traffic.

The capability subclass is VIe. The woodland ordination symbol is 9C.

GYA—Guyton-Iuka association, frequently flooded. These level soils are on flood plains along streams that drain the uplands. They are frequently flooded for brief periods from December through April. The depth of floodwater typically is 2 to 5 feet but can be more than 10 feet in places. The Guyton soil is poorly drained, and the Iuka soil is moderately well drained. Areas of these soils are long and wide and range from 100 to 1,000 acres in size. They are crossed by several perennial streams and many intermittent drainageways. Slopes are less than 1 percent. The number of observations was fewer in areas of this map unit than in most other areas of the parish. The detail in mapping, however, is adequate for the expected use of the soils. The composition of this map unit varies somewhat between mapped areas, but most areas are about 65 percent Guyton soil and 20 percent Iuka soil. The soils occur in a regular, repeating pattern. The Guyton soil is on low flats, and the Iuka soil is on slightly convex natural levees adjacent to stream channels and on other microhighs.

Typically, the Guyton soil has a surface layer of brown, mottled silt loam about 6 inches thick. The subsurface layer is grayish brown, mottled silt loam about 21 inches thick. The next layer, to a depth of about 60 inches, is light brownish gray, mottled silty clay loam and silt loam. The subsoil extends to a depth of about 80 inches. It is gray, mottled silty clay loam. In places the surface layer is very fine sandy loam.

The Guyton soil is characterized by low fertility and moderately high levels of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some crops. Water and air move through this soil at a slow rate. Water runs off the surface at a slow rate. A seasonal high water table is within a depth of 1.5 feet from December through May in most years. The surface layer remains wet for long periods after heavy rains. The shrink-swell potential is low.

Typically, the Iuka soil has a surface layer of dark brown, mottled silt loam about 6 inches thick. The underlying material extends to a depth of about 68 inches. It is mottled silt loam. It is dark yellowish brown in the upper part, yellowish brown in the next part, and light brownish gray in the lower part. In places the surface layer is fine sandy loam. In some high areas the soil is well drained, and in some low areas it is somewhat poorly drained.

The Iuka soil is characterized by low fertility and moderately high levels of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some crops. Water and air move through this soil at a moderate rate. Water runs off the surface at a slow rate. A seasonal high water table is at a depth of about 1 to 3 feet from December through April. The surface layer dries quickly after rains. The shrink-swell potential is low. Plants generally are damaged by a lack of water during dry periods in the summer and fall of most years.

Included with these soils in mapping are a few small areas of Sardis soils. Sardis soils are in landscape positions similar to those of the Iuka soil. They have more clay and less sand in the subsoil than the Iuka soil. They make up about 15 percent of the map unit.

Most of the acreage is used as woodland. A small acreage is used as pasture.

The Guyton and Iuka soils are moderately well suited to bottom-land hardwoods and loblolly pine. Common hardwoods are willow oak, sweetgum, water oak, green ash, eastern cottonwood, and Nuttall oak. The site index for willow oak is 93 in areas of the Guyton soil. The site index for loblolly pine is 95 in areas of the Guyton soil and 100 in areas of the Iuka soil. The wetness and the flooding severely limit the use of equipment in areas of the Guyton soil during winter and spring. Trafficability is poor and the surface layer is easily compacted when the Guyton soil is wet. The use of equipment is moderately restricted on the Iuka soil because of the flooding. This limitation can be overcome by using special equipment during wet periods or by logging during the drier periods. Other concerns in producing timber are moderate or severe seedling mortality and severe plant competition. Carefully managing reforestation after harvesting helps to control competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, or trees. The seedling survival rate can be increased by planting trees in bedded rows.

These soils are well suited to habitat for woodland wildlife. The Guyton soil is well suited to habitat for wetland wildlife, but the Iuka soil is poorly suited. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Shallow ponds can be constructed in areas of the Guyton soil to provide open water areas for waterfowl and furbearers, such as muskrat, nutria, and otter.

Because of the low fertility, the wetness, and the flooding, these soils are poorly suited to pasture. The droughtiness in summer is an additional limitation in areas of the Iuka soil. The wetness limits the choice of plants and the period of grazing. Plants that can tolerate the wetness and the flooding in areas of the Guyton soil include common bermudagrass. Bahiagrass and improved bermudagrass are suitable on the Iuka soil. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

Because of the flooding, the wetness, and the low fertility, these soils generally are not suited to most cultivated crops. The droughtiness in summer is an additional limitation in areas of the Iuka soil. Planting dates are delayed and crops are damaged by flooding in some years. If the soils are protected from flooding and drained, most climatically adapted crops can be grown.

These soils are poorly suited to urban uses and generally are not suited to homesite development. They have severe limitations affecting building sites, local roads and streets, and most sanitary facilities because of the flooding and the wetness. Roads and streets should be constructed above the expected level of flooding. Ring levees, pumps, and other water-control systems can control the flooding and remove excess water. Constructing on pilings or mounds helps to raise buildings above the expected level of flooding.

Because of the flooding and the wetness, these soils are poorly suited to intensively used recreational areas.

The capability subclass is Vw. The woodland ordination symbol is 6W in areas of the Guyton soil and 9W in areas of the Iuka soil.

HtC—Herty very fine sandy loam, 1 to 5 percent slopes. This gently sloping, somewhat poorly drained soil is on ridgetops and the upper side slopes in the uplands. Areas are irregular in shape and range from 20 to 200 acres in size. Slopes are generally long and smooth, but some are short and complex.

Typically, the surface layer is very dark grayish brown, mottled very fine sandy loam about 6 inches thick. The subsurface layer is grayish brown, mottled very fine sandy loam about 4 inches thick. The subsoil to a depth of about 28 inches is grayish brown, mottled clay. Between depths of 28 and 42 inches, the subsoil is grayish brown, mottled sandy clay. The lower part of the subsoil, to a depth of about 68 inches, is light brownish gray, mottled sandy clay loam. In places, the surface layer is loamy fine sand or the lower part of the subsoil is loamy fine sand.

Included with this soil in mapping are a few small areas of Letney and Rayburn soils. These soils are higher on the landscape than the Herty soil. Letney soils have a thick sandy surface layer and subsurface layer and a loamy subsoil. Rayburn soils have a subsoil that is red in the upper part. Included soils make up about 15 percent of the map unit.

This Herty soil is characterized by low fertility and high levels of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some crops. Water and air move through this soil at a very slow rate. Water runs off the surface at a medium rate. The surface layer dries slowly after heavy rains. Water is perched above the clayey subsoil at a depth of about 0.5 to 1.0 foot from January through April. The shrink-swell potential of the subsoil is high.

Most of the acreage is used as woodland. A small acreage is used as pasture.

This soil is well suited to loblolly pine. Shortleaf pine, water oak, southern red oak, and post oak also grow on this soil. The site index for loblolly pine is 80. The main concerns in producing and harvesting timber are a moderate equipment limitation, compaction, moderate seedling mortality, and moderate plant competition because of the wetness and the clayey subsoil. Logging roads require suitable surfacing for year-round use. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from December through February. Compaction can be minimized by using suitable logging systems, laying out skid trails in advance, and harvesting during the drier periods. Undesirable plants may hinder natural or artificial reforestation. Site preparation, such as chopping, burning, applying herbicides, and bedding, helps to reduce debris, control immediate plant competition, facilitate mechanical planting, and improve the seedling survival rate.

This soil is well suited to habitat for woodland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey.

This soil is moderately well suited to pasture. The main limitations are the low fertility and the wetness. Erosion is a hazard until pasture plants are established. Suitable pasture plants are improved bermudagrass, common bermudagrass, bahiagrass, and ryegrass. Seedbeds should be prepared on the contour or across the slope where practical. Additions of fertilizer and lime are needed for optimum production of forage. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition. In the wetter areas, shallow ditches can be used to remove excess surface water.

Mainly because of a severe hazard of erosion, this soil is poorly suited to cultivated crops. The wetness and the low fertility are additional limitations. Crop residue left on or near the surface helps to maintain tilth and control erosion. The risk of sheet and rill erosion on the steeper slopes can be reduced by establishing terraces and farming on the contour. Most crops respond well to applications of fertilizer and lime, which help to overcome the low fertility and reduce the levels of exchangeable aluminum.

This soil is poorly suited to urban development. It has severe limitations affecting building sites, local roads and streets, and most sanitary facilities because of the wetness, the very slow permeability, the high shrink-swell potential, and low strength. Preserving the existing plant cover during construction helps to control erosion. Roads and streets should be designed to overcome the instability of the subsoil. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the very slow permeability. Sewage lagoons or self-contained disposal units can be used to dispose of sewage. The high shrink-swell potential and the wetness are limitations affecting dwellings. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. Excess water can be removed by shallow ditches and proper grading.

This soil is poorly suited to intensively used recreational areas. The main limitations are the wetness and the very slow permeability (fig. 4). A good drainage system should be provided in intensively used areas, such as playgrounds and camp areas. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer and controlling traffic.

The capability subclass is IVe. The woodland ordination symbol is 8C.

KaC—Keiffer clay loam, 1 to 5 percent slopes. This gently sloping, well drained, calcareous soil is on ridgetops in the uplands. Areas are irregular in shape and range from 10 to 80 acres in size. Slopes are generally long and smooth, but some are short and complex.

Typically, the surface layer is dark grayish brown clay loam about 5 inches thick. The next layer is light yellowish brown and yellow, mottled silty clay loam about 6 inches thick. The subsoil extends to a depth of about 96 inches. In sequence downward, it is yellow, mottled clay loam; yellow, mottled silty clay loam; light yellowish brown, mottled silty clay; pale olive, mottled clay; pale olive and brownish yellow silty clay; and light olive gray and brownish yellow clay. Common fine nodules of calcium carbonate are in the lower part of the subsoil. In eroded areas, fragments of limestone are on the surface.

Included with this soil in mapping are a few small areas of Oktibbeha soils. These soils are slightly higher on the landscape than the Keiffer soil. They have a subsoil that is yellowish red and clayey in the upper part. They make up about 15 percent of the map unit.

This Keiffer soil is characterized by medium fertility. It is alkaline and contains accumulations of lime throughout. Water and air move through this soil at a slow rate. Water runs off the surface at a medium rate. The shrink-swell potential is high.

Most of the acreage is used as woodland. A small acreage is used as pasture.

This soil is poorly suited to loblolly pine and most hardwoods. Eastern red cedar is the most suitable tree. The site index for eastern redcedar is 37. The main concerns in producing and harvesting timber are low timber production, a moderate equipment limitation, and

Figure 4.—A golf fairway in an area of Herty very fine sandy loam, 1 to 5 percent slopes. Wetness is a limitation.

moderate seedling mortality caused by the surface layer of alkaline clay loam and the clayey subsoil. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from December through February. Compaction can be minimized by using suitable logging systems, laying out skid trails in advance, and harvesting during the drier periods. The seedling mortality rate can be reduced by planting trees in bedded rows and applying phosphorus fertilizer.

This soil is poorly suited to habitat for woodland wildlife because the selection of trees is limited by the alkaline surface layer. Wildlife habitat can be improved by planting adapted vegetation and by maintaining the existing plant cover. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey.

This soil is moderately well suited to pasture. The main limitations are the slope, the medium fertility, and a limited selection of adapted pasture plants. Erosion is a hazard in tilled areas until pasture grasses are established. Suitable pasture plants are Johnsongrass, bahiagrass, improved bermudagrass, and white clover. Seedbeds should be prepared on the contour or across the slope where practical. Additions of fertilizer are needed for the optimum growth of grasses and legumes. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is moderately well suited to cultivated crops. The slope, the medium fertility, poor tilth, and a moderate hazard of erosion are the main limitations. The main crops are soybeans and grain sorghum. This soil is somewhat difficult to keep in good tilth. The surface layer is sticky when wet and hard when dry, and it becomes cloddy if tilled when too wet or too dry. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material help to improve fertility and help to maintain tilth and the content of organic matter. Minimizing tillage and establishing terraces, diversions, and grassed waterways help to control erosion. Most crops respond well to applications of phosphorus and nitrogen fertilizer. Lime is not needed.

Because of the high shrink-swell potential, the slow permeability, and low strength, this soil is poorly suited to urban development. Revegetating disturbed areas around construction sites as soon as possible helps to control erosion. The slow permeability is a limitation affecting septic tank absorption fields. Backfilling with sandy material in trenches and long absorption lines helps to overcome this limitation. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. Roads can be designed to overcome the low load-supporting capacity.

This soil is moderately well suited to intensively used recreational areas. The main limitations are the slow permeability and the slope. Erosion is a hazard on playgrounds. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer and controlling traffic.

The capability subclass is IIIe. The woodland ordination symbol is 3C.

KAE—Keiffer clay loam, 5 to 12 percent slopes. This moderately sloping and strongly sloping, well drained soil is calcareous throughout. It is on side slopes in the uplands. Well defined drainageways cross most areas of this soil. Areas are irregular in shape and range from 10 to 50 acres in size. Slopes are generally short and complex. The number of observations was fewer in areas of this map unit than in most other areas of the parish. The detail in mapping, however, is adequate for the expected use of the soil.

Typically, the surface layer is very dark grayish brown clay loam about 7 inches thick. The subsoil extends to a depth of about 72 inches. The upper part of the subsoil is light yellowish brown, mottled silty clay loam. The next part, to a depth of about 45 inches, is grayish brown, mottled silty clay loam. The lower part is brownish yellow and pale olive, mottled silty clay. It has common fine nodules of calcium carbonate. In severely eroded areas, fragments of limestone are on the surface.

Included with this soil in mapping are a few small areas of Oktibbeha soils. These soils are in the slightly higher landscape positions. They have a subsoil that is yellowish red and clayey in the upper part. They make up about 15 percent of the map unit.

This Keiffer soil is characterized by medium fertility. It is alkaline and contains accumulations of lime throughout. Water and air move through this soil at a slow rate. Water runs off the surface at a rapid rate. The shrink-swell potential is high.

Most of the acreage is used as woodland. A small acreage is used as pasture.

This soil is poorly suited to loblolly pine and most hardwoods. Eastern red cedar is a suitable tree. The site index for eastern redcedar is 37. The main concerns in producing timber are low timber production, a moderate equipment limitation, and moderate seedling mortality caused by the surface layer of alkaline clay loam and the clayey subsoil. When wet or moist, unsurfaced roads and skid trails are sticky and slippery. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from December through February. Compaction can be minimized by using suitable logging systems, laying out skid trails in advance, and harvesting during the drier periods. The seedling mortality rate can be reduced by planting trees in bedded rows and applying phosphorus fertilizer.

This soil is poorly suited to habitat for woodland wildlife because the selection of adapted trees and shrubs is limited by the alkaline surface layer. Wildlife habitat can be improved by planting adapted vegetation and by maintaining the existing plant cover. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey.

This soil is poorly suited to pasture. The main limitations are the slope, the medium fertility, and a limited choice of adapted pasture plants. Erosion is a hazard in tilled areas until pasture grasses are established. Suitable pasture plants are Johnsongrass, bahiagrass, improved bermudagrass, and white clover. Seedbeds should be prepared on the contour or across the slope where practical. Additions of fertilizer are needed for the optimum growth of grasses and legumes. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

Because of the slope and a severe hazard of erosion, this soil is generally not suited to cultivated crops. Poor tilth and the medium fertility are additional limitations. If conservation practices are used, close-sown crops, such as small grains, can be grown. The hazard of erosion on the steeper slopes can be reduced by establishing terraces and farming on the contour.

This soil is poorly suited to urban uses. The main limitations are the slope, the high shrink-swell potential, the slow permeability, and low strength. Revegetating disturbed areas around construction sites as soon as possible helps to control erosion. On sites for septic tank absorption fields, backfilling with sandy material in trenches and long absorption lines helps to overcome the slow permeability. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. Roads can be designed to overcome the low load-supporting capacity.

This soil is moderately well suited to most intensively used recreational areas. It is poorly suited to playgrounds because of the slope. Other limitations are the slow permeability and the hazard of erosion. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer and controlling traffic.

The capability subclass is VIe. The woodland ordination symbol is 3C.

KeC—Keithville very fine sandy loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on broad ridgetops and on side slopes in the uplands. Areas are irregular in shape and range from 25 to 200 acres in size. Slopes are generally long and smooth.

Typically, the surface layer is brown very fine sandy loam about 7 inches thick. The subsurface layer is yellowish brown, mottled very fine sandy loam about 6 inches thick. The subsoil extends to a depth of about 55 inches. The upper part of the subsoil is strong brown, mottled silty clay loam. The next part, to a depth of about 27 inches, is brownish yellow, mottled loam. The next 5 inches is strong brown, mottled loam and light brownish gray silt. The next part is mottled brownish yellow, light brownish gray, and red clay. The lower part of the subsoil is light brownish gray, mottled silty clay. The substratum extends to a depth of about 63 inches. It is light brownish gray, mottled clay. In places the subsoil is clay or silty clay within a depth of 30 inches.

Included with this soil in mapping are a few small areas of Sacul soils. These soils are slightly higher on the landscape than the Keithville soil. They are clayey in the upper part of the subsoil. They make up about 15 percent of the map unit.

This Keithville soil is characterized by low fertility and high levels of exchangeable aluminum. The aluminum is potentially toxic to some crops. Water and air move through this soil at a very slow rate. Water runs off the surface at a medium rate. A seasonal high water table is at a depth of about 2 to 3 feet from December through April. The surface layer dries quickly after rains. The shrink-swell potential of the subsoil is high.

Most of the acreage is used as woodland or pasture. A small acreage is used for homesite development.

This soil is well suited to loblolly pine and shortleaf pine. Sweetgum also grows well on this soil. The site index for loblolly pine is 90. The main concerns in producing and harvesting timber are a moderate equipment limitation, compaction, and moderate plant competition caused by the wetness. If site preparation is not adequate, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Proper site preparation controls initial plant competition, and spraying controls subsequent growth. Conventional methods of harvesting timber generally are suitable, but the soil may become compacted if it is wet and heavy equipment is used.

This soil is well suited to habitat for woodland and openland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey. In areas of pasture, grasses and legumes that mature in different seasons can be planted in alternating strips to improve habitat for quail, rabbits, and nongame birds and animals.

This soil is well suited to pasture. The main limitations are the low fertility and a hazard of erosion. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, ryegrass, and southern wild winterpea. Seedbeds should be prepared on the contour or across the slope where practical. Additions of lime and fertilizer help to overcome the low fertility and increase the production of forage. Grazing when the soil is wet puddles the surface layer and thus causes poor tilth and excessive runoff. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is moderately well suited to cultivated crops. It is limited mainly by the low fertility and a hazard of erosion. The main crops are soybeans, corn, and grain sorghum. The surface layer is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material help to improve fertility and help to maintain tilth and the content of organic matter. Seeding cover crops in early fall, minimizing tillage, and establishing terraces, diversions, and grassed waterways help to control erosion. Areas should always be tilled on the contour or across the slope. Crops respond well to applications of lime and fertilizer, which help to overcome the low fertility and reduce the levels of exchangeable aluminum.

This soil is moderately well suited to urban uses. It has moderate limitations affecting building sites and local roads and streets and moderate or severe limitations affecting sanitary facilities because of the very slow permeability, the wetness, and low strength. Low strength is a limitation affecting local roads and streets. Roads and streets can be designed to overcome this limitation. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the very slow permeability. Sewage lagoons or self-contained disposal units can be used to dispose of sewage. The wetness can be reduced by constructing shallow ditches, proper grading, and installing drainage tile around footings.

This soil is moderately well suited to intensively used recreational areas because of the very slow permeability in the subsoil, which causes water to perch above the subsoil. Excess water can be removed by shallow ditches and proper grading.

The capability subclass is IIIe. The woodland ordination symbol is 9W.

KhB—Kenefick loamy fine sand, 1 to 3 percent slopes. This very gently sloping, well drained soil is in high areas on stream terraces. Areas are irregular in shape and range from 20 to 200 acres in size. Slopes are generally long and smooth.

Typically, the surface layer is dark yellowish brown loamy fine sand about 3 inches thick. The next layer is strong brown, mottled very fine sandy loam about 7 inches thick. The subsoil extends to a depth of about 56 inches. The upper 25 inches of the subsoil is mottled loam. It is red in the upper part and yellowish red in the lower part. The next 10 inches is yellowish red and light yellowish brown, mottled very fine sandy loam. The lower part of the subsoil is yellowish red and pale brown, mottled very fine sandy loam. The substratum extends to a depth of about 76 inches. It is strong brown, mottled very fine sandy loam. In places the upper part of the subsoil is strong brown.

Included with this soil in mapping are a few small areas of Latonia soils. These soils are lower on the landscape than the Kenefick soil. They have a yellowish brown and brownish yellow subsoil that has less clay than that of the Kenefick soil. They make up about 10 percent of the map unit.

This Kenefick soil is characterized by low fertility and low to moderately high levels of exchangeable aluminum. The aluminum is potentially toxic to some crops. Water and air move through this soil at a moderately slow rate. Water runs off the surface at a slow rate. The surface layer dries quickly after rains. The shrink-swell potential is moderate. Plants generally are damaged by a lack of water during dry periods in the summer and fall of some years because of the moderate available water capacity.

Most of the acreage is used as woodland or pasture. A few small areas are used for homesite development.

This soil is well suited to loblolly pine and shortleaf pine. Other common trees are sweetgum and southern red oak. The site index for loblolly pine is 100. This soil has few limitations affecting use and management. If site preparation is not adequate, however, competition from undesirable plants can prolong reestablishment of trees. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, or trees.

This soil is well suited to habitat for woodland and openland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey. Providing small undisturbed areas in pasture and hayland and carefully scheduling haying operations help to protect nesting birds and animals and improve habitat for quail, doves, rabbits, and nongame birds and animals.

This soil is well suited to pasture. The main limitations are the low fertility, the moderate available water capacity, and a hazard of erosion during the establishment of pasture plants. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, crimson clover, and ryegrass. Unless the soil is irrigated, the production of forage can be limited by the droughtiness. Seedbeds should be prepared on the contour or across the slope where practical. Additions of lime and fertilizer help to overcome the low fertility and increase the production of forage. Proper stocking rates and pasture rotation help to keep the pasture in good condition.

This soil is well suited to most cultivated crops. It is limited by the low fertility, the droughtiness, and a moderate hazard of erosion. The main crops are oats, soybeans, grain sorghum, and vegetables. The surface layer is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material help to conserve moisture, improve fertility, and maintain tilth and the content of organic matter. Managing crop residue, stripcropping, farming on the contour, and establishing terraces and grassed waterways help to control erosion. Most crops respond well to applications of lime and fertilizer, which help to overcome the low fertility and reduce the levels of exchangeable aluminum in the root zone.

This soil is moderately well suited to urban uses. It has moderate limitations affecting dwellings because of the moderate shrink-swell potential in the subsoil. It has slight to severe limitations affecting sanitary facilities because of the moderately slow permeability. Seepage can be a problem on sites for sanitary facilities, such as sewage lagoons and sanitary landfills. The walls and bottom of sewage lagoons and sanitary landfills can be coated with an impervious material to prevent seepage of sewage effluent, which could contaminate nearby water supplies. Septic tank absorption fields can be enlarged to overcome the moderately slow permeability.

This soil is well suited to intensively used recreational areas. The moderately slow permeability and the slope are limitations. Erosion is a slight hazard on playgrounds. It can be controlled by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer and controlling traffic.

The capability subclass is IIe. The woodland ordination symbol is 11A.

KnC—Kirvin fine sandy loam, 1 to 5 percent slopes. This gently sloping, well drained soil is on narrow to broad, convex ridgetops in the uplands. Areas are irregular in shape and range from 20 to 500 acres in size. Slopes are generally long and smooth.

Typically, the surface layer is very dark grayish brown fine sandy loam about 6 inches thick. The subsurface layer is light yellowish brown, mottled fine sandy loam about 4 inches thick. The subsoil to a depth of about 40 inches is red, mottled clay. The lower part of the subsoil, to a depth of about 60 inches, is mottled red, strong brown, and light gray silty clay. The substratum extends to a depth of about 75 inches. It is stratified red and strong brown clay loam and gray soft shale that has a texture of clay.

Included with this soil in mapping are a few small areas of Briley, Keithville, and Sacul soils. Briley soils are higher on the landscape than the Kirvin soil. They have a thick sandy surface layer and subsurface layer and a loamy subsoil. Keithville and Sacul soils are in the lower areas. Keithville soils have a subsoil that is loamy in the upper part and clayey in the lower part. Sacul soils have gray mottles within a depth of 24 inches from the top of the subsoil. Included soils make up about 15 percent of the map unit.

This Kirvin soil is characterized by low fertility and high levels of exchangeable aluminum. The aluminum is potentially toxic to some crops. Water and air move through this soil at a moderately slow rate. Water runs off the surface at a medium rate. The shrink-swell potential of the subsoil is moderate.

Most of the acreage is used as woodland. A small acreage is used as pasture or for homesite development.

This soil is well suited to loblolly pine and shortleaf pine. Few limitations affect this use. The site index for loblolly pine is 85.

This soil is well suited to habitat for woodland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey.

This soil is well suited to pasture. The low fertility is a limitation, and erosion is a moderate hazard in tilled areas until pasture plants are established. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, ryegrass, and crimson clover. Seedbeds should be prepared on the contour or across the slope where practical. Proper stocking rates and pasture rotation help to keep the pasture in good condition. Additions of fertilizer are needed for the optimum growth of grasses and legumes.

This soil is moderately well suited to cultivated crops. It is limited mainly by the low fertility and the moderate hazard of erosion. The main crops are soybeans, corn, and grain sorghum. The surface layer is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. Seeding in early fall, minimizing tillage, and establishing terraces, diversions, and grassed waterways help to control erosion. Areas should always be tilled on the contour or across the slope. Crops respond well to applications of lime and fertilizer, which help to overcome the low fertility and reduce the levels of exchangeable aluminum in the root zone.

This soil is moderately well suited to urban uses. It has moderate limitations affecting building sites because of the slope and the moderate shrink-swell potential. It has severe limitations affecting local roads and streets because of low strength. It has slight to severe limitations affecting most sanitary facilities because of the moderately slow permeability, the slope, and the clayey subsoil. Preserving the existing plant cover during construction helps to control erosion. Roads and streets should be designed to overcome the instability of the subsoil. Septic tank absorption fields do not function properly during rainy periods because of the moderately slow permeability. The moderately slow permeability can be overcome by increasing the size of the absorption field. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential.

This soil is moderately well suited to intensively used recreational areas. It is limited mainly by the slope and the moderately slow permeability. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover.

The capability subclass is IIIe. The woodland ordination symbol is 8A.

KNE—Kirvin fine sandy loam, 5 to 12 percent slopes. This moderately sloping and strongly sloping, well drained soil is on side slopes in the uplands. Areas are irregular in shape and range from 20 to 100 acres in size. Well defined drainageways cross most areas of this soil. Slopes are generally short and convex. The number of observations was fewer in areas of this map unit than in most other areas of the parish. The detail in mapping, however, is adequate for the expected use of the soil, which is woodland.

Typically, the surface layer is brown fine sandy loam about 4 inches thick. The subsoil is mottled clay about 32 inches thick. It is red in the upper part, yellowish red in the next part, and strong brown and light brown in the lower part. The substratum extends to a depth of about 60 inches. It is stratified yellowish brown and red clay loam and light brownish gray clay.

Included with this soil in mapping are a few small areas of Sacul soils. These soils are lower on the landscape than the Kirvin soil. They have gray mottles within a depth of 24 inches from the top of the subsoil. They make up about 15 percent of the map unit.

This Kirvin soil is characterized by low fertility and high levels of exchangeable aluminum. The aluminum is potentially toxic to some crops. Water and air move through this soil at a moderately slow rate. Water runs off the surface at a rapid rate. The shrink-swell potential of the subsoil is moderate.

Most of the acreage is used as woodland. A small acreage is used as pasture.

This soil is well suited to loblolly pine. Shortleaf pine is also a common tree. The site index for loblolly pine is 85. This soil has few limitations in producing and harvesting timber.

This soil is well suited to habitat for woodland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey.

Because of the slope, the low fertility, and a severe hazard of erosion, this soil is poorly suited to pasture. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, ryegrass, and crimson clover. Seedbeds should be prepared on the contour or across the slope where practical. Proper stocking rates and pasture rotation help to keep the pasture in good condition. Additions of lime and fertilizer help to overcome the low fertility and increase the production of forage.

Because of the slope and the severe hazard of erosion, this soil is generally not suited to cultivated crops. The low fertility is an additional limitation. In the less sloping areas, close-sown crops, such as small grains, can be grown if conservation practices are used. Seeding in early fall, minimizing tillage, and establishing terraces, diversions, and grassed waterways help to control erosion. Most crops respond well to applications of lime and fertilizer, which help to overcome the low fertility and reduce the levels of exchangeable aluminum in the root zone.

This soil is poorly suited to urban development. It has moderate or severe limitations affecting building sites, local roads and streets, and most sanitary facilities. The main limitations are low strength, the moderately slow permeability, the moderate shrink-swell potential, the slope, and the clayey subsoil. Preserving the existing plant cover during construction and seeding disturbed areas around construction sites as soon as possible help to control erosion. Low strength is a limitation on sites for local roads and streets. Roads and streets should be designed to overcome the instability of the subsoil. The slope and the moderately slow permeability are limitations affecting septic tank absorption fields. Absorption lines should be installed on the contour. The size of the septic tank absorption field can be increased to overcome the moderately slow permeability. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential.

This soil is moderately well suited to intensively used recreational areas. The main limitations are the slope and the moderately slow permeability. Paths and trails should be established across the slope. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer and controlling traffic.

The capability subclass is VIe. The woodland ordination symbol is 8A.

KSF—Kisatchie-Mayhew-Rayburn association, 5 to 20 percent slopes. These soils are on moderately sloping to moderately steep side slopes in the uplands. The well drained Kisatchie soils, poorly drained Mayhew soils, and moderately well drained Rayburn soils occur in a regular, repeating pattern. Areas of these soils are dissected by many narrow drainageways. Eroded spots, shallow to deep gullies, and outcrops of sandstone or siltstone occur in places. Slopes are generally short and convex, but some are long and smooth. Areas are irregular in shape and range from 10 to 350 acres in size. They are about 40 percent Kisatchie soil, 20 percent Mayhew soil, and 20 percent Rayburn soil. The Kisatchie and Rayburn soils are mainly on the convex upper and middle side slopes. Slopes range from 5 to 20 percent on these soils. The Mayhew soil is mainly on the concave lower side slopes. Slopes range from 5 to 12 percent on this soil.

The number of observations was fewer in areas of this map unit than in other areas of the parish. Because the slope, gullies, and rock outcrops are major limitations affecting the use and management of these soils, separating the soils in mapping would be of little value to the land user. The detail in mapping, however, is adequate for the expected use of the soils.

Typically, the Kisatchie soil has a surface layer of dark grayish brown silt loam about 2 inches thick. The subsoil is silty clay about 31 inches thick. In sequence downward, the upper part of the subsoil is yellowish brown, light olive brown, and light olive gray. The lower part, between depths of 20 and 33 inches, is light olive gray and light gray. The substratum extends to a depth of about 50 inches. It is light gray sandstone bedrock. In places the upper part of the subsoil has gray mottles.

The Kisatchie soil is characterized by low fertility and high levels of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some crops. Water and air move through this soil at a very slow rate. Water runs off the surface at a rapid rate, and the hazard of water erosion is severe. The shrink-swell potential is high. The effective rooting depth is about 33 inches. The available water capacity is low.

Typically, the Mayhew soil has a surface layer of brown loam about 2 inches thick. The subsoil is about 46 inches thick. It is light brownish gray, mottled silty clay in the upper part and light brownish gray, mottled clay in the lower part. The substratum extends to a depth of about 72 inches. It is light brownish gray, mottled clay.

The Mayhew soil is characterized by low fertility and moderately high levels of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some crops. Water and air move through this soil at a very slow rate. Water runs off the surface at a medium rate, and the hazard of erosion is severe. The shrink-swell potential of the subsoil is high. A seasonal high water table ranges from near the surface to 1 foot below the surface from January through March.

Typically, the Rayburn soil has a surface layer of brown fine sandy loam about 3 inches thick. The subsoil is about 37 inches thick. It is red clay in the upper part and reddish brown, mottled silty clay in the lower part. The substratum extends to a depth of about 67 inches. It is light brownish gray, mottled siltstone bedrock.

The Rayburn soil is characterized by low fertility and high levels of exchangeable aluminum. The aluminum is potentially toxic to some crops. Water and air move through this soil at a very slow rate. Water runs off the surface at a rapid rate, and the hazard of erosion is severe. A seasonal high water table is perched on the siltstone bedrock at a depth of about 2.5 to 4.5 feet from December through February. The shrink-swell potential of the subsoil is high. The effective rooting depth is about 45 inches. The available water capacity is low.

Included with these soils in mapping are a few small areas of Herty and Letney soils. Also included are a few small eroded areas that have boulders and other outcrops of sandstone or siltstone. Herty soils are lower on the landscape than the Kisatchie and Rayburn soils and higher on the landscape than the Mayhew soil. They have a grayish brown clayey and loamy subsoil. They are not underlain by sandstone or siltstone bedrock. Letney soils are on the upper side slopes. They have a thick sandy surface layer and subsurface layer and a loamy subsoil. Included soils make up about 20 percent of the map unit.

Most of the acreage is used as woodland. A small acreage is used as pasture.

The Kisatchie, Mayhew, Rayburn soils are moderately well suited to loblolly pine. Shortleaf pine and longleaf pine are other common trees in areas of the Kisatchie and Rayburn soils. Sweetgum, water oak, and white oak are common trees in areas of the Mayhew soil. The site index for loblolly pine is 65 in areas of the Kisatchie soil, 90 in areas of the Mayhew soil, and 87 in areas of the Rayburn soil. The main concerns in producing and harvesting timber are a

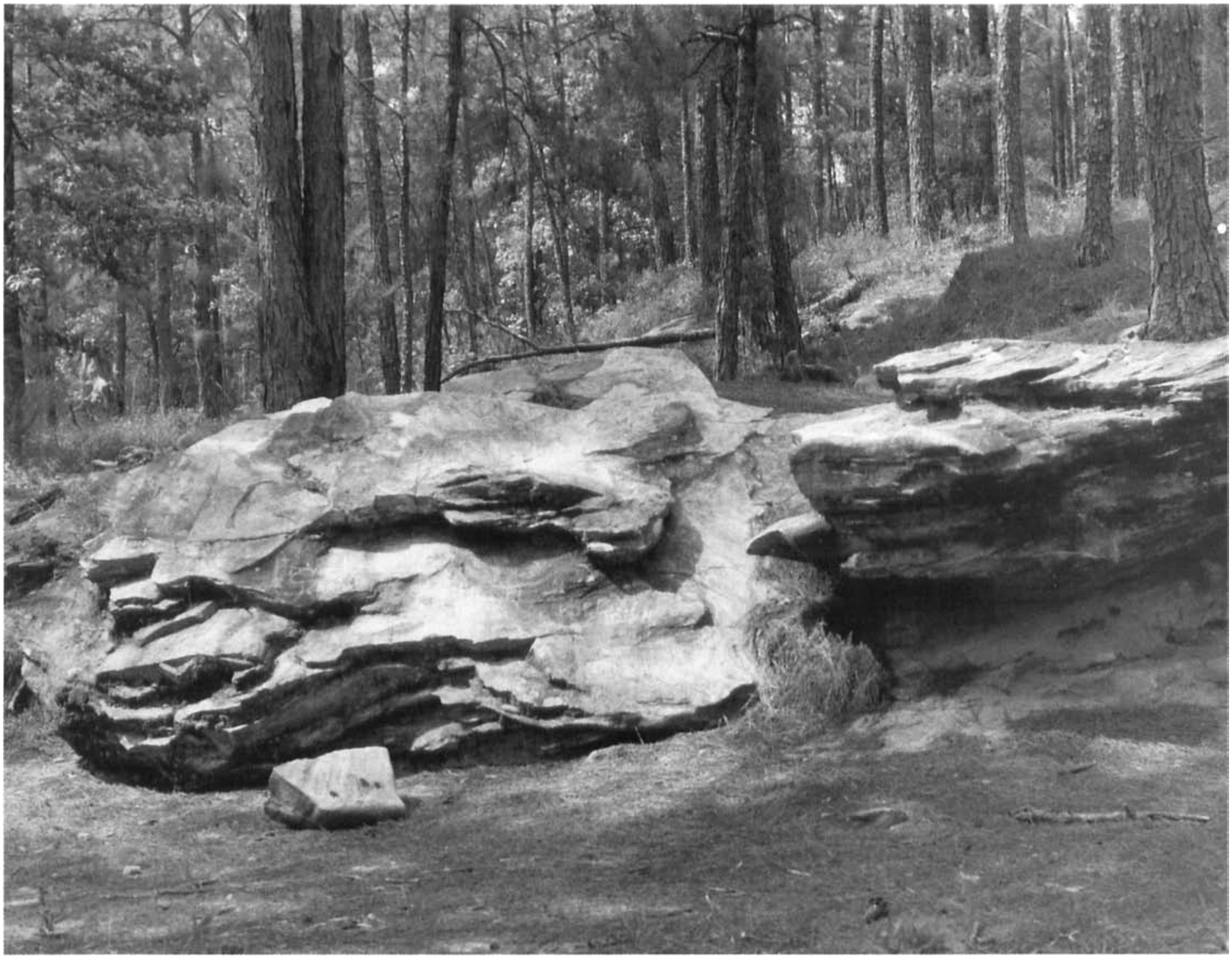

Figure 5.—Boulders of sandstone in an area of Kisatchie-Mayhew-Rayburn association, 5 to 20 percent slopes. The boulders restrict the use of equipment.

slight or moderate hazard of erosion because of the slope and a moderate or severe seedling mortality rate and a moderate equipment limitation because of seasonal wetness, the droughtiness in summer, the clayey subsoil, the slope, and the rock outcrops (fig. 5). Plant competition is moderate or severe. Haul roads need suitable surfacing for year-round use. Management that reduces the hazard of erosion is essential in harvesting timber. Roads, landings, skid trails, and firebreaks can be protected against erosion by constructing diversions and by seeding cuts and fills. Planting trees on the contour also helps to control erosion. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from December through February. Compaction can be minimized by using suitable logging systems, laying out skid trails in advance, and harvesting during the drier periods. Undesirable plants may hinder natural or artificial reforestation. Site preparation, such as chopping, burning, applying herbicides, and bedding, reduces debris, controls immediate plant competition, and facilitates mechanical planting. Hand planting hardy nursery stock and adding phosphorus fertilizer to the soils can improve seedling survival.

These soils are moderately well suited to habitat for woodland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey.

Because of the slope, a severe hazard of erosion, the low fertility, and the seasonal wetness, these soils are poorly suited to pasture. In places the gullies and the rock outcrops limit the use of equipment. Suitable pasture plants are improved bermudagrass, common bermudagrass, bahiagrass, and ryegrass. Seedbeds should be prepared on the contour or across the slope where practical. Additions of fertilizer and lime are needed for optimum production of forage. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

Because of the slope, the low fertility, the rock outcrops, the gullies, and the severe hazard of erosion, these soils are generally not suited to cultivated crops. The seasonal wetness is an additional limitation in areas of the Mayhew soil. Tillage equipment can generally be used only in gently sloping areas.

These soils are poorly suited to urban uses. They have severe limitations affecting building sites, local roads and streets, and most sanitary facilities. The main limitations are the wetness, the slope, the high shrink-swell potential, the very slow permeability, and low strength. The rock outcrops and the bedrock substratum are additional limitations in areas of the Kisatchie and Rayburn soils. Preserving the existing plant cover during construction helps to control erosion. Surface runoff can be controlled by properly grading access roads and constructing diversions and grassed waterways. The slope, the moderate depth to bedrock, and the very slow permeability are limitations affecting the installation and performance of septic tank absorption fields and sewage lagoons. Self-contained disposal units can be used to dispose of sewage. The effects of shrinking and swelling and low strength can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential.

These soils are poorly suited to recreational development. The main limitations are the slope, the very slow permeability, the wetness, the rock outcrops, and the severe hazard of erosion. A drainage system is needed in areas of the Mayhew soil, especially for playgrounds, picnic areas, and camp areas. Paths and trails should be established across the slope. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer and controlling traffic.

The Kisatchie and Rayburn soils are in capability subclass VIe, and the Mayhew soil is in capability subclass IVe. The woodland ordination symbol is 6D in areas of the Kisatchie soil, 9W in areas of the Mayhew soil, and 9C in areas of the Rayburn soil.

LaC—Latonia fine sandy loam, 1 to 5 percent slopes. This gently sloping, well drained soil is on stream terraces. Areas are irregular in shape and range from 20 to 400 acres in size. Slopes are generally long and smooth.

Typically, the surface layer is brown fine sandy loam about 5 inches thick. The subsurface layer is yellowish brown very fine sandy loam about 7 inches thick. The next layer, to a depth of about 19 inches, is yellowish brown, mottled loam and light yellowish brown fine sandy loam. The subsoil, to a depth of about 38 inches, is mottled loam. It is yellowish brown in the upper part and brownish yellow in the lower part. The substratum is brownish yellow fine sandy loam. In places the subsoil is loamy fine sand.

Included with this soil in mapping are a few small areas of Guyton and Keithville soils. Guyton soils are in swales and are poorly drained. They are grayish throughout. Keithville soils are on uplands. They have a subsoil that is loamy in the upper part and clayey in the lower part. Included soils make up about 15 percent of the map unit.

This Latonia soil is characterized by low fertility. Water and air move through this soil at a moderately rapid rate. Water runs off the surface at a slow rate. The surface layer dries quickly after rains. The shrink-swell potential is low. Plants generally are damaged by a lack of water during dry periods in the summer and fall of some years.

Most of the acreage is used as pasture or woodland. A small acreage is used as cropland or for homesite development.

This soil is well suited to loblolly pine. Longleaf pine is also a common tree. This soil has few limitations affecting timber production. The site index for loblolly pine is 90.

This soil is well suited to habitat for woodland and openland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey. Establishing areas of grain and

Figure 6.—Hayland in an area of Latonia fine sandy loam, 1 to 5 percent slopes. This soil is well suited to hayland.

other seed-producing plants near areas of cover helps to improve habitat for openland wildlife, such as doves and rabbits.

This soil is well suited to pasture and hayland (fig. 6). The main limitations are the low fertility, the droughtiness, and a hazard of erosion. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, ryegrass, and crimson clover. Seedbeds should be prepared on the contour or across the slope where practical. Additions of lime and fertilizer help to overcome the low fertility and increase the production of forage. Proper stocking rates and pasture rotation help to keep the pasture in good condition.

This soil is well suited to most cultivated crops. It is limited mainly by the low fertility, the droughtiness, and a hazard of erosion. The main crops are soybeans, grain sorghum, corn, and cotton. The surface layer is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material help to conserve moisture, improve fertility, control erosion, and maintain tilth and the content of organic matter. Seeding in early fall, minimizing tillage, and establishing terraces, diversions, and grassed waterways help to control erosion. Areas should always be tilled on the contour or across the slope. Crops respond well to applications of lime and fertilizer.

This soil is moderately well suited to urban uses. It has slight or moderate limitations affecting building sites and local roads and streets and severe limitations affecting most sanitary facilities. Seepage can be a problem on sites for sanitary facilities, such as sewage lagoons and sanitary landfills. Where shallow excavations are made, cutbanks are subject to caving.

Erosion is a hazard on sites for small commercial buildings. Preserving the existing plant cover during construction helps to control erosion.

This soil is well suited to intensively used recreational areas. The slope and the hazard of erosion are limitations affecting playgrounds. The droughtiness can prolong the establishment of grasses on golf fairways. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by irrigating, applying fertilizer, and controlling traffic.

The capability subclass is IIe. The woodland ordination symbol is 9A.

LtC—Letney loamy sand, 1 to 5 percent slopes. This gently sloping, well drained soil is on broad ridgetops in the uplands. Areas are irregular in shape and range from 10 to 250 acres in size. Slopes are generally long and smooth.

Typically, the surface layer is brown loamy sand about 7 inches thick. The subsurface layer is about 20 inches thick. It is brown loamy sand in the upper part and light yellowish brown, mottled loamy sand in the lower part. The subsoil extends to a depth of about 60 inches. It is mottled sandy clay loam. It is yellowish brown in the upper part and brownish yellow in the lower part. In places the upper part of the subsoil is red.

Included with this soil in mapping are a few small areas of Bowie and Briley soils. Bowie soils are slightly lower on the landscape than the Letney soil. They are loamy throughout. Briley soils are in the slightly higher areas. They have a yellowish red and red subsoil. Included soils make up about 10 percent of the map unit.

This Letney soil is characterized by low fertility and high levels of exchangeable aluminum. The aluminum is potentially toxic to some crops. Water and air move through the subsoil at a moderately rapid rate. Water runs off the surface at a slow rate. The surface layer dries quickly after rains. The shrink-swell potential of the subsoil is low. Plants generally are damaged by a lack of water during dry periods in the summer and fall of most years.

Most of the acreage is used as woodland or pasture. A small acreage is used for homesite development.

This soil is well suited to loblolly pine. Other common trees are shortleaf pine and longleaf pine. The site index for loblolly pine is 86. The main concerns in producing and harvesting timber are a moderate equipment limitation and moderate seedling mortality caused by the sandy texture and the droughtiness. Also, competition from undesirable plants is moderate. Trafficability is poor when the soil is saturated or very dry. The low available water capacity generally reduces the seedling survival rate, especially in areas where understory plants are numerous. Site preparation controls initial plant competition, and spraying controls subsequent growth. Restricting burning and leaving slash well distributed help to maintain the content of organic matter.

This soil is moderately well suited to habitat for woodland and openland wildlife. Because of the droughtiness and the low fertility, it has a medium potential for the production of grasses and other understory plants, which are used as food and cover. Habitat for deer, squirrels, and turkeys can be improved by selectively harvesting timber so that large den and mast-producing trees remain. In areas of pasture, grasses and legumes that mature in different seasons can be planted in separate strips to improve habitat for doves, rabbits, and nongame birds and animals.

This soil is moderately well suited to pasture. The main limitations are the low fertility and the droughtiness. The low available water capacity limits the production of plants suitable for pasture. Suitable pasture plants are improved bermudagrass, bahiagrass, and crimson clover. Additions of lime and fertilizer help to overcome the low fertility and increase the production of forage. Proper stocking rates and pasture rotation help to keep the pasture in good condition.

This soil is moderately well suited to cultivated crops. It is limited mainly by the low fertility, the droughtiness, and a hazard of erosion. The main crops are cotton, corn, soybeans, watermelons, and other vegetables. This soil provides poor traction for farm equipment, especially when it is very dry. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material help to conserve moisture, improve fertility, and maintain tilth and the content of organic matter. Areas should always be tilled on the contour or across the slope. Most crops respond well to applications of fertilizer and lime, which improve fertility and reduce the levels of exchangeable aluminum in the root zone.

This soil is moderately well suited to urban uses. It has slight limitations affecting buildings and local roads and streets and severe limitations affecting most sanitary facilities because of the moderately rapid permeability. Seepage is a problem on sites for sanitary facilities, such as sewage lagoons and sanitary landfills. During rainy periods, effluent from onsite sewage disposal systems may seep in downslope areas. Selection of adapted vegetation is critical in areas used for lawns, shrubs, trees, and vegetable gardens. Plants that can tolerate the droughtiness should be selected unless irrigation water is provided. Where shallow excavations are made, cutbanks are subject to caving.

This soil is moderately well suited to intensively used recreational areas. It is limited mainly by the sandy surface layer, which is loose when dry and provides poor traction. The slope and the hazard of erosion are additional limitations on playgrounds. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer, irrigating, and controlling traffic.

The capability subclass is IIIs. The woodland ordination symbol is 9S.

LTE—Letney loamy sand, 5 to 12 percent slopes. This moderately sloping and strongly sloping, well drained soil is on side slopes in the uplands. Areas are irregular in shape and range from 10 to 150 acres in size. Slopes are short and convex. Well defined drainageways cross most areas of this soil. Because of the slope, the number of observations was fewer in areas of this map unit than in most other areas of the parish. The detail in mapping, however, is adequate for the expected use of the soil.

Typically, the surface layer is dark brown loamy sand about 7 inches thick. The subsurface layer is loamy sand about 15 inches thick. It is brown in the upper part and light yellowish brown and mottled in the lower part. The subsoil extends to a depth of about 60 inches. It is mottled sandy clay loam. It is yellowish brown in the upper part and brownish yellow in the lower part. In places the combined thickness of the sandy surface layer and subsurface layer is more than 40 inches.

Included with this soil in mapping are a few small areas of Bowie and Saucier soils. Bowie soils are slightly lower on the landscape than the Letney soil. They are loamy throughout. Saucier soils are in the lower areas. They have a loamy surface layer and a loamy and clayey subsoil. Included soils make up about 10 percent of the map unit.

This Letney soil is characterized by low fertility and high levels of exchangeable aluminum. The aluminum is potentially toxic to some crops. Water and air move through the subsoil at a moderately rapid rate. Water runs off the surface at a slow rate. The surface layer dries quickly after rains. The shrink-swell potential of the subsoil is low. Plants generally are damaged by a lack of water during dry periods in the summer and fall of most years.

Most of the acreage is used as woodland. A small acreage is used as pasture.

This soil is well suited to loblolly pine. The site index for loblolly pine is 86. Longleaf pine and shortleaf pine also are common trees. The main concerns in producing and harvesting timber are a moderate equipment limitation and moderate seedling mortality caused by the sandy texture and the droughtiness. Plant competition is moderate. The sandy surface layer is loose when dry and hinders the use of most wheeled equipment. Inadequate soil moisture in summer can cause moderate seedling mortality. Natural regeneration may be preferable on the driest sites. Proper site preparation can control immediate plant competition, and spraying can control subsequent growth. Restricting burning and leaving slash well distributed help to maintain the content of organic matter.

This soil is moderately well suited to habitat for woodland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Preserving and promoting the growth of existing oaks can improve habitat for deer, squirrels, and turkey.

This soil is moderately well suited to pasture. The main limitations are the low fertility and the droughtiness. Erosion is a severe hazard in tilled areas until pasture grasses are established. The low available water capacity limits the production of plants suitable for pasture. Suitable pasture plants are improved bermudagrass, bahiagrass, and crimson clover. Seedbeds should be prepared on the contour or across the slope where practical. Additions of lime and fertilizer help to overcome the low fertility and increase the production of forage.

Because of the slope and the severe hazard of erosion, this soil is poorly suited to most cultivated crops. The low fertility and the droughtiness are additional limitations. Close-sown crops, such as small grains, can be grown if proper conservation practices are used. The sandy surface layer is loose when dry and provides poor traction to farm equipment. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material help to conserve moisture, improve fertility, and maintain tilth and the content of organic matter. Seeding in early fall, minimizing tillage, and establishing terraces, diversions, and grassed waterways help to control erosion. Areas should always be tilled on the contour or across the slope. Most crops respond well to applications of fertilizer and lime, which help to overcome the low fertility and reduce the levels of exchangeable aluminum in the root zone.

This soil is moderately well suited to urban uses. It has moderate or severe limitations affecting building sites, local roads and streets, and most sanitary facilities because of the slope and the moderately rapid permeability. Septic tank absorption fields can adequately dispose of sewage effluent if absorption lines are placed on the contour. Seepage and the slope are limitations on sites for sanitary facilities, such as sewage lagoons and sanitary landfills. Excavations for buildings and roads increase the hazard of erosion. Revegetating disturbed areas around construction sites as soon as possible helps to control erosion. Selection of adapted vegetation is critical in areas used for lawns, shrubs, and trees. Plants that can tolerate the droughtiness should be selected unless irrigation water is provided. Where shallow excavations are made, cutbanks are subject to caving.

This soil is moderately well suited to intensively used recreational areas. It is limited mainly by the sandy surface layer and the slope. Also, the droughtiness can limit the growth of grasses on golf fairways. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer, irrigating, and controlling traffic.

The capability subclass is IVe. The woodland ordination symbol is 9S.

MhC—Mayhew loam, 1 to 5 percent slopes. This gently sloping, poorly drained soil is on broad ridgetops in the uplands. Areas are irregular in shape and range from 20 to 300 acres in size. Slopes are long and smooth.

Typically, the surface layer is very dark gray loam about 5 inches thick. The next layer is dark grayish brown loam about 6 inches thick. The subsoil to a depth of about 43 inches is grayish brown, mottled clay. The subsoil between depths of 43 and 65 inches is pale olive, mottled clay.

Included with this soil in mapping are a few small areas of Corrigan, Kisatchie, Letney, and Rayburn soils. Corrigan and Kisatchie soils are in landscape positions similar to those of the Mayhew soil. They are underlain by bedrock within a depth of 40 inches. Letney soils are in the higher areas. They have a sandy surface layer and subsurface layer and a loamy subsoil. Rayburn soils are higher on the landscape than the Mayhew soil. They have a red clayey subsoil and have bedrock within a depth of 40 to 60 inches. Included soils make up about 15 percent of the map unit.

This Mayhew soil is characterized by low fertility and moderately high levels of exchangeable aluminum. The aluminum is potentially toxic to some crops. Water and air move through this soil at a very slow rate. Water runs off the surface at a medium rate. A seasonal high water table ranges from near the surface to about 1 foot below the surface from January through March. The surface layer dries slowly after heavy rains. The shrink-swell potential of the subsoil is high.

Most of the acreage is used as woodland (fig. 7). A small acreage is used as pasture or for homesite development.

This soil is moderately well suited to loblolly pine. Other common trees are sweetgum, water oak, and white oak. The site index for loblolly pine is 90. The main concerns in producing and harvesting timber are a moderate equipment limitation, compaction, and moderate seedling mortality caused by the wetness. Plant competition is severe. Roads require suitable surfacing for year-round use. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from December through March. Compaction can be minimized by using suitable logging systems, laying out skid trails in advance, and harvesting during the drier periods. Undesirable plants can hinder natural or artificial reforestation. Chopping, burning, spraying, and bedding help to control plant competition and improve the seedling survival rate.

This soil is moderately well suited to habitat for woodland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey.

This soil is moderately well suited to pasture. The main limitations are the low fertility and the wetness. Erosion is a hazard in tilled areas until pasture grasses are established. Suitable pasture plants are bahiagrass, common bermudagrass, improved bermudagrass, ball clover, arrowleaf clover, crimson clover, singletary pea, vetch, ryegrass, and tall fescue. Seedbeds should be prepared on the contour or across the slope where practical. Additions of fertilizer and lime are needed for optimum production of forage. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is moderately well suited to cultivated crops. It is limited mainly by the low fertility, the wetness, and the slope. The hazard of erosion is severe. The main crops are corn, soybeans, and small grains. Crop residue left on or near the surface helps to maintain tilth and control erosion. Most crops respond well to applications of fertilizer and lime, which help to improve fertility and reduce the levels of exchangeable aluminum. Sheet and rill erosion on the steeper slopes can be controlled by establishing terraces and grassed waterways and farming on the contour.

This soil is poorly suited to urban uses. It has severe limitations affecting building sites, local roads and streets, and most sanitary facilities because of the wetness, the very slow permeability, the slope, low strength, and the high shrink-swell potential. Preserving

Figure 7.—A stand of loblolly pine on Mayhew loam, 1 to 5 percent slopes.

the existing plant cover during construction helps to control erosion. Roads and streets should be designed to overcome the instability of the subsoil. The very slow permeability and the high water table increase the possibility that septic tank absorption fields will fail. Sewage lagoons or self-contained disposal units can be used to dispose of sewage. The high shrink-swell potential is a limitation affecting dwellings and roads. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. The wetness can be reduced by constructing shallow ditches, proper grading, and installing drainage tile around footings.

This soil is poorly suited to intensively used recreational areas. The main limitations are the wetness and the very slow permeability. Excess water can be removed by shallow ditches and proper grading. Erosion is a moderate hazard on playgrounds. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer and controlling traffic.

The capability subclass is IIIe. The woodland ordination symbol is 9W.

NcC—Nacogdoches gravelly sandy loam, 1 to 5 percent slopes. This gently sloping, well drained soil is on narrow, convex ridgetops and on side slopes in the uplands. Areas are irregular in shape and range from 20 to 200 acres in size. Slopes are generally long and smooth, but some are short and convex.

Typically, the surface layer is dark reddish brown gravelly sandy loam about 4 inches thick. The upper part of the subsoil, to a depth of about 54 inches, is dark red clay. The next part, between depths of 54 and 60 inches, is dark red clay and ironstone. The lower part, to a depth of about 74 inches, is red, mottled clay. In places a layer of ironstone is within a depth of 25 inches.

Included with this soil in mapping are a few small areas of Eastwood, Kirvin, and Oktibbeha soils. Eastwood and Oktibbeha soils are lower on the landscape than the Nacogdoches soil. The clay mineralogy of Eastwood and Kirvin soils is different than that of the Nacogdoches soil. Oktibbeha soils have nodules of lime, glauconitic marl, or soft chalk in the lower part of the subsoil. Kirvin soils are in the higher areas. Included soils make up about 15 percent of the map unit.

This Nacogdoches soil is characterized by medium fertility. Water and air move through this soil at a moderately slow rate. Water runs off the surface at a medium rate. The shrink-swell potential of the subsoil is moderate. Plants generally are damaged by a lack of water during dry periods in the summer and fall of most years.

Most of the acreage is used as woodland. A small acreage is used as pasture.

This soil is moderately well suited to loblolly pine and shortleaf pine. The site index for loblolly pine is 70. The main concern in producing and harvesting timber is a moderate equipment limitation because of the clayey subsoil. The gravelly surface layer and a medium or high available water capacity somewhat limit tree growth. Proper site preparation controls initial plant competition, and spraying controls subsequent growth.

This soil is well suited to habitat for woodland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey.

This soil is moderately well suited to pasture. The main limitations are the slope, the droughtiness, and medium fertility. Erosion is a severe hazard in tilled areas until grasses are established. Suitable pasture plants are improved bermudagrass, crimson clover, and bahiagrass. Seedbeds should be prepared on the contour or across the slope where practical. Additions of fertilizer and lime are needed for optimum production of forage. Proper stocking rates and pasture rotation help to keep the pasture in good condition.

This soil is moderately well suited to cultivated crops. The main limitations are the slope, the droughtiness, and the medium fertility. Suitable crops are grain sorghum, soybeans, and small grains. Managing crop residue, farming on the contour, and establishing grassed waterways and terraces help to control runoff and erosion. Minimizing tillage helps to conserve moisture and control erosion. Additions of lime and fertilizer help to overcome the medium fertility.

This soil is moderately well suited to urban uses. It has moderate limitations affecting building sites and local roads and streets and slight to severe limitations affecting sanitary facilities. The main limitations are the moderate shrink-swell potential, the moderately slow permeability, the slope, and low strength. Preserving the existing plant cover during construction helps to control erosion. Roads and streets should be designed to overcome the instability of the subsoil. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. The moderately slow permeability is a limitation affecting septic tank absorption fields. Backfilling with sandy material in trenches and long absorption lines helps to overcome the moderately slow permeability.

This soil is moderately well suited to intensively used recreational areas. It is limited mainly by the moderately slow permeability and small stones on the surface. The slope is an additional limitation on playgrounds. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer and controlling traffic. Adding loamy fill to the surface layer can improve the suitability of the soil for intensively used areas, such as playgrounds and camp areas.

The capability subclass is IIIe. The woodland ordination symbol is 6F.

NgA—Niwana-Gessner loams. These soils are on stream terraces. They occur as areas so intermingled that it is not practical to map them separately at the selected scale. The map unit is about 60 percent Niwana soil and 30 percent Gessner soil. The gently sloping Niwana soil is moderately well drained. It is on circular mounds that are 2 to 5 feet high and 40 to 100 feet in diameter. The level Gessner soil is poorly drained. It is on flats and in swales. Areas of these soils are irregular in shape and range from 50 to 500 acres in size. Slopes range from 1 to 5 percent on mounds and are 0 to 1 percent in areas between the mounds.

Typically, the Niwana soil has a surface layer of dark grayish brown loam about 6 inches thick. The subsurface layer is brown fine sandy loam about 9 inches thick. The next layer, to a depth of about 21 inches, is pale brown fine sandy loam. The subsoil extends to a depth of about 60 inches. It is yellowish brown and light yellowish brown fine sandy loam in the upper part; brownish yellow loam and pale brown, mottled fine sandy loam in the next part; and brownish yellow loam and light brownish gray, mottled fine sandy loam in the lower part.

The Niwana soil is characterized by low fertility and high levels of exchangeable aluminum. The aluminum is potentially toxic to some crops. Water and air move through this soil at a moderate rate. Water runs off the surface at a slow rate. A seasonal high water table is at a depth of about 4 to 6 feet from January through March. The shrink-swell potential is low.

Typically, the Gessner soil has a surface layer of grayish brown, mottled loam about 5 inches thick. The subsurface layer is light brownish gray, mottled loam about 10 inches thick. The next layer, to a depth of about 25 inches, is light brownish gray and light gray loam. The subsoil extends to a depth of about 60 inches. It is light brownish gray, mottled loam.

The Gessner soil is characterized by low fertility and moderately high levels of exchangeable aluminum. The aluminum is potentially toxic to some crops. Water and air move through this soil at a moderate rate. Water runs off the surface at a very slow rate and stands in low areas for long periods after heavy rains. A seasonal high water table ranges from about 1 foot above the surface to 2 feet below from November through May. The shrink-swell potential is low. Plants are damaged by a lack of water during dry periods in the summer and fall of some years.

Included with these soils in mapping are a few small areas of Kenefick and Latonia soils. The included soils are higher on the landscape than the Niwana and Gessner soils and are well drained. They have a subsoil that is browner than that of the Gessner soil. Kenefick soils have more clay in the subsoil than the Niwana soil. In Latonia soils, the content of clay in the subsoil decreases within a depth of 60 inches. Included soils make up about 10 percent of the map unit.

Most of the acreage is used as woodland. A small acreage is used as pasture.

The Niwana soil is well suited to loblolly pine, and the Gessner soil is moderately well suited. Other common trees are longleaf pine in areas of the Niwana soil, water oak in areas of the Gessner soil, and sweetgum in areas of both soils. The site index for loblolly pine is 96 in areas of the Niwana soil and 80 in areas of the Gessner soil. The Niwana soil has few concerns in producing and harvesting timber. The main concerns in producing and harvesting timber on the Gessner soil are a severe equipment limitation and severe seedling mortality caused by the wetness. Plant competition is severe. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from November through May. Logging roads require suitable surfacing for year-round use. The surface layer of the Gessner soil may become compacted if it is wet and heavy equipment is used. This limitation can be overcome by using special equipment during wet periods or by logging during the drier periods. Carefully managing reforestation after harvesting helps to control competition from undesirable understory plants. Site preparation controls initial plant competition, and spraying controls subsequent growth. These soils often have a low or very low content of organic matter, and harvesting systems that remove all tree biomass reduce fertility levels. Harvesting systems that leave slash well distributed should be used. Natural regeneration of pine in areas of the Gessner soil is difficult in wet years. Bedding and surface drainage may be needed to ensure the survival of pine seedlings.

The Niwana soil is well suited to habitat for woodland wildlife, and the Gessner soil is moderately well suited. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants.

These soils are moderately well suited to pasture. The main limitations are the seasonal wetness, the droughtiness in summer, and the low fertility. The wetness limits the choice of plants and the period of grazing. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, tall fescue, ryegrass, and southern wild winterpea. Excess surface water can be removed by shallow ditches and proper grading. Additions of fertilizer and lime are needed for optimum production of forage. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

These soils are moderately well suited to cultivated crops. The seasonal wetness and the low fertility are the main limitations. Land grading and smoothing can improve surface drainage and increase the efficiency of farm equipment. Minimizing tillage and returning all crop residue to the soils or regularly adding other organic material can improve fertility and help to maintain tilth and the content of organic matter. Most crops respond well to applications of fertilizer and lime, which help to overcome the low fertility and reduce the levels of exchangeable aluminum.

The Niwana soil is moderately well suited to urban uses, but the Gessner soil is poorly suited. The main limitations are ponding, the wetness, and the moderate permeability. Ponding is a severe limitation affecting urban uses in areas of the Gessner soil. In areas of the Niwana soil, seepage is a hazard on sites for sanitary facilities, such as sewage lagoons and sanitary landfills. Artificial drainage can improve the suitability of these soils for roads and building foundations. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the moderate permeability. Lagoons or self-contained disposal units can be used to dispose of sewage.

The Niwana soil is well suited to intensively used recreational areas, but the Gessner soil is poorly suited to this use. The main limitation is ponding. In areas of the Niwana soil, the slope is a moderate limitation on playgrounds. Drainage can improve the suitability of the Gessner soil for most recreational uses. Erosion in areas of the Niwana soil can be controlled by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer and controlling traffic.

The Niwana soil is in capability subclass IIw, and the Gessner soil is in capability subclass IVw. The woodland ordination symbol is 9A in areas of the Niwana soil and 8W in areas of the Gessner soil.

OtC—Oktibbeha loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on broad ridgetops in the uplands. Areas are irregular in shape and range from 20 to 500 acres in size. Slopes are generally long and smooth. In places the landscape has many microdepressions and microknolls.

Typically, the surface layer is dark grayish brown loam about 3 inches thick. The subsurface layer is light yellowish brown loam about 2 inches thick. The subsoil extends to a depth of about 70 inches. The upper 18 inches of the subsoil is yellowish red, mottled clay. The next 19 inches is light olive brown and mottled. It is clay in the upper part and silty clay in the lower part. The next part, to a depth of about 48 inches, is mottled olive brown, olive yellow, and light brownish gray silty clay loam. The lower part of the subsoil is light olive brown and light brownish gray clay loam. Below a depth of 33 inches, the subsoil contains white nodules of calcium carbonate. In places the soil has glauconitic marl or soft chalk below a depth of 50 inches.

Included with this soil in mapping are a few small areas of Keiffer soils. These soils are lower on the landscape than the Oktibbeha soil. They are loamy and calcareous throughout. They make up about 10 percent of the map unit.

This Oktibbeha soil is characterized by low fertility. Water and air move through this soil at a very slow rate. Water runs off the surface at a medium rate. The surface layer dries slowly after rains. The shrink-swell potential of the subsoil is high. Plants generally are damaged by a lack of water during dry periods in the summer and fall of most years.

Most of the acreage is used as woodland. A small acreage is used as pasture.

This soil is well suited to loblolly pine. Other common trees are shortleaf pine, eastern redcedar, and southern red oak. The site index for loblolly pine is 76. The main concerns in producing and harvesting timber are a moderate equipment limitation and moderate seedling mortality caused by the seasonal wetness and the clayey subsoil. Plant competition is moderate, and the soil is somewhat droughty. Roads require suitable surfacing for year-round use. The use of equipment, especially on trails, can disturb the surface layer and expose the subsoil, which is sticky and slippery when wet. Compaction can be minimized by using suitable logging systems, laying out skid trails in advance, and harvesting during the drier periods. Undesirable plants may hinder natural or artificial reforestation; however, intensive site preparation and maintenance are generally not needed. Chopping, burning, spraying, and bedding reduce debris, control immediate plant competition, and facilitate mechanical planting. Seedlings planted in the less fertile subsoil grow poorly. Because this soil is somewhat droughty, seedlings should be planted in spring so that they can obtain sufficient moisture from spring rains.

This soil is well suited to habitat for woodland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey.

This soil is moderately well suited to pasture. The slope, the low fertility, and the droughtiness are the main limitations. Erosion is the main hazard. Suitable pasture plants are common bermudagrass, bahiagrass, improved bermudagrass, crimson clover, and ryegrass. Seedbeds should be prepared on the contour or across the slope where practical. Additions of fertilizer and lime are needed for optimum production of forage. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is moderately well suited to cultivated crops. It is limited mainly by the slope, the low fertility, and the droughtiness. Erosion is a severe hazard. The main crops are corn, soybeans, and grain sorghum. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. The risk of sheet and rill erosion on the steeper slopes can be reduced by establishing terraces and farming on the contour. Most crops respond well to applications of fertilizer. Lime is generally needed.

This soil is poorly suited to most urban uses. It has severe limitations affecting building sites, local roads and streets, and most sanitary facilities because of the clayey texture, the high shrink-swell potential, low strength, and the very slow permeability. Preserving the existing plant cover during construction helps to control erosion. Roads and streets should be designed to overcome the instability of the subsoil. Septic tank absorption fields do not function properly during rainy periods because of the very slow permeability. The very slow permeability can be overcome by increasing the size of the absorption field. The high shrink-swell potential is a limitation affecting building foundations and footings. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential.

This soil is poorly suited to intensively used recreational areas. The main limitation is the wetness caused by the very slow permeability in the subsoil. Artificial drainage can improve the suitability of the soil for intensively used areas, such as playgrounds and camp areas. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer and controlling traffic.

The capability subclass is IIIe. The woodland ordination symbol is 7C.

OTE—Oktibbeha loam, 5 to 12 percent slopes. This gently sloping and strongly sloping, moderately well drained soil is on side slopes in the uplands. Well defined drainageways cross most areas of this soil. Areas are irregular in shape and range from 20 to 300 acres in size. Slopes are generally short and plane or convex. The number of observations was fewer in areas of this map unit than in most other areas of the parish. The detail in mapping, however, is adequate for the expected use of the soil.

Typically, the surface layer is dark brown loam about 3 inches thick. The subsoil extends to a depth of about 60 inches. The upper 34 inches of the subsoil is mottled clay. It is red in the upper part, yellowish red in the next part, and olive yellow in the lower part. The lower part of the subsoil is light olive gray, mottled silty clay. In places, the surface layer has been lost through erosion or the soil is underlain by glauconitic marl or soft chalk at a depth of about 50 inches or more.

Included with this soil in mapping are a few small areas of Keiffer and Nacogdoches soils. Keiffer soils are lower on the landscape than the Oktibbeha soil. They are loamy and calcareous throughout. Nacogdoches soils are in the higher areas. They have a subsoil that is dark red and red throughout. Included soils make up about 15 percent of the map unit.

This Oktibbeha soil is characterized by low fertility. Water and air move through this soil at a very slow rate. Water runs off the surface at a rapid rate. The surface layer dries slowly after rains. The shrink-swell potential of the subsoil is high. Plants generally are damaged by a lack of water during dry periods in the summer and fall of most years.

Almost all of the acreage is used as woodland.

This soil is well suited to loblolly pine. Other common trees are shortleaf pine, eastern redcedar, and southern red oak. The site index for loblolly pine is 76. The main concerns in producing and harvesting timber are a moderate equipment limitation and moderate seedling mortality caused by the clayey subsoil. Plant competition is moderate, and the soil is somewhat droughty. Roads require suitable surfacing for year-round use. The use of equipment, especially on trails, can disturb the surface layer and expose the subsoil, which is sticky and slippery when wet. Compaction can be minimized by using suitable logging systems, laying out skid trails in advance, and harvesting during the drier periods. Undesirable plants may hinder natural or artificial reforestation. Chopping, burning, spraying, and bedding reduce debris, control immediate plant competition, and facilitate mechanical planting. Seedlings planted in the less fertile subsoil grow poorly. Because this soil is somewhat droughty, seedlings should be planted in spring so that they can obtain sufficient moisture from spring rains.

This soil is well suited to habitat for woodland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey.

Because of the slope and a severe hazard of erosion, this soil is poorly suited to pasture. The low fertility and the droughtiness are additional limitations. Suitable pasture plants are common bermudagrass, bahiagrass, improved bermudagrass, crimson clover, and ryegrass. Seedbeds should be prepared on the contour or across the slope where practical. Additions of fertilizer and lime are needed for optimum production of forage. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

Because of the slope and the severe hazard of erosion, this soil is generally not suited to cultivated crops. The low fertility and the droughtiness are additional limitations affecting crops. In the less sloping areas, close-sown crops, such as small grains, can be grown if conservation practices are used. Returning all crop residue to the soil or minimizing tillage helps to conserve moisture and control erosion. The risk of sheet and rill erosion also can be reduced by establishing terraces and farming on the contour.

This soil is poorly suited to urban uses. It has severe limitations affecting building sites, local roads and streets, and most sanitary facilities because of the clayey texture, the high shrink-swell potential, low strength, the very slow permeability, and the slope. Preserving the existing plant cover during construction helps to control erosion. Roads and streets should be designed to overcome the instability of the subsoil. Septic tank absorption fields do not function properly during rainy periods because of the very slow permeability. Self-contained disposal units can be used to dispose of sewage. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential.

This soil is poorly suited to intensively used recreational areas because of the wetness, which is caused by the very slow permeability in the subsoil. The slope is an additional limitation on playgrounds, golf fairways, and paths and trails. Artificial drainage can improve the suitability of the soil for playgrounds and camp areas. Paths and trails should be established across the slope where possible. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer and controlling traffic.

The capability subclass is VIe. The woodland ordination symbol is 7C.

RbC—Rayburn fine sandy loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on ridgetops and side slopes in the uplands. Areas are irregular in shape and range from 20 to 300 acres in size. Slopes are generally long and smooth, but some are short and convex.

Typically, the surface layer is brown fine sandy loam about 5 inches thick. The subsoil to a depth of about 20 inches is red, mottled clay. The next part of the subsoil to a depth of about 31 inches is mottled red, brownish yellow, and light brownish gray clay. The lower part of the subsoil to a depth of about 45 inches is light brownish gray, mottled clay. The substratum extends to a depth of about 82 inches. It is light brownish gray, mottled siltstone bedrock. In places, the lower part of the subsoil is clay loam or it is underlain by siltstone bedrock within a depth of 30 inches.

Included with this soil in mapping are a few small areas of Corrigan, Herty, and Letney soils. Herty and Letney soils are not underlain by bedrock. Corrigan soils are higher on the landscape than the Rayburn soil. They are underlain by sandstone bedrock within a depth of 40 inches. Herty soils are in the lower areas. They have a grayish brown or grayish brown and olive subsoil. Letney soils are in landscape positions similar to those of the Rayburn soil. They have a sandy surface layer and subsurface layer and a loamy subsoil. Included soils make up about 15 percent of the map unit.

This Rayburn soil is characterized by low fertility and high levels of exchangeable aluminum that are potentially toxic to some crops. Water and air move through this soil at a very slow rate. Water runs off the surface at a medium rate. A seasonal high water table is at a depth of about 2.5 feet to 4.5 feet from December through February. The effective rooting depth is about 45 inches. The surface layer dries slowly after heavy rains. The shrink-swell potential of the subsoil is high.

Most of the acreage is used as woodland. A small acreage is used as pasture.

This soil is well suited to loblolly pine and shortleaf pine. Another common tree is longleaf pine. The site index for loblolly pine is 87. The main concerns in producing and harvesting timber are a moderate equipment limitation and moderate seedling mortality caused by the clayey subsoil. Plant competition is moderate. The use of equipment, especially on skid trails, can disturb the surface layer and expose the subsoil, which is sticky and slippery when wet. Management that reduces the hazard of erosion is essential in harvesting timber. Roads and landings can be protected against erosion by constructing diversions and by seeding cuts and fills. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from December through February. Compaction can be minimized by using suitable logging systems, laying out skid trails in advance, and harvesting during the drier periods. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, and trees. Ripping skid trails and landings when the soil is dry breaks up compacted layers, helps to maintain tilth, and increases seedling survival.

This soil is well suited to habitat for woodland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey.

This soil is moderately well suited to pasture. The main limitations are the slope, the low fertility, and the clayey subsoil, which causes an equipment limitation during wet periods. Erosion is a severe hazard in tilled areas until pasture grasses are established. Suitable pasture plants are improved bermudagrass, common bermudagrass, bahiagrass, and ryegrass. Seedbeds should be prepared on the contour or across the slope where practical. Additions of fertilizer and lime are needed for optimum production of forage. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

Because of the slope and the severe hazard of erosion, this soil is poorly suited to cultivated crops. The low fertility is an additional limitation. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Establishing terraces and farming on the contour help to control sheet and rill erosion on the steeper slopes. Most crops respond well to applications of fertilizer and lime, which help to overcome the low fertility and reduce the levels of exchangeable aluminum.

This soil is poorly suited to urban uses. It has severe limitations affecting building sites, local roads and streets, and most sanitary facilities. The main limitations are the wetness, the very slow permeability, the high shrink-swell potential, and low strength. The depth to bedrock is a limitation on sites for sanitary facilities, such as sewage lagoons and sanitary landfills. Preserving the existing plant cover during construction helps to control erosion. Roads and streets should be designed to overcome instability of the subsoil. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the very slow permeability. Self-contained disposal units can be used to dispose of sewage. The high shrink-swell potential is a limitation affecting roads and dwellings. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential.

This soil is poorly suited to intensively used recreational areas. The main limitation is the very slow permeability and the seasonal wetness. Artificial drainage can improve the suitablity of this soil for intensively used areas, such as playgrounds and camp areas. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer and controlling traffic.

The capability subclass is IVe. The woodland ordination symbol is 9C.

ScC—Sacul fine sandy loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on broad ridgetops and on side slopes in the uplands. Areas are irregular in shape and range from 30 to 500 acres in size. Slopes are generally long and smooth, but some are short and convex.

Typically, the surface layer is dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is yellowish brown fine sandy loam about 8 inches thick. The subsoil is about 33 inches thick. It is red, mottled clay in the upper part and mottled light brownish gray, dark yellowish brown, and light yellowish brown silty clay loam in the lower part. The substratum extends to a depth of about 60 inches. It is stratified light brownish gray, red, and yellowish brown sandy clay loam and clay loam. In places the middle part of the subsoil is brownish yellow.

Included with this soil in mapping are a few small areas of Keithville soils. These soils are lower on the landscape than the Sacul soil. They have a subsoil that is loamy in the upper part and clayey in the lower part. They make up about 15 percent of the map unit.

This Sacul soil is characterized by low fertility and high levels of exchangeable aluminum. The aluminum is potentially toxic to some crops. Water and air move through this soil at a slow rate. Water runs off the surface at a medium rate. A seasonal high water table is at a depth of about 2 to 4 feet from December through April in most years. The shrink-swell potential of the subsoil is high.

Most of the acreage is used as woodland. A small acreage is used as pasture or for homesite development.

This soil is well suited to loblolly pine and shortleaf pine. The site index for loblolly pine is about 84. The main concerns in producing and harvesting timber are a moderate equipment limitation caused by the wetness and the clayey subsoil. Plant competition is moderate. The use of equipment can disturb the surface layer and expose the subsoil, which is sticky and slippery when wet. Roads require suitable surfacing for year-round use. Compaction can be minimized by using low-pressure ground equipment or by planting and harvesting only during dry periods. Carefully managing reforestation after harvesting helps to control competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, or trees.

This soil is well suited to habitat for woodland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey.

This soil is moderately well suited to pasture. The main limitation is the low fertility, and the main hazard is erosion. Erosion is a severe hazard in tilled areas until pasture grasses are established. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, ryegrass, and crimson clover. Additions of fertilizer and lime are needed for optimum production of forage. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

Because of the slope and the severe hazard of erosion, this soil is poorly suited to cultivated crops. The low fertility is also a limitation. The main crops are cotton, corn, and soybeans. The surface layer is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Establishing terraces and farming on the contour help to control erosion. Most crops respond well to applications of fertilizer and lime, which help to overcome the low fertility and reduce the levels of exchangeable aluminum.

This soil is poorly suited to urban uses. The main limitations are the high shrink-swell potential, the slow permeability, the wetness, and low strength. Buildings and roads can be designed to offset the effects of shrinking and swelling and overcome the low load-supporting capacity. Lagoons or self-contained disposal units may be used to dispose of sewage. Preserving the existing plant cover during construction helps to control erosion. Excess water can be removed by shallow ditches and proper grading.

This soil is moderately well suited to intensively used recreational areas. The slow permeability, the slope, and small stones on the surface are the main limitations. Because the soil has a slow rate of water intake, the surface layer remains wet for long periods after rains. The slope and the hazard of erosion are management concerns affecting playgrounds. Excess water can be removed by shallow ditches and proper grading. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover.

The capability subclass is IVe. The woodland ordination symbol is 8C.

SCE—Sacul fine sandy loam, 5 to 12 percent slopes. This moderately sloping and strongly sloping, moderately well drained soil is on side slopes in the uplands. Well defined drainageways cross most areas of this soil. Areas are irregular in shape and range from 20 to 400 acres in size. Slopes are generally short.

Typically, the surface layer is brown fine sandy loam about 4 inches thick. The subsurface layer is reddish brown fine sandy loam about 4 inches thick. The subsoil extends to a depth of about 32 inches. It is red clay in the upper part; mottled light brownish gray, red, and brownish yellow silty clay in the next part; and light brownish gray, mottled silty clay loam in the lower part. The substratum extends to a depth of about 80 inches. It is light brownish gray, light yellowish brown, strong brown, and light olive gray clay loam. In places the subsoil is grayish brown clay.

Included with this soil in mapping are a few small areas of Keithville soils. These soils are lower on the landscape than the Sacul soil. They have a subsoil that is loamy in the upper part and clayey in the lower part. They make up about 20 percent of the map unit.

This Sacul soil is characterized by low fertility and high levels of exchangeable aluminum. The aluminum is potentially toxic to some crops. Water and air move through this soil at a slow rate. Water runs off the surface at a rapid rate. A seasonal high water table is at a depth of about 2 to 4 feet from December through April in most years. The shrink-swell potential of the subsoil is high.

Most of the acreage is used as woodland. A small acreage is used as pasture or for homesite development.

This soil is well suited to loblolly pine and shortleaf pine. The site index for loblolly pine is 80. The main concerns in producing and harvesting timber are a moderate equipment limitation caused by the clayey subsoil and the seasonal wetness. Plant competition is moderate. The use of equipment can disturb the surface layer and expose the subsoil, which is sticky and slippery when wet. Compaction can be minimized by using low-pressure ground equipment or by harvesting only when the soil is dry. Roads and landings can be protected against erosion by constructing diversions and by seeding cuts and fills. Carefully managing reforestation after harvesting helps to control competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, or trees.

This soil is well suited to habitat for woodland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey.

Because of the slope and a severe hazard of erosion, this soil is poorly suited to pasture. The low fertility is an additional limitation. Erosion is a severe hazard in tilled areas until pasture grasses are established. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, ryegrass, and crimson clover. Additions of fertilizer and lime are needed for optimum production of forage. Proper grazing, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

Because of the slope and the severe hazard of erosion, this soil is generally not suited to cultivated crops. The low fertility is an additional limitation. In places the short irregular slopes hinder the use of farm equipment. If conservation practices are used, close-sown crops, such as small grains, can be grown in moderately sloping areas. Erosion can be controlled by minimizing tillage and establishing terraces, diversions, and grassed waterways. Tilth and fertility can be maintained by returning crop residue to the soil. Most crops respond well to applications of fertilizer and lime, which help to overcome the low fertility and reduce the levels of exchangeable aluminum.

This soil is poorly suited to urban uses. It has severe limitations affecting building sites, local roads and streets, and most sanitary facilities. The main limitations are the slope, the wetness, the slow permeability, the high shrink-swell potential, and low strength. Buildings and roads can be designed to offset the effects of shrinking and swelling and overcome the low load-supporting capacity. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the slow permeability. Sewage lagoons or self-contained disposal units may be used to dispose of sewage. Preserving the existing plant cover during construction helps to control erosion. Excess water can be removed by shallow ditches and proper grading.

This soil is moderately well suited to intensively used recreational areas. The main limitations are the slope, the slow permeability, and small stones on the surface. Establishing paths and trails across the slope helps to control erosion. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover.

The capability subclass is VIe. The woodland ordination symbol is 8C.

SCF—Sacul fine sandy loam, 12 to 30 percent slopes. This moderately steep and steep, moderately well drained soil is on side slopes in the uplands. Areas are irregular in shape and range from 10 to 100 acres in size. Well defined drainageways cross most areas of this soil. Slopes are generally short.

Typically, the surface layer is brown fine sandy loam about 3 inches thick. The subsurface layer is light brown fine sandy loam about 4 inches thick. The upper part of the subsoil is red clay. The lower part, to a depth of about 40 inches, is mottled light brownish gray, red, and yellowish red silty clay loam. The substratum extends to a depth of about 60 inches. It is light brownish gray, brownish yellow, and yellowish red clay loam. In places, the soil is eroded and the surface layer and subsoil are thinner.

Included with this soil in mapping are a few small areas of Kirvin soils. These soils are in the higher landscape positions or in the more convex areas. They do not have gray mottles within a depth of 24 inches from the top of the subsoil. They make up about 15 percent of the map unit.

This Sacul soil is characterized by low fertility and high levels of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some crops. Water and air move through this soil at a slow rate. Water runs off the surface at a rapid rate. A seasonal high water table is at a depth of about 2 to 4 feet from December through April in most years. The shrink-swell potential of the subsoil is high.

Almost all of the acreage is used as woodland.

This soil is well suited to loblolly pine and shortleaf pine. The site index for loblolly pine is 84. The main concerns in producing and harvesting timber are a moderate hazard of erosion caused by the slope and a moderate equipment limitation caused by the clayey subsoil. Plant competition is moderate. Roads require suitable surfacing for year-round use. Management that reduces the hazard of erosion is essential in harvesting timber. Planting trees on the contour helps to control erosion. Roads and landings can be protected against erosion by constructing diversions and by seeding cuts and fills. Carefully managing reforestation after harvesting helps to control competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, or trees. Compaction can be minimized by planting and harvesting only during dry periods.

This soil is well suited to habitat for woodland wildlife.

Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey.

Because of the slope and a severe hazard of erosion, this soil is poorly suited to pasture. The low fertility is an additional limitation. The soil is best suited to native grasses, but pasture plants, such as common bermudagrass, improved bermudagrass, ryegrass, bahiagrass, and crimson clover, can be grown in the less sloping areas. The use of equipment is somewhat limited by the slope. Seedbeds should be prepared on the contour or across the slope where practical. Additions of lime and fertilizer help to overcome the low fertility and increase the production of forage. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

Because of the slope and the severe hazard of erosion, this soil is generally not suited to cultivated crops. The low fertility and the potentially toxic levels of exchangeable aluminum are limitations affecting crops.

This soil is poorly suited to urban uses. It has severe limitations affecting building sites, local roads and streets, and most sanitary facilities. The main limitations are the slope, the high shrink-swell potential, the slow permeability, the wetness, and low strength. Slopes are generally too steep for septic tank absorption fields. Self-contained disposal units can be used to dispose of sewage. Buildings and roads can be designed to offset the effects of shrinking and swelling and overcome the low load-supporting capacity. Erosion is a severe hazard. Only the part of the site that is used for construction should be disturbed. Topsoil can be stockpiled and used to reclaim areas disturbed by cutting and filling.

Because of the slope, this soil is poorly suited to intensively used recreational areas. Recreational uses are mainly limited to a few paths and trails, which should be established across the slope. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover.

The capability subclass is VIIe. The woodland ordination symbol is 8R.

SDA—Sardis-Guyton loams, rarely flooded. These soils are on flood plains and are subject to rare flooding. They occur as areas so intermingled that it is not practical to map them separately at the scale selected. The map unit is about 60 percent Sardis soil and 35 percent Guyton soil. The Sardis soil is somewhat poorly drained and is on slightly convex natural levees adjacent to drainage channels and on microhighs on the flood plains. The Guyton soil is poorly drained and is on low flats. Areas of these soils are long and narrow or long and wide. They range from 100 to 1,000 acres in size. Most areas are dissected by stream channels. Slopes are less than 1 percent. The number of observations was fewer in areas of this map unit than in most other areas of the parish. The detail in mapping, however, is adequate for the expected use of the soils.

Typically, the Sardis soil has a surface layer of brown loam about 4 inches thick. The subsoil extends to a depth of about 62 inches. The upper 10 inches is yellowish brown, mottled loam. The next 21 inches is brown, mottled silt loam in the upper part and yellowish brown, mottled silty clay loam in the lower part. The next part, to a depth of about 51 inches, is yellowish brown and light brownish gray silty clay loam. The lower part is mottled dark yellowish brown, light brownish gray, and strong brown silty clay loam.

The Sardis soil is characterized by low fertility and moderately high levels of exchangeable aluminum. The aluminum is potentially toxic to some crops. Water and air move through this soil at a moderate rate. Water runs off the surface at a slow rate. Flooding can occur during unusually wet periods. A seasonal high water table is at a depth of about 1.5 to 3.0 feet from January through May in most years. The surface layer remains wet for long periods after heavy rains. The shrink-swell potential is low.

Typically, the Guyton soil has a surface layer of brown, mottled loam about 6 inches thick. The subsurface layer is grayish brown, mottled silt loam about 21 inches thick. The next layer, to a depth of about 57 inches, is light brownish gray, mottled silty clay loam and silt loam. The subsoil extends to a depth of about 80 inches. It is gray, mottled silty clay loam. In places the surface layer is loam or fine sandy loam.

The Guyton soil is characterized by low fertility and moderately high levels of exchangeable aluminum in the root zone. The aluminum is potentially toxic to some crops. Water and air move through this soil at a slow rate. Water runs off the surface at a slow rate. Flooding can occur during unusually wet periods. A seasonal high water table ranges from about 1.5 feet below the surface to near the surface from December through May. The surface layer remains wet for long periods after heavy rains. The shrink-swell potential is low.

Included with these soils in mapping are a few small areas of Kenefick and Latonia soils on nearby stream terraces. The included soils are well drained. They have more sand in the subsoil than the Sardis and Guyton soils. They make up about 5 percent of the map unit.

Most of the acreage is used as woodland. A few small areas are used as pasture or cropland.

The Sardis and Guyton soils are moderately well suited to hardwoods and pines. Common trees in areas of the Sardis soil are loblolly pine, sweetgum, and water oak. Common trees in areas of the Guyton soil are loblolly pine, sweetgum, green ash, southern red oak, and water oak. The site index for loblolly pine is 96 in areas of the Sardis soil and 90 in areas of the Guyton soil. Both soils have moderate or severe limitations affecting timber production, mainly because of the wetness. Seasonal wetness limits the use of equipment and increases the risk of seedling mortality. Trafficability is poor when the soils are wet. This limitation can be overcome by using special equipment during wet periods or by logging during the drier periods. The seedling survival rate can be increased by planting in bedded rows. Plant competition is severe on both soils. Carefully managing reforestation after harvesting helps to control competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, or trees.

The Sardis soil is well suited to habitat for woodland wildlife, and the Guyton soil is moderately well suited to this use. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Desirable trees in habitat for deer, squirrels, and turkeys are oaks and hickories.

These soils are moderately well suited to pasture. The main limitations are the low fertility and the seasonal wetness. The wetness limits the choice of plants and the period of grazing. Plants that can tolerate the wetness include common bermudagrass, improved bermudagrass, bahiagrass, and ryegrass. Additions of fertilizer and lime are needed for optimum production of forage. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

These soils are moderately well suited to most cultivated crops. They are limited mainly by the low fertility and the wetness. A drainage system can improve the suitability of these soils for most cultivated crops. Minimizing tillage and returning all crop residue to the soils or regularly adding other organic material help to improve fertility and help to maintain tilth and the content of organic matter. Most crops respond well to applications of fertilizer and lime, which help to overcome the low fertility and reduce the levels of exchangeable aluminum.

These soils are poorly suited to urban uses. They have severe limitations affecting building sites, local roads and streets, and most sanitary facilities because of the wetness, the flooding, the moderate and slow permeability, and low strength. The flooding can be controlled by levees, and drainage can be improved by water pumps. Constructing on mounds or pilings helps to raise dwellings above the expected level of flooding. Low strength is a limitation affecting local roads and streets. Roads and streets should be designed to overcome the instability of the subsoil. If flooding is controlled, sewage lagoons or self-contained disposal units can be used to dispose of sewage.

These soils are poorly suited to intensively used recreational areas because of the wetness and the flooding. The flooding can be controlled and the wetness reduced by levees and water pumps.

The Sardis soil is in capability subclass IIw, and the Guyton soil is in capability subclass IIIw. The woodland ordination symbol is 9W in areas of both soils.

SeC—Saucier fine sandy loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on the lower side slopes adjacent to drainageways in the uplands. Areas are irregular in shape and range from 10 to 150 acres in size. Slopes are generally long and smooth.

Typically, the surface layer is dark brown fine sandy loam about 5 inches thick. The subsurface layer is pale brown, mottled fine sandy loam about 3 inches thick. The next layer, to a depth of about 15 inches, is pale brown and brownish yellow, mottled fine sandy loam. The upper part of the subsoil is yellowish brown, mottled sandy clay loam. The next part, to a depth of about 58 inches, is yellowish brown, mottled silty clay loam. The lower part, to a depth of about 70 inches, is mottled light brownish gray and brownish yellow silty clay.

Included with this soil in mapping are a few small areas of Bowie, Guyton, and Keithville soils. Bowie and Keithville soils are higher on the landscape than the Saucier soil. Bowie soils do not have gray mottles within a depth of 30 inches. Keithville soils have a loamy and clayey subsoil. Guyton soils are on narrow flood plains along drainageways and are poorly drained. They have a grayish subsoil. Included soils make up about 15 percent of the map unit.

This Saucier soil is characterized by low fertility and high levels of exchangeable aluminum. The aluminum is potentially toxic to some crops. Water and air move through this soil at a slow rate. Water runs off the surface at a medium rate. A seasonal high water table is at a depth of about 2.5 to 4.0 feet from January through March in most years. The shrink-swell potential of the subsoil is low to a depth of about 58 inches and high between depths of 58 and 70 inches.

Most of the acreage is used as woodland or pasture.

A few small areas are used for homesite development.

This soil is well suited to loblolly pine. The wetness, however, limits the use of some equipment during winter and early spring unless artificial drainage is provided. Plant competition is moderate. Longleaf pine and shortleaf pine are other common trees in areas of this soil. The site index for loblolly pine is 80. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from January through March. Compaction can be minimized by using suitable logging systems, laying out skid trails in advance, and harvesting during the drier periods. Site preparation, prescribed burning, and herbicides help to control unwanted vegetation.

This soil is well suited to habitat for woodland and openland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. Prescribed burning that is applied every 3 years and is rotated among several small tracts of land can increase the amount of browse palatable to deer and the number of seed-producing plants available to quail and turkey.

This soil is well suited to pasture. The main limitations are the slope, the low fertility, and the wetness. Erosion is a hazard in tilled areas until pasture grasses are established. Suitable pasture plants are bahiagrass, common bermudagrass, improved bermudagrass, and ryegrass. Seedbeds should be prepared on the contour or across the slope where practical. Additions of lime and fertilizer help to overcome the low fertility and increase the production of forage. Grazing when the soil is wet can puddle the surface layer and damage the plant community. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is well suited to most cultivated crops. It is limited mainly by the slope, the low fertility, the wetness, and a moderate hazard of erosion. The main crops are soybeans, corn, grain sorghum, and cotton. This soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Traffic pans, however, develop easily, but they can be broken up by deep plowing or chiseling. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material help to improve fertility and help to maintain tilth and the content of organic matter. Seeding in early fall, minimizing tillage, and establishing terraces, diversions, and grassed waterways help to control erosion. Areas should always be tilled on the contour or across the slope. Most crops respond well to applications of fertilizer and lime, which improve fertility and reduce the levels of exchangeable aluminum.

This soil is moderately well suited to urban uses. It has slight or moderate limitations affecting building sites and local roads and streets. It has moderate or severe limitations affecting most sanitary facilities. The main limitations are the wetness, the slow permeability, and the slope. Excess water can be removed by shallow ditches and proper grading. Preserving the existing plant cover during construction helps to control erosion. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the slow permeability. Self-contained disposal units or sewage lagoons can be used to dispose of sewage.

This soil is well suited to intensively used recreational areas. If the soil is used for playgrounds, the main limitations are the slope and small stones on the surface. Sedimentation can be controlled by maintaining an adequate plant cover. Adding loamy fill to the surface layer can improve the suitability of the soil for playgrounds.

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

TpC—Trep loamy fine sand, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on broad ridgetops in the uplands. Areas are irregular in shape and range from 10 to 250 acres in size. Slopes are generally long and smooth.

Typically, the surface layer is dark grayish brown loamy fine sand about 4 inches thick. The subsurface layer is light yellowish brown loamy fine sand about 18 inches thick. The subsoil extends to a depth of about 60 inches. It is yellowish brown, mottled sandy clay loam in the upper part; mottled brownish yellow, red, and light brownish gray sandy clay loam in the next part; and mottled light brownish gray, yellowish brown, and red sandy clay in the lower part. In places the upper part of the subsoil is red or yellowish red.

Included with this soil in mapping are a few small areas of Bowie and Briley soils. Bowie soils are lower on the landscape than the Trep soil. They have a loamy surface layer and subsurface layer. Briley soils are in the slightly higher landscape positions. They have a reddish subsoil. Included soils make up about 10 percent of the map unit.

This Trep soil is characterized by low fertility. Water and air move through the upper part of the subsoil at a moderate rate and through the lower part at a moderately slow rate. Water runs off the surface at a slow rate. A seasonal high water table is at a depth of about 3.5 to 5.0 feet from November through May in most years. The surface layer dries quickly after rains. The shrink-swell potential is moderate in the lower part of the subsoil. Plants generally are damaged by a lack of water during dry periods in the summer and fall of most years.

Most of the acreage is used as woodland or pasture. A small acreage is used for homesite development.

This soil is well suited to loblolly pine and shortleaf pine. The site index is 90 for loblolly pine and 80 for shortleaf pine. The main concerns in producing and harvesting timber are moderate seedling mortality and a moderate equipment limitation caused by the sandy texture and the droughtiness. Plant competition is moderate. Trafficability is poor when the soil is dry. The low available water capacity generally reduces the seedling survival rate, especially in areas where understory plants are numerous. The rate of seedling mortality can be reduced by planting seedlings in early spring so that seedlings can obtain sufficient moisture from spring rains. Restricting burning and leaving slash well distributed help to maintain the content of organic matter. Unwanted understory plants can be controlled by proper site preparation and herbicides.

This soil is well suited to habitat for woodland wildlife and moderately well suited to habitat for openland wildlife. Wildlife habitat can be improved by planting the appropriate vegetation, maintaining the existing plant cover, or promoting the establishment of desirable plants. In areas of pasture, grasses and legumes that mature in different seasons can be planted in alternating strips to improve habitat for doves, quail, rabbits, and nongame birds and animals.

This soil is moderately well suited to pasture. The main limitations are the slope, the low fertility, and the droughtiness. Erosion is a hazard in tilled areas until pasture grasses are established. The low or moderate available water capacity limits the production of plants suitable for pasture. Suitable pasture plants are improved bermudagrass, common bermudagrass, bahiagrass, and crimson clover. Seedbeds should be prepared on the contour or across the slope where practical. Additions of lime and fertilizer help to overcome the low fertility and increase the production of forage. Proper stocking rates and pasture rotation help to keep the pasture in good condition.

This soil is moderately well suited to cultivated crops. It is limited by the slope, the low fertility, the droughtiness, and a severe hazard of erosion. The main crops are cotton, corn, soybeans, watermelons, and other vegetables. This soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material help to improve fertility, control erosion, conserve moisture, and maintain the content of organic matter. Areas should always be tilled on the contour or across the slope. Most crops respond well to applications of fertilizer and lime.

This soil is moderately well suited to urban uses. The main limitations are the wetness, the slope, and the sandy texture. Seepage is a hazard affecting sanitary facilities, such as sewage lagoons and sanitary landfills. During rainy periods, effluent from onsite sewage disposal systems may seep in downslope areas. Septic tank absorption fields do not function properly during rainy periods because of the wetness and the moderate or moderately slow permeability. Self-contained disposal units can be used to dispose of sewage. Where shallow excavations are made, cutbanks cave easily. Selection of adapted vegetation is critical in areas used for lawns, shrubs, trees, and vegetable gardens. Plants that can tolerate the droughtiness should be selected unless irrigation water is provided. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed. A seasonal high water table is perched above the subsoil, and drainage should be provided on sites for buildings. The wetness can be reduced by installing drainage tile around footings.

This soil is moderately well suited to intensively used recreational areas. It is limited mainly by the sandy surface layer, which is loose when dry and provides poor traction. The slope is a limitation on playgrounds. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer and controlling traffic.

The capability subclass is IIIe. The woodland ordination symbol is 9S.

TPE—Trep loamy fine sand, 5 to 12 percent slopes. This moderately sloping and strongly sloping, moderately well drained soil is on side slopes in the uplands. Areas are irregular in shape and range from 10 to 150 acres in size. Slopes generally are short. Well defined drainageways cross most areas of this soil. The number of observations was fewer in areas of this map unit than in most other areas of the parish. The detail in mapping, however, is adequate for the expected use of the soil.

Typically, the surface layer is brown loamy fine sand about 7 inches thick. The subsurface layer is loamy fine sand about 15 inches thick. It is brown in the upper part and light yellowish brown in the lower part. The subsoil extends to a depth of about 81 inches. It is yellowish brown, mottled sandy clay loam in the upper part; brownish yellow, mottled sandy clay loam in the next part; and mottled brownish yellow, red, and light brownish gray sandy clay in the lower part. In places the combined thickness of the surface layer and subsurface layer is more than 40 inches.

Included with this soil in mapping are a few small areas of Bowie and Saucier soils. These soils are lower on the landscape than the Trep soil. They have a loamy surface layer and subsurface layer. Included soils make up about 10 percent of the map unit.

This Trep soil is characterized by low fertility. Water and air move through the upper part of the subsoil at a moderate rate and through the lower part at a moderately slow rate. Water runs off the surface at a slow rate. A seasonal high water table is at a depth of about 3.5 to 5.0 feet from November through May in most years. The surface layer dries quickly after rains. The shrink-swell potential is moderate in the lower part of the subsoil. Plants generally are damaged by a lack of water during dry periods in the summer and fall of most years.

Most of the acreage is used as woodland. A small acreage is used as pasture.

This soil is well suited to loblolly pine and shortleaf pine. The site index is 90 for loblolly pine and 80 for shortleaf pine. The main concerns in producing and harvesting timber are moderate seedling mortality caused by the droughtiness and a moderate equipment limitation caused by the sandy texture. Plant competition is moderate. Inadequate soil moisture can cause a high rate of seedling mortality in the summer. Seedlings should be planted in spring so that they can obtain sufficient moisture from spring rains. Managing reforestation after harvesting helps to control competition from undesirable understory plants. Site preparation and herbicides help to reduce debris and control immediate plant competition.

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

This soil is moderately well suited to pasture. The main limitations are the slope, the low fertility, and the droughtiness. Erosion is a hazard in tilled areas until pasture grasses are established. Additions of lime and fertilizer help to overcome the low fertility and increase the production of forage. The low or moderate available water capacity limits the production of plants suitable for pasture. Suitable pasture plants are improved bermudagrass, bahiagrass, common bermudagrass, and crimson clover. Seedbeds should be prepared on the contour or across the slope where practical.

Because of the slope and a severe hazard of erosion, this soil is poorly suited to cultivated crops. The low fertility and the droughtiness are additional limitations. If conservation practices are used, close-sown crops, such as small grains and vegetables, can be grown. This soil is friable and can be easily kept in good tilth. It can be worked throughout a wide range in moisture content. Minimizing tillage and returning all crop residue to the soil or regularly adding other organic material can improve fertility, conserve moisture, and help to maintain tilth and the content of organic matter. Most crops respond well to applications of fertilizer and lime. Seeding cover crops in early fall, minimizing tillage, and establishing terraces, diversions, and grassed waterways help to control erosion.

This soil is moderately well suited to urban uses. The main limitations are the slope and the wetness. Erosion is a hazard. Only the part of the site that is used for construction should be disturbed. Cutbanks are not stable and are subject to slumping. If the soil is used for septic tank absorption fields, the main limitations are the moderate or moderately slow permeability and the wetness. During rainy periods, effluent from onsite sewage disposal systems may seep in downslope areas. Self-contained disposal units may be used to dispose of sewage. Seepage is a hazard affecting sanitary facilities, such as sewage lagoons and sanitary landfills. Selection of adapted vegetation is critical in areas used for lawns, shrubs, trees, and vegetable gardens. Plants that can tolerate the droughtiness should be selected unless irrigation water is provided. A seasonal high water table is perched above the subsoil, and drainage should be provided on sites for buildings. The wetness can be reduced by installing drainage tile around footings.

Because of the sandy surface layer and the slope, this soil is moderately well suited to intensively used recreational areas. When the surface layer is very dry, it is loose and provides poor traction. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The plant cover can be maintained by applying fertilizer and controlling traffic.

The capability subclass is IVe. The woodland ordination symbol is 9S.

Prime Farmland

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

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

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

Prime farmland soils usually receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not frequently flooded during the growing season. The slope ranges mainly from 0 to 5 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 156,952 acres in the survey area, or nearly 29 percent of the total land area, meets the soil requirements for prime farmland. Scattered areas of this land are throughout the parish. Most of the acreage is used as woodland. This woodland, consisting mainly of loblolly pine and shortleaf pine, accounts for an estimated 80 percent of the total agricultural income of the parish each year. Because Sabine Parish is primarily rural and does not have a large population center, it has not lost a large percentage of its prime farmland to industrial or urban uses.

The map units in the survey area that are considered prime farmland are listed in table 6. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 5. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use. Soils that have limitations, such as a seasonal high water table or flooding, may qualify as prime farmland if these limitations are overcome by such measures as drainage or flood control. Only the soils that have few limitations and do not need any additional improvements to qualify as prime farmland are included in the list.

Use and Management of the Soils

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

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

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

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

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

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

Crops and Pasture

Richard C. Aycock, area agronomist, Natural Resources Conservation Service, helped prepare this section.

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

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

In 1987, about 58,112 acres in Sabine Parish was farmland. About 17,736 acres was used as pasture, and 8,169 acres was used as cropland. The mainly crops are vegetables and annual forage crops, such as small grain and ryegrass.

Differences in crop suitability and management needs result from differences in soil characteristics, such as fertility levels, erodibility, organic matter content, availability of water for plants, drainage, and the hazard of flooding. Cropping systems and soil tillage also are an important part of management. Each farm has a unique soil pattern and, therefore, unique management problems. Some principles of farm management apply to specific soils and certain crops. This section, however, presents the general principles of management that can be applied widely to the soils in the parish.

Perennial grasses or legumes or mixtures of both are grown for pasture and hay. The mixtures generally consist of either a summer or a winter perennial grass and a suitable legume. Excess grass in summer is harvested as hay for use in winter.

Common bermudagrass, improved bermudagrass, and Pensacola bahiagrass are the most commonly grown summer perennials. These grasses produce good-quality forage if properly managed. Tall fescue, the main 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, crimson clover, vetch, and southern wild winterpea are the most commonly grown legumes. All of these legumes respond well to lime, particularly on acid soils.

Proper grazing management, applications of fertilizer and lime, clipping, and weed control are important for high-quality forage, stand survival, and erosion control.

Proper grazing management includes delaying livestock grazing in spring until the pasture plants are well established, rotation grazing, grazing only during the best periods, and periodic resting of grazingland. Proper additions of fertilizer help to maintain an adequate supply of plant nutrients. Clipping helps to distribute grazing and stimulate uniform regrowth. In areas where the stand is thin, mowing or spraying to control weeds increases the amount of moisture and nutrients available to the desirable pasture plants.

Grazing the understory native plants in woodland provides additional forage. About 1,000 acres of woodland are used for grazing in Sabine Parish. Forage volume varies with the woodland site, the condition of the native forage, and the density of the timber stand. Most areas of woodland are managed mainly for timber. These areas, however, can provide substantial volumes of forage under proper management. Careful management of stocking rates and grazing periods ensures optimum forage production and maintains an adequate cover of understory plants, which helps to control erosion.

Fertilizer and lime. The soils in Sabine Parish range from extremely acid to moderately alkaline within a depth of 20 inches. Most soils used for crops have a low content of organic matter and a low content of available nitrogen. Some soils also have a high or moderately high level of exchangeable aluminum within the root zone. Acid soils and soils that have a high or moderately high level of exchangeable aluminum require applications of lime. The amount of fertilizer needed in areas used for crops or pasture depends on the kind of crop to be grown, past cropping history, the desired level of yields, and the kind of soil. The amount should be based on the results of soil tests. Information about collecting and testing soil samples can be obtained from the Cooperative Extension Service.

Organic matter content. Organic matter is an important source of nitrogen for crops. It also increases the rate of water intake, reduces surface crusting, and helps to maintain tilth. In most of the cultivated soils in the parish, the content of organic matter is low. The content of organic matter can be maintained by leaving plant residue on the surface, growing crops that produce an extensive root system and an abundance of foliage, adding barnyard manure, and growing perennial grasses and legumes in rotation with other crops.

Soil tillage. Because excessive tillage destroys soil structure, soils should be tilled only for seedbed preparation and weed control. Conservation tillage and no-till practices help to maintain tilth. The more clayey soils in the parish become cloddy if they are cultivated when too wet or too dry.

A compacted layer, generally known as a traffic pan or plowpan, sometimes develops just below the plow layer in loamy soils. Formation of this layer can be prevented by plowing only when the soil is dry or by varying the plowing depth. If a compacted layer forms, it can be broken up by subsoiling or chiseling. The use of tillage implements that stir the surface layer but leave crop residue in place protects the soil from beating rains. This protection of the soil surface helps to control erosion, reduces runoff and surface crusting, and increases infiltration.

Drainage. Some of the soils in Sabine Parish need a surface drainage system if they are used for crops. A properly designed system of field ditches can remove excess water from seasonally wet soils, such as Guyton soils. Major flood-control structures are needed to control flooding on some soils, such as Iuka, Sardis, and Guyton soils.

Water for plant growth. The available water capacity of the soils in the parish ranges from low to high. In many years, however, sufficient amounts of water are not available at the critical time for optimum plant growth unless supplemental water is provided by irrigation. The amount of rainfall is plentiful in winter and spring and is generally sufficient in the summer and autumn of most years. During dry periods in summer and autumn, however, moisture deficits of 2 to 4 inches can occur and most of the soils do not have sufficient water supplies for optimum plant growth. This rainfall pattern favors the growth of early maturing crops.

Cropping system. A good cropping system includes a legume for nitrogen, a cultivated crop to help control weeds, a deep-rooted crop to utilize subsoil fertility and maintain subsoil permeability, and a close-growing crop to help maintain the content of organic matter. A crop sequence that keeps the soil covered most of the year also helps to control erosion.

A suitable cropping system varies according to the needs of the farmer and the characteristics of the soil. On livestock farms, for example, cropping systems that have higher percentages of pasture and annual forage crops than those on cash-crop farms are generally used. Cover crops of grasses or legumes are grown during fall and winter.

Control of erosion. Erosion is a hazard on many of the soils in Sabine Parish. It is especially a serious problem on soils in the uplands and on soils that have a claypan subsoil. Erosion generally is not a serious problem on soils on the flood plains because these soils mainly are level or nearly level. Sloping soils, such as Bellwood and Sacul soils, are highly susceptible to erosion if they do no have a 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 also are lost.

Sheet erosion is common in all fallow-plowed fields in the parish. Gullies form easily on the strongly sloping to steep soils. Cropping systems that keep a plant cover on the soil for extended periods reduce the hazard of erosion. Conservation tillage, contour farming, stripcropping, no-till farming or minimum tillage, and establishing terraces and grassed waterways help to control erosion in areas of cropland or pasture. Disturbed areas around construction sites and new drainage ditches should be seeded and mulched immediately after construction. Installing water-control structures that drop water to different levels in drainageways can help to prevent gullying.

Additional information on erosion control, cropping systems, and drainage practices can be obtained from the local office of the Natural Resources Conservation Service, the Cooperative Extension Service, or the Louisiana Agricultural Experiment Station.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 7. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification also is shown in the table.

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

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

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

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

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for 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 woodland or for engineering purposes.

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

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

Class I soils have few limitations that restrict their use.

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

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

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

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

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

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

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

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

There are no subclasses in class I because the soils of this class have few limitations. The soils in class V are subject to little or no erosion, but they have other limitations that restrict their use to pasture, 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" and in the yields table.

Woodland Management and Productivity

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

This section contains information on the relation between trees and their environment, particularly trees and the soils in which they grow. It provides information on the kind, amount, and condition of woodland resources in Sabine Parish as well as soil interpretations that can be used in planning.

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

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 Betis and Letney soils, are less fertile and have a lower available water capacity than clayey soils, such as Bellwood soils. Aeration, however, is often impeded in clayey soils, particularly under wet conditions. Slope position strongly influences species composition as well as growth of individual trees.

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

Oaks grow on a variety of soils. White oak grows on flood plains, ridges, uplands, coves, and well drained second bottoms. It grows best on deep, well drained loamy soils. Water oak and willow oak grow well on many alluvial soils and on well drained, loamy soils in the uplands and on ridges. Swamp chestnut oak is widely distributed on well drained, loamy soils on first bottom ridges. It grows best on well drained, loamy soils on terraces and in colluvial areas on the bottom land along large and small streams. In the uplands, such oaks as southern red oak grow well on dry, sandy or clayey soils and on a variety of other soils. Post oak is well adapted to upland areas. It grows well on rocky ridges, in sandy areas of rock outcrop, and on southern exposures.

Loblolly pine grows best on soils that have poor surface drainage, a medium-textured surface layer, and a fine-textured subsoil. Bellwood and Mayhew soils are examples of these soils. The production of loblolly pine is highest on soils on stream bottoms and terraces. It is lowest on shallow or moderately shallow soils, such as Kisatchie soils, and on eroded soils.

Shortleaf pine grows well on deep, well drained or moderately well drained, loamy soils on terraces and flood plains. Latonia and Iuka soils are examples of these soils. In good areas site indices at age 50 can exceed 90 feet, and in poor areas they can be as low as 55 feet. Shortleaf pine does not grow well on alkaline soils or on soils that have a high content of calcium, such as Keiffer soils.

No natural stands of longleaf pine or slash pine remain in Sabine Parish. Only a few plantations of these pines have been established in the parish.

Woodland Resources

Sabine Parish has about 462,600 acres of commercial woodland *(29)*. Commercial woodland is defined as land that is producing or is capable of producing crops of industrial wood and that is not withdrawn from timber use. This woodland makes up about 84 percent of the total land area in the parish. About 3.8 percent of the woodland is public land that is owned by Federal, State, and local governments, 45 percent is owned by the forest industry, 45 percent is part of private farms, and 5 percent is owned by corporations.

The Sabine Wildlife Management Area, in the midwestern part of Sabine Parish, near Zwolle, covers about 10,500 acres. It is predominantly hilly forests of pines. Sparse stands of hardwoods grow on the flood plains along local streams. This wildlife management area is owned and managed by the State for wildlife habitat.

The Peason Ridge Wildlife Management Area, in the north-central part of Vernon Parish, the southeastern part of Sabine Parish, and the southwestern part of Natchitoches Parish, covers 33,488 acres. It consists of piney woods on rolling hills. Hardwoods grow on the flood plains. This wildlife management area is owned by the Federal government.

About 60,000 acres of bottom-land hardwood forest on the flood plain of the Sabine River was inundated by the Toledo Bend Reservoir.

Commercial forests can be divided into forest types based on tree species, site quality, or age *(29)*. In this survey, forest types are named for the dominant trees growing in the tree stand. The stands are similar in character, composed of the same species, and growing under the same ecological and biological conditions.

The loblolly-shortleaf pine forest type covers about 214,000 acres and makes up about 46 percent of the forest land in the parish. About 60 percent of this forest type consists of natural stands, and 32 percent consists of planted trees. Loblolly pine is generally dominant except on the drier sites. On well drained soils, scattered hardwoods, such as sweetgum, blackgum, southern red oak, post oak, white oak, mockernut hickory, and pignut hickory, are mixed with the pines. On the more moist sites, sweetgum, red maple, water oak, and willow oak are mixed with the pines. American beech and ash are associated with this forest type in fertile, well drained coves and along stream bottoms.

The oak-hickory forest type makes up about 28 percent of the forest land in the parish. Upland oaks or hickories, singly or in combination, dominate the stand. Elm and maple are commonly associated with this forest type.

The oak-pine forest type makes up about 20 percent of the forest land in the parish. About 50 to 75 percent of the stand is hardwoods, generally upland oaks, and 25 to 50 percent is softwoods (not including cypress). The species that make up the oak-pine forest type are primarily determined by the soil, slope, and aspect. On the higher, drier sites, the hardwood components tend to be upland oaks, such as post oak, southern red oak, and blackjack oak. On the more moist and fertile sites, white oak, southern red oak, and black oak are dominant. Blackgum, winged elm, red maple, and various hickories are associated with the oak-pine forest type on both of these broad sites.

The oak-gum-cypress forest type makes up about 5 percent of the forest land in the parish. Most sites consist of bottom-land forests of water tupelo, blackgum, sweetgum, oak, and baldcypress, singly or in combination. Eastern cottonwood, black willow, green ash, hackberry, red maple, and winged elm are associated with this forest type.

The longleaf-slash pine forest type makes up about 10 percent of the forest land in the parish. About 50 percent or more of the stand is longleaf pine or slash pine, singly or in combination. Other southern pines, oak, and gum are associated with this forest type.

The forest land in Sabine Parish is about 73 percent pines and 27 percent hardwoods. The marketable volume is about 83 percent pines and 17 percent hardwoods. About 51 percent of the forest acreage is used for sawtimber, 26 percent supports saplings and seedlings, 21 percent is used for poletimber, and 2 percent is classified as nonstocked. Although the more productive sites are mainly used as pasture or cropland, about 15 percent of the forest land produces 165 cubic feet or more of wood per acre, 46 percent produces 120 to 165 cubic feet per acre, 36 percent produces 85 to 120 cubic feet per acre, and 3 percent produces 50 to 85 cubic feet per acre. None of the forest land in Sabine Parish produces less than 50 cubic feet of wood per acre *(29)*.

Timber production is an important part of the economy in the parish. Most of the upland pine sites are owned by the forest industry and are generally well managed. The small, privately owned tracts and most of the bottom-land tracts, however, are producing below their potential. Most of these tracts can be improved by thinning out mature trees and undesirable species. Improved methods of tree planting and protection from grazing, fire, insects, and diseases are also needed.

The Natural Resources Conservation Service, the Louisiana Office of Forestry, and the Louisiana Cooperative Extension Service can help to determine woodland management needs in specific areas.

Forestry practices that help to maintain the content of organic matter, prevent compaction, and control erosion include using technical methods for site preparation rather than mechanical methods. If mechanical methods are needed, the method using a roller drum chopper should be selected rather than the shear and windrow method. Other important forestry practices are deferring harvesting and site preparation activities until the soil is dry, using logging slash to protect the soil, applying treatments to critically eroding areas, leaving filter strips along drainageways and streams, properly constructing logging and access roads, installing water-control and drainage systems, and constructing stream crossings.

Silvicultural practices that help to improve forest production include sanitation cutting, which removes trees killed or injured by fire, insects, and fungi; improvement cutting, which improves the composition of species and condition of stands; and thinning, which increases the growth rate of trees by reducing plant competition and improves the composition and quality of the stands.

Multiple Uses of Woodland

Woodland is valuable in providing wildlife habitat, recreational areas, and natural beauty and in helping to conserve soil and water. The commercial forest land of Sabine Parish provides food and shelter for wildlife and offers recreational opportunities. The parish has many hunting and fishing clubs. Forest land provides watershed protection, helps to control erosion and minimize sedimentation, and enhances the quality of water resources. Grasses, legumes, forbs, and much of the woody browse in the understory are grazable and, if properly managed, can supplement a woodland enterprise without damaging the wood crop.

Trees can be planted to screen distracting views of dumps and other unsightly areas, muffle the sound of traffic, reduce the velocity of winds, and lend beauty to the area. They produce fruits and nuts. Trees help to filter out airborne dust and other impurities, convert carbon dioxide into oxygen, and provide shade.

Table 8 can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to applications of fertilizer than others, and some are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special reforestation efforts. In the section "Detailed Soil Map Units," the description of each map unit in the survey area suitable for timber includes information about productivity, limitations in harvesting timber, and management concerns in producing timber. Table 8 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate,* and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

Table 8 lists the *ordination symbol* for each soil. The first part of the ordination symbol, a number, indicates the potential productivity of a soil for the indicator species in cubic meters per hectare. The larger the number, the greater the potential productivity. Potential productivity is based on the site index and the point where mean annual increment is the greatest.

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation affecting use and management. The letter *R* indicates a soil that has a significant limitation because of steepness of slope. The letter *X* indicates that a soil has restrictions because of stones or rocks on the surface. The letter *W* indicates a soil in which excessive water, either seasonal or year-round, causes a significant limitation. The letter *T* indicates a soil that has, within the root zone, excessive alkalinity or acidity, sodium salts, or other toxic substances that limit the development of desirable trees. The letter *D* indicates a soil that has a limitation because of a restricted rooting depth, such as a shallow soil that is underlain by hard bedrock, a hardpan, or other layers that restrict roots. The letter *C* indicates a soil that has a limitation because of the kind or amount of clay in the upper part of the profile. The letter *S* indicates a dry, sandy soil. The letter *F* indicates a soil that has a large amount of coarse fragments. The letter *A* indicates a soil having no significant limitations that affect forest use and management. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

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

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, and susceptibility of the surface layer to compaction. As slope gradient and length increase, it becomes more difficult to use wheeled equipment. On the steeper slopes, tracked equipment is needed. On the steepest slopes, even tracked equipment cannot be operated and more sophisticated systems are needed. The rating is *slight* if equipment use is restricted by wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are so steep that wheeled equipment cannot be operated safely across the slope, if wetness restricts equipment use from 2 to 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. The rating is *severe* if slopes are so steep that tracked equipment cannot be operated safely across the slope, if wetness restricts equipment use for more than 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. Ratings of moderate or severe indicate a need to choose the best suited equipment and to carefully plan the timing of harvesting and other management activities.

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

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

The *potential productivity* of *common trees* on a soil is expressed as a *site index*. Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate. The first tree listed for each soil is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands. The estimates of the productivity of the soils in this survey area are based on published data *(7, 8, 9, 10, 11, 29)*.

The *productivity class* represents the yield likely to be produced by the most important trees, expressed in cubic meters per hectare per year.

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

Recreation

In table 9, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, 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 a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

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. 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, Natural Resources Conservation Service, helped prepare this section.

Sabine Parish is predominantly rural. It provides habitat for a large and varied population of fish and other wildlife in areas of forest and pasture, including open areas of agricultural land, upland forests of pines, and upland forests of pines and hardwoods along creek bottoms.

About 17,736 acres of pasture and 8,169 acres of cropland in Sabine Parish provide food and cover for mourning dove, bobwhite quail, rabbit, red fox, coyote, and many songbirds and nongame animals. Perennial pasture grasses, such as common bermudagrass, bahiagrass, and improved bermudagrass, provide food and cover to wildlife in summer. Ryegrass and other winter annuals make up a significant acreage in areas of cropland. These annuals provide adequate cover during fall and winter.

The upland forests of pines cover about 464,800 acres and are managed primarily for loblolly pine. Woodland management practices, such as periodic thinning and prescribed burning, benefit wildlife, especially white-tailed deer, bobwhite quail, and turkey. The management of even-aged stands is primarily used by landowners of the larger areas. Where clearcuts are less than 66 acres in size, they especially benefit deer, turkey, and quail.

Some of the upland areas have stands of mixed pines and hardwoods. The common trees are loblolly pine, shortleaf pine, white oak, southern red oak, post oak, sweetgum, winged elm, persimmon, water oak, and several species of hickory. The areas of mixed pines and hardwoods generally support larger populations of woodland wildlife than the areas of only pines.

The upland forests along creek bottoms cover about 49,500 acres. They form the nucleus of the habitat used for squirrel, deer, and wild turkey. The typical trees include beech, magnolia, cherrybark oak, red oak, white oak, swamp chestnut oak, water oak, shagbark hickory, and winged elm. These areas provide excellent opportunities for deer hunting and squirrel hunting. Populations of wild turkey are increasing because of better protection, restocking efforts, and interest by hunting clubs.

The Sabine Wildlife Management Area covers about 14,780 acres and is managed by the Louisiana Department of Wildlife and Fisheries for the production of forest game species.

Many ponds, lakes, creeks, and rivers in the parish support small to large populations of largemouth bass, white bass, striped bass, white crappie, black crappie, bluegill, warmouth, bowfin, buffalo, gar, carp, shad, pickerel, and several species of shiners and minnows. The Toledo Bend Reservoir offers some of the best fishing in the parish. The endangered bald eagle is regularly sighted in the reservoir area. The parish has about 2,100 farm ponds. Most of these ponds have been stocked with bluegill and largemouth bass, and some have been stocked with channel catfish.

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

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

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

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

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, bermudagrass, bahiagrass, 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, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, paspalum, woolly 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, beech, magnolia, sweetgum, elm, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are huckleberry, redbay, and mayhaw.

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

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are American beautyberry, waxmyrtle, American elder, sumac, and elderberry.

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, rushes, sedges, and reeds.

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

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

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

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 coyote.

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, nutria, muskrat, mink, and beaver.

Engineering

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

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

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

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

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

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

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

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

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm, dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

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

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

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

Sanitary Facilities

Table 12 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 12 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

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

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

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

Table 12 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, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

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

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

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

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, depth to a water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

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

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

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

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

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

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

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

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

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

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

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

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

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

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

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

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

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

Water Management

Table 14 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 and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

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

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

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

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

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

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

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

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

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

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

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

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

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

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

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

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

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

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

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

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

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

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

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

The estimates of grain-size distribution, liquid limit, and plasticity index generally are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extends 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 16 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 ability of the soil to adsorb cations and retain moisture. They influence the shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

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

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of 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 and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage 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.

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

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

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, more 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 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

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

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands 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 17 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

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

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

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

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 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 17.

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

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

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

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

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

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

Soil Fertility Levels

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

Factors Affecting Crop Production

Crop composition and yield function with many environmental, plant, and soil factors. This section gives a brief description of the more important factors.

Environmental factors. The main environmental factors are intensity and duration of light, temperature of air and soil, distribution and amount of precipitation, and atmospheric carbon dioxide concentration.

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

Soil factors. These factors include both physical and chemical properties of the soils.

Physical properties. These are distribution, texture, structure, surface area, bulk density, water retention and flow, and aeration.

Chemical properties (soil fertility factors). The quantity of the chemical element, its intensity, the relationship of quantity and intensity, and the rate of replenishment of the elements to the soils are the factors of chemical properties. They affect crop growth.

Quantity factor. The quantity factor refers to the concentration of a nutrient ion adsorbed or held in exchangeable form on the solid phase of the soil. This form of nutrient ion is also available for plant uptake.

Intensity factor. The intensity factor refers to the concentration of a nutrient ion in soil solution. Because plant roots absorb nutrients directly from the soil solution, this factor quantifies the amount of a nutrient element immediately available for plant uptake.

Quantity/intensity relationship factor. The relationship between the quantity and intensity factors is sometimes called the buffer power. As plant roots absorb nutrients from soil solution, the concentration in solution is replenished by ions from the solid phase. If two soils have identical intensity factors, the soil having the greater quantity factor will provide more nutrients during the growing season because it can maintain the intensity factor level for a longer period.

Replenishment factor. This is the rate of replenishment of the available supply of nutrients in the solid and solution phases 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 control crop response. The relative importance of each factor changes from soil to soil, crop to crop, and environment to environment. The soil factors are only part of the overall system.

Soil testing provides 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 and protects the environment against the buildup of potentially toxic levels of essential and nonessential elements. Current soil tests measure the available supply of one or more nutrients in the plow layer. The available supply consists of nutrients characterized by both the intensity and quantity factors. If the available supply of one or more nutrients in the plow layer clearly limits crop production, existing soil tests can generally diagnose the problem and reliable recommendations can be suggested. Soil management systems are generally based on the 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.

Alteration of the plow layer produces little change in the subsurface horizons or changes them very slowly. These horizons reflect the soil's inherent ability to supply nutrients to plant roots and to provide a favorable environment for root growth. If soil fertility recommendations based on current soil tests are followed, major fertility problems in the plow layer are normally corrected. Other limitations for crop production are crop and environmental factors, physical properties of the plow layer, and physical and chemical properties of the subsoil.

Chemical Analysis Methods

Information on the available nutrient supply in the subsoil allows evaluation of the natural fertility levels of the soil. Soil profiles were sampled during the soil survey and analyzed for reaction; organic matter; extractable phosphorus; exchangeable cations of calcium, magnesium, potassium, sodium, aluminum, and hydrogen; total acidity; and cation-exchange capacity. The results are summarized in table 18. More detailed information on chemical analysis of soils is available *(1, 5, 6, 12, 16, 17, 21, 27, 28, 32, 34)*. The methods used to obtain the data are listed below. The codes in parentheses refer to published methods *(32)*.

Reaction (pH)—1:1 soil/water solution (8C1a).

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

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

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

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

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

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

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

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

Exchangeable sodium percentage—exchangeable sodium/sum cation-exchange capacity.

Aluminum saturation—exchangeable aluminum/effective cation-exchange capacity.

Characteristics of Soil Fertility

In general, four major types of nutrient distribution in soils of Louisiana can be identified. The first type includes soils that have relatively high levels of available nutrients throughout the profile. This type reflects the relatively high fertility status of the parent material from which the soils developed and a relatively young age or a less intense degree of weathering of the soil profile. No soils of this type are in Sabine Parish.

The second type includes soils that have relatively low levels of available nutrients in the surface layer, but these levels generally increase with increasing depth through the soil profile. These soils have relatively fertile parent material but are older soils that have been subjected either to weathering over a longer period of time or to more intense weathering. If the levels of available nutrients in the surface layer are low, crops may exhibit deficiency symptoms early in the growing season. Deficiency symptoms often disappear if crop roots are able to penetrate to the more fertile subsoil as the growing season progresses. Most of the soils in Sabine Parish are of this type.

The third type includes soils that have adequate or relatively high levels of available nutrients in the surface layer but have relatively low levels in the subsoil. Such soils developed from parent material with low fertility, or they are older soils that have been subjected to more intense weathering over a longer period of time. The higher nutrient levels in the surface layer generally are a result of fertilization in agricultural soils or biocycling in undisturbed soils. Bowie and Letney soils are of this type.

The fourth type includes soils that have relatively low levels of available nutrients throughout. These soils developed from parent material with low fertility, or they are older soils that have been subjected to intense weathering over a long period of time. Neither fertilization nor biocycling has contributed to nutrient levels in the surface layer of these soils. Betis, Briley, and Kirvin soils are of this type.

Soil reaction and acidity, organic matter content, sodium content, and cation-exchange capacity can also show the general nutrient distribution patterns in soils. These distributions are the result of the interactions of parent material, weathering (climate), time, and, to a lesser extent, organisms and topography.

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

Nitrogen generally is the most limiting nutrient element in crop production because plants have a high demand of it. Nitrogen fertilizer recommendations in the survey area are nearly always based on the nitrogen requirement of the crop rather than nitrogen soil test levels because no reliable nitrogen soil tests have been developed for Louisiana soils.

The status of nitrogen fertility in the soil can be estimated from the amount of readily available ammonium and nitrate nitrogen in the soil, the amount of organic nitrogen, the rate of mineralization of organic nitrogen to available forms of inorganic nitrogen, and the rate of conversion of fixed ammonium nitrogen to available forms of nitrogen. Because the amounts and rates of transformation of the various forms of nitrogen in the soils of Sabine Parish have not been determined, the nitrogen fertility status cannot be assessed. However, fertilizer nitrogen recommendations obtained from the Louisiana Cooperative Extension Service may be used to determine application rates.

Phosphorus. Phosphorus occurs in soils as inorganic phosphorus in soil solution; as discrete minerals, such as hydroxyapatite, variscite, and strengite; as occluded or coprecipitated phosphorus in other minerals; as phosphorus retained on the surfaces of minerals, such as carbonates, metal oxides, and layer silicates; and in organic compounds. Concentrations of phosphorus in soil solution are generally low. Because plant roots mainly obtain phosphorus from the soil solution, the plant uptake of phosphorus depends on the ability of the phosphorus in soil solid phase to maintain the phosphorus concentration in soil solution. Soil test procedures measure soil solution phosphorus and the readily available solid phase phosphorus that buffers the solution phase concentration.

The Bray 2 extractant tends to extract more phosphorus than the more commonly used Bray 1, Mehlich 1, and Olsen extractants *(6, 20, 22)*. The Bray 2 extractant provides an estimate of the readily available and the slowly available supplies of phosphorus in the soil. In most of the soils in Sabine Parish, the content of Bray 2 extractable phosphorus is uniformly low throughout, except where additions of phosphorus fertilizer have raised the level of extractable phosphorus in the surface layer. These low levels of available phosphorus limit crop production. Continual additions of phosphorus fertilizer are needed to build up and maintain adequate levels of available phosphorus for sustained crop production.

Potassium. Potassium exists in four major forms in soils: soil solution potassium, exchangeable potassium associated with negatively charged sites on clay mineral surfaces, nonexchangeable potassium trapped between clay mineral interlayers, and structural potassium in mineral crystal lattices. Exchangeable potassium in soils can be replaced by other cations and is generally readily available for plant uptake. To become available to plants, nonexchangeable potassium and structural potassium must be converted to exchangeable potassium through weathering reactions.

The content of exchangeable potassium in soils is an estimate of the supply available to plants. The available supply of potassium in most of the soils of Sabine Parish is very low or low throughout the profile. In some soils, such as Bowie, Keithville, and Kenefick soils, it increases slightly with increasing depth and as the content of clay increases. Low levels of exchangeable potassium indicate a general lack of micaceous minerals, which are a source of exchangeable potassium during the process of weathering. A few soils, such as Bellwood, Eastwood, Kirvin, Sacul, and Saucier soils, have low levels in the surface layer and medium or high levels in the subsoil.

On soils that have very low or low levels of exchangeable potassium, crops respond well to potassium fertilizer. On soils that have enough clay to hold the potassium, low levels can be gradually built up by additions of potassium fertilizer. Exchangeable potassium levels can be maintained by adding enough potassium fertilizer to account for the amount removed by crops, for fixation of exchangeable potassium to nonexchangeable potassium, and for leaching losses. The soils in Sabine Parish that have a sandier texture, such as Briley and Kenefick soils, do not have a sufficient amount of clay to hold the potassium. Therefore, these soils do not have a cation-exchange capacity high enough to maintain adequate quantities of available potassium for sustained crop production. In areas of these soils, more frequent additions of potassium are needed to balance the amount of potassium lost through leaching.

Magnesium. Magnesium exists in soil solution, as exchangeable magnesium associated with negatively charged sites on clay mineral surfaces, and as structural magnesium in mineral crystal lattices. Solution magnesium and exchangeable magnesium generally are readily available for plant uptake, but structural magnesium must be converted to exchangeable magnesium during mineral weathering reactions.

According to guidelines for soil test interpretations, the content of exchangeable magnesium in the soils in Sabine Parish is low, medium, or high, depending on the soil texture. Low levels of exchangeable magnesium occur throughout most of the profile in such soils as Betis soils. Bowie soils have low levels in the upper part and medium or high levels in the lower part. Levels vary throughout the profile in Latonia soils. Medium or high levels occur throughout Eastwood soils. Higher levels of exchangeable magnesium in certain soil horizons are generally associated with a higher content of clay in those horizons.

The levels of exchangeable magnesium in most of the soils in Sabine Parish are more than adequate for crop production, especially where plant roots can exploit the high levels in the subsoil. Because magnesium deficiencies in plants are normally rare, fertilizer sources of magnesium are generally not needed for crop production.

Calcium. Calcium exists in soil solution, as exchangeable calcium associated with negatively charged sites on clay mineral surfaces, and as structural calcium in mineral crystal lattices. Exchangeable calcium generally is available for plant uptake, but structural calcium is not.

Calcium deficiencies in plants are extremely rare. Calcium is normally included with the material added to soils when lime is applied for the correction of acidity problems.

Some soils in Sabine Parish, such as Bellwood soils, have medium or high levels of exchangeable calcium throughout. Some soils, such as Attoyac, Gessner, and Kenefick soils, have low levels in the upper part and medium or high levels in the lower part. Some soils, such as Bowie, Briley, Iuka, and Letney soils, have varying levels throughout. Higher levels of exchangeable calcium in the surface layer are normally associated with a soil reaction that is higher than that in the subsoil, and they are probably the result of applications of lime. Exchangeable calcium levels that are higher in the subsoil than in the surface layer generally are associated with a higher content of clay in the subsoil. A few soils, such as Bellwood and Keiffer soils, have free calcium carbonate, which originated either from translocation within the soil profile or as a secondary deposit directly above the water table.

Calcium is normally the most abundant exchangeable cation in soils. In Eastwood, Guyton, Keithville, and Sacul soils, however, the exchangeable magnesium levels in the subsoil are greater than the exchangeable calcium levels. In other soils, the exchangeable calcium levels are greater than, or about the same as, the exchangeable magnesium levels.

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

Increasing the organic matter content is very difficult because organic matter is continually subject to microbial degradation, especially in Louisiana, where higher soil temperatures and higher water content increase microbial activity. The rate at which organic matter in native plant communities breaks down is balanced by the rate at which fresh material is added. Disruption of this natural process can lead to a decline in the organic matter content of the soil. Management practices that cause erosion lead to a further decrease.

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

The organic matter content of the soils in Sabine Parish is low. It decreases sharply with increasing depth because additions of fresh organic matter are confined to the surface layer. These low levels reflect a high rate of organic matter degradation, erosion, and cultural practices that make maintenance of a higher content of organic matter difficult.

Sodium. Sodium exists in soil solution, as exchangeable sodium associated with negatively charged sites on clay mineral surfaces, and as structural sodium in mineral crystal lattices. Because sodium is readily soluble and generally is not strongly retained by soils, well drained soils that are subject to moderate or high rainfall normally do not have significant amounts of sodium. Soils in low rainfall environments, soils that have restricted drainage in the subsoil, and soils of the coastal marshes may have significant 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.

Although some soils in Sabine Parish have more exchangeable sodium than exchangeable potassium, none of the soils has excessive levels of exchangeable sodium. Higher levels of exchangeable sodium occur in such soils as Bellwood, Eastwood, and Gessner soils. Levels of exchangeable sodium that are higher than normal are associated with restricted drainage in the subsoil. Levels of exchangeable sodium that make up more than 6 percent of the sum of the cation-exchange capacity in the rooting depth of summer annuals can create undesirable physical properties in soils, such as surface crusting, dispersion of soil particles, low rates of water infiltration, and low hydraulic conductivity.

Exchangeable aluminum, exchangeable hydrogen, pH, exchangeable acidity, and total acidity. The pH of the soil solution in contact with the soil affects other soil properties. Soil pH is an intensity factor rather than a quantity factor. The lower the pH, the more acidic the soil. Soil pH controls the availability of essential and nonessential elements by controlling mineral solubility, ion exchange, and adsorption and desorption reactions with soil surfaces. It also affects microbial activity.

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

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

Acidity from hydrolysis of neutral salt-exchangeable aluminum plus neutral salt-exchangeable hydrogen from pH-dependent exchange sites makes up the exchangeable acidity in soils. Exchangeable acidity is determined by soil pH. Titratable acidity is the amount of acidity neutralized to a selected pH, generally 7 or 8.2, and constitutes the total potential acidity of a soil. 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 bases 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.

Most of the soils in Sabine Parish have a low pH, significant quantities of exchangeable aluminum, and high levels of total acidity in many horizons. Examples are Attoyac, Eastwood, and Guyton soils. High levels of exchangeable aluminum are a major limitation affecting crop production. The high levels can be reduced in the surface layer by adding lime, but no economical methods are presently available to neutralize acidity below the surface layer. Exchangeable aluminum levels below the surface layer can be reduced somewhat by applying gypsum so that the calcium leaches through the soil and replaces the exchangeable aluminum.

Cation-exchange capacity. The cation-exchange capacity represents the amount of nutrient and nonnutrient cations that a soil can hold in an exchangeable form. It depends on the number of negatively charged sites, both permanent and pH dependent, that are present in the soil. Permanent charge cation-exchange sites occur because a net negative charge develops on a mineral surface from substitution of ions within the crystal lattice. A negative charge develops from ionization of surface hydroxyl groups on minerals. Organic matter also produces pH-dependent cation-exchange sites.

Methods for determining cation-exchange capacity are available and 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 the unbuffered salt methods include only a part of the pH-dependent cation-exchange capacity and the buffered salt methods include all of the pH-dependent cation-exchange capacity up to the pH of the buffer (pH 7 or 8.2). Errors in the saturation, washing, and replacement steps can also cause different results.

The effective cation-exchange capacity is the sum of exchangeable bases (calcium, magnesium, potassium, and sodium) determined by extraction with 1 molar ammonium acetate at pH 7 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 and includes only that part of the pH-dependent cation-exchange capacity that is determined by exchange of hydrogen with a neutral salt. 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 soil pH is about 8.2, the effective and sum cation-exchange capacities will be about the same. The larger the cation-exchange capacity, the larger the capacity to store nutrient cations.

The pH-dependent charge is a significant source of the cation-exchange capacity in most of the soils in Sabine Parish. Because the pH-dependent cation-exchange capacity increases as pH increases, the cation-exchange capacity of many of the soils can be increased by adding lime. Increased cation-exchange capacities result in a greater storage capacity for nutrient cations, such as potassium, magnesium, and calcium.

Physical and Chemical Analyses of Selected Soils

The results of physical analysis of several typical pedons in the survey area are given in table 19 and the results of chemical analysis in table 20. 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 Survey Laboratory Staff, Lincoln, Nebraska, and the Soil Characterization Laboratory, Louisiana Agricultural Experiment Station.

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an ovendry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods *(23)*.

Sand—(0.05-2.0 mm fraction) weight percentages of material less than 2 mm (3A1).
Silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all material less than 2 mm (3A1).
Clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of material less than 2 mm (3A1).
Water retained—pressure extraction, percentage of ovendry weight of less than 2 mm material; 1/3 or 1/10 bar (4B1), 15 bars (4B2).
Water-retention difference—between 1/3 bar and 15 bars for whole soil (4C1).
Bulk density—of less than 75 mm material, saran-coated clods field moist (4A1a), 1/3 bar (4A1d), ovendry (4A1h).
Organic carbon—wet combustion. Walkley-Black modified acid-dichromate, ferric sulfate titration (6A1c).
Extractable cations—ammonium acetate pH 7.0, atomic absorption; calcium (6N2e), magnesium (6O2d), sodium (6P2b), potassium (6Q2b).
Extractable acidity—barium chloride-triethanolamine IV (6H5a).
Cation-exchange capacity—ammonium acetate, pH 7.0, steam distillation (5A8b).
Cation-exchange capacity—sum of cations (5A3a).
Base saturation—ammonium acetate, pH 7.0 (5C1).
Base saturation—sum of cations, TEA, pH 8.2 (5C3).
Reaction (pH)—1:1 water dilution (8C1f).
Reaction (pH)—potassium chloride (8C1g).
Reaction (pH)—calcium chloride (8C1f).
Aluminum—potassium chloride extraction (6G9).
Aluminum—acid oxalate extraction (6G12).
Iron—acid oxalate extraction (6C9a).
Extractable phosphorus—Bray P-1 (6S3).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(31)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 21 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

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 Udalf (*Ud*, meaning humid, plus *alf*, from Alfisol).

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 Hapludalfs (*Hapl*, meaning minimal or simple horizonation, plus *udalf*, the suborder of the Alfisols that has a udic 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 Hapludalfs.

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

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

Soil Series and Their Morphology

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

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(33)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(31)*. 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."

Attoyac Series

The Attoyac series consists of well drained, moderately permeable soils that formed in loamy stream sediments of Pleistocene age. These soils are on stream terraces. Slopes range from 1 to 5 percent.

Soils of the Attoyac series are fine-loamy, siliceous, thermic Typic Paleudalfs.

Attoyac soils commonly are near Bowie, Briley, Latonia, and Sacul soils. Bowie and Latonia soils are lower on the landscape than the Attoyac soils. Bowie soils have more than 5 percent plinthite in the argillic horizon. Latonia soils are coarse-loamy. Briley soils are in the higher landscape positions. They have a thick sandy surface layer and subsurface layer. Sacul soils are on side slopes in the uplands. They have a clayey control section.

Typical pedon of Attoyac fine sandy loam, 1 to 5 percent slopes; in North Toledo State Park, about 7.0 miles southwest of Zwolle, about 4.25 miles west on Sabine Parish Highway 3229 from its junction with Louisiana State Highway 482, about 300 feet southeast of the end of an improved road, 20 feet east of a woodland road; NE¼NW¼ sec. 31, T. 7 N., R. 13 W., map sheet 33:

A—0 to 9 inches; brown (10YR 4/3) fine sandy loam; weak medium granular structure; friable; many fine roots and pores; strongly acid; clear smooth boundary.

E—9 to 14 inches; pale brown (10YR 6/3) fine sandy loam; massive; very friable; many fine and very fine roots; strongly acid; clear smooth boundary.

B/E—14 to 21 inches; about 80 percent yellowish red (5YR 5/6) (Bt) and 20 percent light yellowish brown (10YR 6/4) (E) fine sandy loam; weak medium subangular blocky structure (Bt) and massive (E); friable; many fine roots; few faint clay bridges between sand grains; strongly acid; clear wavy boundary.

Bt1—21 to 35 inches; red (2.5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; firm; common fine and very fine roots; few fine irregular pores; common distinct clay films on faces of peds; strongly acid; clear wavy boundary.

Bt2—35 to 45 inches; red (2.5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; firm; common fine and medium roots; few fine irregular pores; common distinct clay films on faces of peds; few fine clean sand grains between peds; strongly acid; clear smooth boundary.

Bt3—45 to 56 inches; red (2.5YR 4/8) sandy clay loam; many medium prominent light yellowish brown (10YR 6/4) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few fine irregular pores between peds; common distinct clay films on faces of peds; few streaks of clean sand grains on faces of some peds; strongly acid; clear smooth boundary.

Bt4—56 to 66 inches; red (2.5YR 4/8) sandy clay loam; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few fine clean sand grains between peds; common distinct clay films on faces of peds; strongly acid.

The solum is more than 60 inches thick. Reaction ranges from strongly acid to slightly acid throughout the profile. In at least one subhorizon within a depth of 30 inches, exchangeable aluminum makes up 20 to 50 percent of the effective cation-exchange capacity.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. It is 4 to 9 inches thick.

The E horizon and the E part of the B/E horizon have hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 to 6. The E horizon is 3 to 12 inches thick.

The Bt horizon and the Bt part of the B/E horizon have hue of 5YR or 2.5YR, value of 3 to 5, and chroma of 6 to 8. Hue of 5YR occurs only in the B/E horizon and the upper part of the Bt horizon. The texture is fine sandy loam, loam, or sandy clay loam. In some pedons the solum contains quartz gravel or fragments of ironstone. Base saturation ranges from 35 to 60 percent in the Bt horizon. In some pedons few skeletans and small pockets of uncoated sand and silt make up less than 5 percent of the Bt horizon.

Bellwood Series

The Bellwood series consists of somewhat poorly drained, very slowly permeable soils that formed in loamy and clayey marine sediments of Tertiary age. These soils are on uplands. Slopes range from 1 to 12 percent.

Soils of the Bellwood series are very fine, montmorillonitic, thermic Aquentic Chromuderts.

Bellwood soils commonly are near Bowie, Eastwood, Herty, and Keithville soils. Bowie, Eastwood, and Herty soils are higher on the landscape than the Bellwood soils. Bowie soils are fine-loamy. Eastwood and Herty soils have less than 60 percent clay in the control section. Keithville soils are in the slightly higher landscape positions. They are fine-silty.

Typical pedon of Bellwood silty clay loam, 1 to 5 percent slopes; about 0.75 mile northwest of Hodges Garden Lake, 87 feet north of a woodland road, 45 feet west of electric power line poles; SE¼SW¼ sec. 20, T. 5 N., R. 10 W., map sheet 61:

A—0 to 6 inches; reddish brown (5YR 4/4) silty clay loam; moderate medium granular structure; friable;

many fine and medium roots; extremely acid; clear irregular boundary.

Bw1—6 to 16 inches; yellowish red (5YR 4/6) clay; common fine prominent brown (10YR 5/3) mottles; moderate medium subangular blocky structure; very firm; many fine and medium roots; extremely acid; clear smooth boundary.

Bw2—16 to 33 inches; grayish brown (10YR 5/2) clay; many medium prominent red (2.5YR 4/6) and few fine prominent strong brown (7.5YR 5/8) mottles; moderate medium angular blocky structure; very firm; many fine and medium roots; many prominent shiny pressure faces; few prominent intersecting slickensides; extremely acid; gradual wavy boundary.

Bw3—33 to 47 inches; grayish brown (2.5Y 5/2) clay; many medium prominent yellowish brown (10YR 5/8) mottles; weak medium angular blocky structure; very firm; many medium and few coarse roots; common distinct shiny pressure faces; extremely acid; clear smooth boundary.

BC—47 to 53 inches; light brownish gray (2.5Y 6/2) clay; few fine prominent brownish yellow (10YR 6/6) mottles; weak coarse angular blocky structure; very firm; extremely acid; clear smooth boundary.

C—53 to 72 inches; light brownish gray (2.5Y 6/2) clay; moderate medium platy structure; very firm; common prominent horizontal layers of brownish yellow (10YR 6/8) liminite that are 0.25 inch thick and 8.0 to 10.0 inches apart; extremely acid.

The thickness of the solum ranges from 50 to 80 inches. The number of intersecting slickensides is none or few. The particle-size control section commonly contains more than 75 percent clay. In at least one subhorizon within a depth of 30 inches, exchangeable aluminum makes up 50 percent or more of the effective cation-exchange capacity. Reaction is extremely acid or very strongly acid throughout the solum. When dry, the soils crack to a depth of 20 inches or more. The cracks are 0.5 inch or more wide.

The A horizon has hue of 10YR, 2.5YR, or 5YR, value of 3 or 4, and chroma of 2 to 4. It typically is 2 to 6 inches thick.

The upper part of the Bw horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 4 to 8. Mottles are in shades of brown and gray. The lower part of the Bw horizon and the BC horizon have hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. The number of mottles in shades of brown, red, or gray ranges from few to many. The Bw and BC horizons are clay or silty clay.

The C horizon has hue of 2.5Y or 10YR, value of 5 or 6, and chroma of 1 to 3. It is clay or silty clay.

Betis Series

The Betis series consists of somewhat excessively drained, rapidly permeable soils. These soils formed in sandy marine sediments of Tertiary age. They are on uplands. Slopes range from 1 to 12 percent.

Soils of the Betis series are sandy, siliceous, thermic Psammentic Paleudults.

Betis soils commonly are near Briley and Trep soils. Briley soils are in landscape positions similar to those of the Betis soils. They have a yellowish red and red loamy subsoil within a depth of 40 inches. Trep soils are on ridges at the lower elevations. They have a yellowish brown and brownish yellow loamy subsoil within a depth of 40 inches.

Typical pedon of Betis loamy fine sand, 1 to 5 percent slopes; about 0.75 mile west of Union Springs, 500 feet north of a gravel road, 800 feet west along an old field road; Spanish Land Grant sec. 31, T. 10 N., R. 14 W., map sheet 1:

A—0 to 4 inches; brown (10YR 4/3) loamy fine sand; weak fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

E—4 to 28 inches; light yellowish brown (10YR 6/4) loamy fine sand; single grained; loose; many fine and medium roots; strongly acid; gradual smooth boundary.

Bw—28 to 45 inches; yellowish brown (10YR 5/6) loamy fine sand; few medium distinct yellowish brown (10YR 6/4) mottles; singled grained; very friable; few fine and medium roots; strongly acid; gradual smooth boundary.

E/Bt—45 to 72 inches; light yellowish brown (10YR 6/4) loamy fine sand (E); common lamellae of yellowish red (5YR 5/6) loamy fine sand (Bt) 0.12 inch thick and 4.0 inches apart; massive; very friable; some clean sand grains and clay bridges in lamellae; strongly acid.

The thickness of the solum ranges from 60 to 80 inches. Reaction ranges from very strongly acid to medium acid throughout the profile.

The A horizon has value of 4 or 5 and chroma of 3 to 6. It is 4 to 10 inches thick.

The E horizon has value of 5 or 6 and chroma of 4 to 6. It is 15 to 45 inches thick.

The Bw horizon has hue of 7.5YR or 10YR and chroma of 6 to 8.

The E part of the E/Bt horizon has value of 5 or 6 and chroma of 4 to 8. The Bt part (lamellae) has hue of 5YR, 7.5YR, or 10YR, value of 4 or 5, and chroma of 6 to 8. The lamellae are loamy fine sand or fine sandy loam. They are about 1 to 4 inches apart. The thickness of each lamella ranges from 0.12 to 1.0 inch.

Bowie Series

The Bowie series consists of moderately well drained, moderately slowly permeable soils that formed in loamy marine sediments of Tertiary age. These soils are on uplands. Slopes range from 1 to 8 percent.

Soils of the Bowie series are fine-loamy, siliceous, thermic Plinthic Paleudults.

Bowie soils are similar to Latonia soils and commonly are near Sacul, Saucier, and Trep soils. Latonia soils are on stream terraces. They are coarse-loamy and do not contain plinthite. Sacul soils are higher on the landscape than the Bowie soils. They have a clayey control section. Saucier soils are lower on the landscape than the Bowie soils. They have low chroma mottles within a depth of 30 inches. Trep soils are in the higher landscape positions. They have a sandy surface layer and subsurface layer that have a combined thickness of more than 20 inches.

Typical pedon of Bowie fine sandy loam, 1 to 5 percent slopes; about 0.25 mile north of Mitchell, 300 feet east of Louisiana State Highway 483; Spanish Land Grant sec. 38, T. 9 N., R. 12 W., map sheet 8:

Ap—0 to 5 inches; dark brown (10YR 3/3) fine sandy loam; weak fine granular structure; friable; many fine and very fine roots; medium acid; clear smooth boundary.

E—5 to 15 inches; light yellowish brown (10YR 6/4) fine sandy loam; common fine distinct brownish yellow (10YR 6/6) mottles; massive; very friable; many medium and fine roots; few medium fragments of ironstone; medium acid; gradual wavy boundary.

Bt1—15 to 23 inches; strong brown (7.5YR 5/6) sandy clay loam; weak medium subangular blocky structure; firm; many medium and fine roots; few faint clay films on faces of peds; many fine red and black nodules; strongly acid; gradual wavy boundary.

Btv1—23 to 31 inches; strong brown (7.5YR 5/6) sandy clay loam; many medium distinct yellowish red (5YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm; many fine roots; common faint clay films on faces of peds; about 10 percent fine plinthite nodules; many fine red and black nodules; very strongly acid; gradual wavy boundary.

Btv2—31 to 45 inches; brownish yellow (10YR 6/8) sandy clay loam; common medium prominent red (2.5YR 4/8) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm; many fine roots; common faint clay films on faces of peds; about 15 percent plinthite nodules; very strongly acid; gradual wavy boundary.

Bt2—45 to 62 inches; yellowish brown (10YR 5/8) sandy clay loam; many coarse prominent red (2.5YR 4/8) mottles; moderate coarse prismatic structure; friable; few faint clay films; few narrow streaks of light gray (10YR 7/2) clay loam in the lower part; very strongly acid.

The solum is more than 60 inches thick. The depth to a horizon that has 5 percent or more plinthite, by volume, ranges from 23 to 37 inches. In at least one subhorizon within a depth of 30 inches, exchangeable aluminum makes up 20 to 50 percent of the effective cation-exchange capacity.

The Ap horizon has value of 3 to 5 and chroma of 2 or 3. It is 2 to 8 inches thick. Reaction ranges from very strongly acid to slightly acid.

The E horizon has value of 5 or 6 and chroma of 3 or 4. It is 3 to 12 inches thick. The number of mottles ranges from none to common. Reaction ranges from very strongly acid to slightly acid.

The Bt and Btv horizons have hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 8. They are fine sandy loam, clay loam, or sandy clay loam. The content of plinthite nodules in the Btv horizon ranges from 5 to 15 percent, by volume. Reaction is very strongly acid or strongly acid. The number of mottles in shades of red or brown ranges from none to many.

Briley Series

The Briley series consists of well drained soils on uplands. These soils are rapidly permeable in the upper part and moderately permeable in the lower part. They formed in sandy and loamy marine sediments of Tertiary age. Slopes range from 1 to 12 percent.

Soils of the Briley series are loamy, siliceous, thermic Arenic Paleudults (fig. 8).

Briley soils commonly are near Attoyac, Betis, Bowie, and Trep soils. Attoyac soils are lower on the landscape than the Briley soils. They are loamy throughout. Betis soils are in landscape positions similar to those of the Briley soils. They have a sandy control section. Bowie soils are in the less convex areas. They are loamy throughout and contain plinthite in the subsoil. Trep soils are in the slightly lower landscape positions. They have a yellowish subsoil.

Typical pedon of Briley loamy fine sand, 1 to 5 percent slopes; about 4.75 miles southwest on Sabine Parish Highway 3229 from its junction with Louisiana State Highway 482, about 0.25 mile north of Sabine Parish Highway 3229 on a woodland road, 105 feet west of the woodland road on a road to a pit, 18 feet south of pit road; SE¼SW¼ sec. 7, T. 7 N., R. 13 W., map sheet 27:

A—0 to 5 inches; dark grayish brown (10YR 4/2) loamy fine sand; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; clear wavy boundary.

E1—5 to 10 inches; brown (10YR 5/3) loamy fine sand; small pockets of dark brown (10YR 4/3) surface material; massive; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

E2—10 to 21 inches; light yellowish brown (10YR 6/4) loamy fine sand; many fine prominent strong brown (7.5YR 5/8) and few fine prominent red (2.5YR 4/8) mottles; massive; very friable; many fine and medium roots; many fine prominent black stains; medium acid; gradual wavy boundary.

B/E—21 to 29 inches; yellowish red (5YR 5/8) (Bt) and light yellowish brown (10YR 6/4) (E) fine sandy loam; common medium distinct red (2.5YR 4/8) mottles; weak coarse subangular blocky structure; friable; common fine and medium roots; strongly acid; clear wavy boundary.

Bt1—29 to 37 inches; red (2.5YR 4/8) sandy clay loam; few fine prominent brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; firm; many fine roots; common distinct clay films and few clean sand grains on faces of peds; some clay bridges; very strongly acid; gradual wavy boundary.

Bt2—37 to 60 inches; red (2.5YR 4/6) sandy clay loam; few fine prominent brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; common distinct clay films and few clean sand grains on faces of peds; some clay bridges; very strongly acid.

The thickness of the solum ranges from 60 to more than 80 inches. Reaction ranges from very strongly acid to medium acid throughout the solum.

The A horizon has value of 4 or 5 and chroma of 2 or 3. It is 4 to 12 inches thick. The E horizon has value of 5 or 6 and chroma of 3 or 4. The combined thickness of the A and E horizons ranges from 20 to 40 inches.

The Bt part of the B/E horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8. The E part has the same colors as the E horizon. Some pedons do not have a B/E horizon.

The upper part of the Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8. The lower part has the same colors as the upper part but also includes hue of 7.5YR. The Bt horizon is sandy clay loam, loam, or fine sandy loam. The number of mottles in shades of red, brown, or yellow ranges from none to common in the upper part of the horizon. In some pedons the lower part of the horizon has a mottled matrix of these colors.

Corrigan Series

The Corrigan series consists of somewhat poorly drained, very slowly permeable soils that are moderately deep over sandstone bedrock. These soils formed in loamy and clayey marine sediments of the Catahoula Formation of Tertiary age. They are on uplands. Slopes range from 1 to 5 percent.

Soils of the Corrigan series are fine, montmorillonitic, thermic Albaquic Hapludalfs.

The Corrigan soils in Sabine Parish are taxadjuncts to the Corrigan series because they are classified as Ultisols rather than Alfisols. This difference, however, does not significantly affect use and management of the soils.

Corrigan soils commonly are near Kisatchie, Letney, Mayhew, and Rayburn soils. Kisatchie soils are in the lower, more sloping areas and are better drained. They do not have red mottles. Letney soils are in the higher landscape positions. They have a thick sandy surface layer and subsurface layer and a loamy subsoil. Mayhew soils are in the slightly higher landscape positions. They have a solum that is thicker than 40 inches. Rayburn soils are in the lower areas. They have a subsoil that is red in the upper part.

Typical pedon of Corrigan fine sandy loam, 1 to 5 percent slopes; about 0.5 mile west of Peason artillery range, 80 feet south of a gravel road; NE¼SW¼ sec. 25, T. 5 N., R. 10 W., map sheet 62:

A—0 to 7 inches; dark grayish brown (10YR 4/2) fine sandy loam; many fine distinct yellowish brown (10YR 5/6) mottles; weak fine granular structure; very friable; few coarse and common medium and fine roots; many medium and fine pores; very strongly acid; clear wavy boundary.

E—7 to 12 inches; grayish brown (10YR 5/2) fine sandy loam; many fine prominent yellowish brown (10YR 5/8) mottles; weak fine subangular blocky structure; friable; common fine and very fine roots; few medium and fine pores; very strongly acid; clear wavy boundary.

Btg1—12 to 23 inches; grayish brown (10YR 5/2) clay; common medium distinct yellowish brown (10YR 5/6) and common fine prominent red (10R 4/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; common fine and very fine roots between peds; few faint clay films on faces of peds; few shiny pressure faces on walls of prisms; very strongly acid; gradual wavy boundary.

Btg2—23 to 29 inches; light brownish gray (2.5Y 6/2) clay; many medium prominent yellowish brown (10YR 5/8) and common medium prominent red (10R 4/8) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; common fine and very fine roots between peds; many fine slickensides forming angular wedges; extremely acid; gradual wavy boundary.

Btssg—29 to 36 inches; light brownish gray (2.5Y 6/2) clay; common medium prominent brownish yellow (10YR 6/6) mottles; moderate medium angular blocky structure; firm; few fine roots between pressure faces; many medium intersecting slickensides; extremely acid; abrupt smooth boundary.

R—36 to 60 inches; light brownish gray (2.5Y 6/2), strongly cemented and consolidated sandstone bedrock.

The thickness of the solum and the depth to lithic or paralithic contact range from 20 to 40 inches. In at least one subhorizon within a depth of 30 inches, exchangeable aluminum makes up 50 percent or more of the effective cation-exchange capacity.

The A horizon has value of 2 to 4 and chroma of 1 or 2. It is 4 to 7 inches thick. Reaction ranges from very strongly acid to medium acid.

The E horizon has value of 4 to 6. It is fine sandy loam or loam. Reaction ranges from very strongly acid to medium acid. The horizon is 2 to 7 inches thick.

The upper part of the Btg horizon has hue of 10YR, 2.5Y, or 5Y and value of 4 to 6. The lower part of the Btg horizon and the Btssg horizon have hue of 10YR, 2.5Y, or 5Y, value of 4 to 7, and chroma of 2 to 4. The number of mottles in shades or red, brown, and olive ranges from few to many throughout the Btg horizon. The Btg and Btssg horizons are clay or silty clay. The content of clay in the upper 20 inches of the Btg horizon ranges from 40 to 60 percent. Reaction in the Btg and Btssg horizons ranges from extremely acid to strongly acid.

The R horizon is strongly consolidated tuffaceous siltstone or sandstone bedrock that is bentonitic and contains volcanic ash, volcanic glass, or other pyroclastic materials. Some pedons have a Cr horizon. This horizon is soft, weakly consolidated siltstone or mudstone. It is extremely acid to medium acid.

Eastwood Series

The Eastwood series consists of moderately well drained, very slowly permeable soils that formed in loamy and clayey marine sediments of Tertiary age. These soils are on uplands. Slopes range from 1 to 12 percent.

Soils of the Eastwood series are fine, montmorillonitic, thermic Vertic Hapludalfs.

Eastwood soils commonly are near Bowie and Keithville soils. These nearby soils are in less convex areas at the higher elevations. Bowie soils are fine-loamy, and Keithville soils are fine-silty.

Typical pedon of Eastwood fine sandy loam, 1 to 5 percent slopes; about 1.25 miles southeast of Fort Jesup, 700 feet east of a pipeline, 100 feet south of a gravel road; SW¼SE¼ sec. 10, T. 7 N., R. 10 W., map sheet 32:

A—0 to 3 inches; dark grayish brown (10YR 4/2) fine sandy loam; common medium faint pale brown (10YR 6/3) mottles; weak medium granular structure; friable; many fine and medium roots; common fine and medium pores; many wormcasts; strongly acid; gradual wavy boundary.

E—3 to 7 inches; light yellowish brown (10YR 6/4) fine sandy loam; many fine prominent yellowish red (5YR 5/8) and common medium prominent reddish yellow (7.5YR 6/6) mottles; weak medium subangular blocky structure; very friable; few fine and medium roots; common fine and medium pores; very strongly acid; clear irregular boundary.

Bt1—7 to 22 inches; red (2.5YR 4/6) clay; common medium prominent yellowish brown (10YR 5/6) and few fine prominent pale brown (10YR 6/3) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; very firm; few fine and medium roots; few very fine pores; common distinct clay films on faces of peds; common fine pebbles of ironstone; thin vertical seams of light yellowish brown (10YR 6/4) fine sandy loam (E) in the upper part; very strongly acid; gradual wavy boundary.

Bt2—22 to 36 inches; red (2.5YR 4/6) clay; many medium prominent light brownish gray (2.5Y 6/2) and light olive brown (2.5Y 5/4) mottles; moderate coarse prismatic structure parting to weak medium subangular blocky; very firm; common fine and medium roots; few very fine pores; common faint clay films on faces of peds; common fine pebbles of ironstone; few pressure faces; very strongly acid; gradual wavy boundary.

Bt3—36 to 48 inches; mottled red (2.5YR 4/6), light brownish gray (2.5Y 6/2), and olive yellow (2.5Y 6/6) clay; moderate coarse prismatic structure parting to weak fine angular blocky; very firm; few fine roots between peds; few fine pores; common faint clay films on faces of peds; old inactive slickensides 3 inches long that break into wedges; very strongly acid; abrupt wavy boundary.

B/Cr—48 to 56 inches; about 70 percent yellowish red (5YR 5/8) clay (Bt) and 30 percent light brownish gray (2.5Y 6/2) loam (Cr); common medium distinct strong brown (7.5YR 5/8) mottles; massive parting to weak medium prismatic structure; hard and very firm; few fine pores; very strongly acid; clear wavy boundary.

Cr—56 to 70 inches; strata that are 80 percent strong brown (7.5YR 5/6) fine sandy loam about 4 inches thick and 20 percent light brownish gray (2.5Y 6/2) clay about 0.25 inch thick; massive with thin bedding planes; hard and very firm; few fine white (10YR 8/1) crystals on faces of some peds; thin streaks of dark material on faces of some peds; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. In at least one subhorizon within a depth of 30 inches, exchangeable aluminum makes up 20 to 50 percent of the effective cation-exchange capacity. When dry, the soils crack to a depth of 20 inches or more. The cracks are 0.5 inch or more wide.

The A horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 to 4. Reaction ranges from very strongly acid to medium acid. The horizon is 2 to 7 inches thick.

The E horizon has value of 5 or 6 and chroma of 3 or 4. It is fine sandy loam or very fine sandy loam. Reaction ranges from very strongly acid to medium acid.

The Bt1 and Bt2 horizons have hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. The number of mottles in shades of brown or gray ranges from none to common in the Bt1 horizon and from few to many in the Bt2 horizon. The Bt1 and Bt2 horizons are clay or silty clay. Reaction ranges from extremely acid to strongly acid.

The Bt3 horizon is mottled and multicolored or it is in shades of red, brown, or gray. The number of mottles in shades of red, brown, gray, or yellow ranges from few to many. The texture is clay, silty clay, silty clay loam, or clay loam. Reaction ranges from extremely acid to medium acid.

The B/Cr horizon or the BC horizon, if it occurs, is in shades of brown or gray, has mottles in these colors, and may have reddish or yellowish mottles. The mixed or composite texture is loam, sandy clay loam, clay loam, or silty clay loam. Thin layers may be clay or silty clay. Reaction ranges from extremely acid to slightly acid.

The Cr horizon is dominantly in shades of brown or gray and has mottles or thin strata in these colors. It ranges from fine sandy loam to shaly clay. Reaction ranges from very strongly acid to neutral.

Gessner Series

The Gessner series consists of poorly drained, moderately permeable soils that formed in loamy stream sediments of Pleistocene age. These soils are on stream terraces. Slopes are generally less than 1 percent.

Soils of the Gessner series are coarse-loamy, siliceous, thermic Typic Glossaqualfs.

Gessner soils commonly are near Kenefick, Latonia, and Niwana soils. Kenefick and Latonia soils are higher on the landscape than the Gessner soils. Kenefick soils are fine-loamy. Latonia soils are well drained. They have a yellowish brown and brownish yellow subsoil. Niwana soils are on mounds. They have a yellowish brown and brownish yellow subsoil.

Typical pedon of Gessner loam, in an area of Niwana-Gessner loams; about 6 miles west of Zwolle, 1.25 miles south of Sabine Parish Highway 3429, about 267 feet south and 99 feet east of a woodland road; NE¼SW¼ sec. 24, T. 7 N., R. 14 W., map sheet 33:

A—0 to 5 inches; grayish brown (10YR 5/2) loam; few fine distinct dark yellowish brown (10YR 4/4) mottles; weak fine subangular blocky structure; friable; few fine roots; extremely acid.

Eg—5 to 15 inches; light brownish gray (10YR 6/2) loam; common fine distinct dark yellowish brown (10YR 4/4) mottles; weak fine subangular blocky structure; friable; few fine roots; very strongly acid; clear irregular boundary.

Btg/E—15 to 25 inches; light brownish gray (10YR 6/2) loam (Btg); moderate medium subangular blocky structure; firm; few fine roots; about 30 percent tongues of light gray (10YR 7/1) loam (E); strongly acid; gradual irregular boundary.

Btg1—25 to 33 inches; light brownish gray (10YR 6/2) loam; many medium distinct light yellowish brown (10YR 6/4) and few fine faint light gray (10YR 7/1) mottles; moderate medium subangular blocky structure; firm; few faint clay films on faces of peds; very strongly acid; gradual irregular boundary.

Btg2—33 to 60 inches; light brownish gray (2.5Y 6/2) loam; common medium prominent brownish yellow (10YR 6/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; very firm; few faint clay films on faces of peds; very strongly acid.

The thickness of the solum is more than 80 inches. In at least one subhorizon within a depth of 30 inches, exchangeable aluminum makes up 20 to 50 percent of the effective cation-exchange capacity.

The A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. Reaction ranges from extremely acid to slightly acid. The horizon is 4 to 8 inches thick.

The Eg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is loam or fine sandy loam. Reaction ranges from very strongly acid to slightly acid. In places, the Eg horizon contains streaks of uncoated fine sand and silt. Tongues and streaks of E material extend through the Btg/E horizon and become tapered or thinner with increasing depth. The E horizon is 5 to 20 inches thick.

The Btg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It is loam or fine sandy loam. Tongues of E material make up 15 to 40 percent, by volume, of the Btg/E horizon. The amount of tongues and interfingers decreases with increasing depth. Reaction ranges from very strongly acid to neutral. The number of mottles in shades of brown, yellow, or red ranges from few to many.

Guyton Series

The Guyton series consists of poorly drained, slowly permeable soils that formed in local loamy alluvium. These soils are on flood plains and are subject to rare or frequent flooding. Slopes are generally less than 1 percent.

Soils of the Guyton series are fine-silty, siliceous, thermic Typic Glossaqualfs.

Guyton soils commonly are near Iuka, Kenefick, Latonia, and Sardis soils. These nearby soils are higher on the landscape than the Guyton soils and are naturally better drained. Iuka and Latonia soils are coarse-loamy, and Kenefick soils are fine-loamy. Sardis soils have a subsoil that is yellowish brown and dark grayish brown in the upper part.

Typical pedon of Guyton silt loam, in an area of Guyton-Iuka association, frequently flooded; about 4.2 miles east on Louisiana State Highway 120 from its intersection with U.S. Highway 171, about 0.25 mile north of Louisiana State Highway 120, about 18 feet east of a woodland road, 224 feet north of a small creek; NW¼ sec. 15, T. 8 N., R. 12 W., map sheet 17:

A—0 to 6 inches; brown (10YR 4/3) silt loam; common medium faint light brownish gray (10YR 6/2) mottles; weak fine granular structure; friable; many fine and medium roots; strongly acid; gradual smooth boundary.

Eg—6 to 27 inches; grayish brown (10YR 5/2) silt loam; common medium distinct brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; friable; many fine and medium roots; faint coatings of light brownish gray (10YR 6/2) silt loam on faces of peds in about 40 percent of horizon; many fine black concretions; very strongly acid; clear irregular boundary.

B/E—27 to 60 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few faint clay films on faces of peds; about 15 percent tongues of light brownish gray (10YR 6/2) silt loam (E); few medium brown concretions with black centers; very strongly acid; clear wavy boundary.

Btg—60 to 80 inches; gray (10YR 6/1) silty clay loam; common coarse prominent strong brown (7.5YR 4/6) and yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few faint clay films on faces of peds; common fine brown concretions; very strongly acid.

The thickness of the solum ranges from 52 to 80 inches. Reaction ranges from extremely acid to medium acid throughout the profile. In some pedons, within a depth of 30 inches, exchangeable aluminum makes up 20 to 50 percent of the effective cation-exchange capacity.

The A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 or 3. It is loam or silt loam. It is 2 to 8 inches thick.

The Eg horizon has hue of 10YR or 2.5Y and value of 5 to 7. It is silt loam or very fine sandy loam. It is 12 to 27 inches thick.

In addition to a thick B/E horizon, some pedons have an E/B horizon. The Btg and Eg parts of the E/B and B/E horizons have the same colors and textures as the Btg and Eg horizons, respectively.

The Btg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. It has few to many mottles in shades of brown or gray. The texture is silt loam, silty clay loam, or clay loam.

Herty Series

The Herty series consists of somewhat poorly drained, very slowly permeable soils that formed in loamy and clayey marine sediments of the Sandel Formation of Tertiary age. These soils are on uplands. Slopes range from 1 to 5 percent.

Soils of the Herty series are fine, montmorillonitic, thermic Vertic Albaqualfs.

Herty soils commonly are near Letney and Rayburn soils. These nearby soils are higher on the landscape than the Herty soils. Letney soils have a loamy control section and a thick sandy surface layer and subsurface layer. Rayburn soils have a subsoil that is red in the upper part.

Typical pedon of Herty very fine sandy loam, 1 to 5 percent slopes; about 0.5 mile east of the main entrance to Hodges Gardens, 300 feet north of a main blacktop road, 50 feet east of a woodland road; SE¼SE¼ sec. 30, T. 5 N., R. 10 W., map sheet 61:

A—0 to 6 inches; very dark grayish brown (10YR 3/2) very fine sandy loam; common fine distinct yellowish brown (10YR 5/4) mottles; weak fine granular structure; very friable; many coarse, medium, and fine roots; few fine quartz crystals; very strongly acid; clear wavy boundary.

E—6 to 10 inches; grayish brown (10YR 5/2) very fine sandy loam; many medium prominent brownish yellow (10YR 6/8) and few medium faint light brownish gray (10YR 6/2) mottles; weak fine subangular blocky structure; very friable; many coarse, medium, fine, and very fine roots; strongly acid; abrupt wavy boundary.

Btg1—10 to 20 inches; grayish brown (2.5Y 5/2) clay; common medium prominent red (2.5YR 5/8) and yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; very firm; many coarse, medium, fine, and very fine roots; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg2—20 to 28 inches; grayish brown (2.5Y 5/2) clay; common medium prominent red (2.5YR 4/8) and yellowish red (5YR 5/8) mottles; moderate coarse prismatic structure parting to moderate medium angular blocky; very firm; many medium, fine, and very fine roots; many fine pressure faces and slickensides; few fine quartz crystals; very strongly acid; gradual wavy boundary.

Btg3—28 to 42 inches; grayish brown (2.5Y 5/2) sandy clay; common medium prominent red (2.5YR 4/8) and yellowish red (5YR 5/8) mottles; moderate coarse prismatic structure parting to moderate medium angular blocky; very firm; common medium, fine, and very fine roots between peds; many fine pressure faces and slickensides; many fine quartz crystals; very strongly acid; gradual wavy boundary.

Btg4—42 to 52 inches; grayish brown (10YR 5/2) sandy clay loam; many coarse prominent red (2.5YR 4/8), common medium distinct light yellowish brown (10YR 6/4), and few medium prominent brownish yellow (10YR 6/8) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm; common fine and very fine roots between peds; few small pockets of light brownish gray (10YR 6/2) fine sandy loam; many fine quartz crystals; very strongly acid; gradual wavy boundary.

Btgy—52 to 68 inches; grayish brown (10YR 5/2) sandy clay loam; many medium prominent strong brown (7.5YR 5/6), common medium faint brown (10YR 5/3), and common medium prominent brownish yellow (10YR 6/8) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; very firm; common fine and very fine roots between peds; 10 to 20 percent white powder and crystals of gypsum on faces of peds; many fine quartz crystals; extremely acid.

The thickness of the solum ranges from 40 to 60 inches. During the summer and fall in most years, the soils crack to a depth of 20 inches or more. The cracks are 0.5 inch to 2.0 inches wide. In at least one subhorizon within a depth of 30 inches, exchangeable aluminum makes up 50 percent or more of the effective cation-exchange capacity.

The A horizon has value of 3 to 5 and chroma of 2 or 3. Reaction ranges from very strongly acid to medium acid. The horizon is 4 to 7 inches thick.

The E horizon has value of 5 or 6 and chroma of 1 to 3. Reaction ranges from very strongly acid to medium acid. The horizon is 2 to 6 inches thick.

The upper part of the Btg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. The number of mottles in shades of red, yellow, and brown is few or common. Reaction ranges from extremely acid to strongly acid. The texture is clay loam, clay, silty clay, or silty clay loam.

The lower part of the Btg horizon and the Btgy horizon have the same colors as the upper part of the Btg horizon and also hue of 5Y. The texture is sandy clay loam, sandy clay, or clay. In the Btgy horizon, gypsum occurs as a whitish powder or as crystals and the content ranges from 2 to 25 percent, by volume. Reaction is extremely acid or very strongly acid.

Some pedons have a Cy horizon. This horizon consists mainly of olive or grayish shaly clay, clay, or soft mudstone. Reaction is extremely acid or very strongly acid. Most pedons have visible gypsum and barite crystals. Some pedons contain calcite, jarosite, and natrojarosite.

Iuka Series

The Iuka series consists of moderately well drained, moderately permeable soils that formed in stratified loamy alluvium. These soils are on flood plains and are frequently flooded. Slopes are generally less than 1 percent.

Soils of the Iuka series are coarse-loamy, siliceous, acid, thermic Aquic Udifluvents.

Iuka soils commonly are near Guyton, Latonia, and Sardis soils. Guyton soils are poorly drained and lower on the landscape than the Iuka soils. They are fine-silty and gray throughout. Latonia soils are on stream terraces. They have an argillic horizon. They do not have gray mottles within a depth of 30 inches. Sardis soils are in landscape positions similar to those of the Iuka soils. They are fine-silty.

Typical pedon of Iuka silt loam, in an area of Guyton-Iuka association, frequently flooded; about 4.2 miles east on Louisiana State Highway 120 from its junction with Louisiana State Highway 171, about 0.25 mile north of Louisiana State Highway 120, about 18 feet east of a woodland road, 93 feet north of a small creek; NW¼ sec. 15, T. 8 N., R. 12 W., map sheet 17:

A—0 to 6 inches; dark brown (10YR 4/3) silt loam; few fine distinct yellowish brown (10YR 5/6) and common medium distinct light brownish gray (2.5Y 6/2) mottles; weak fine granular structure; friable; many medium and fine roots; many fine hard black and brown nodules; strongly acid; clear smooth boundary.

C1—6 to 14 inches; dark yellowish brown (10YR 4/4) silt loam; few fine distinct light brownish gray (2.5Y 6/2) and common medium faint light yellowish brown (10YR 6/4) mottles; massive; friable; few medium, fine, and very fine roots; common fine black nodules; strongly acid; gradual wavy boundary.

C2—14 to 25 inches; yellowish brown (10YR 5/4) silt loam; many medium distinct light brownish gray (2.5Y 6/2), common fine faint pale brown (10YR 6/3), and common medium faint dark yellowish brown (10YR 4/4) mottles; massive; friable; few fine roots; very strongly acid; gradual wavy boundary.

Cg1—25 to 39 inches; light brownish gray (10YR 6/2) silt loam; common medium faint light yellowish brown (10YR 6/4) and few medium prominent yellowish brown (10YR 5/8) mottles; massive; friable; few vertical streaks of fine sandy loam; few fine roots; many fine black concretions; extremely acid; gradual wavy boundary.

Cg2—39 to 56 inches; light brownish gray (10YR 6/2) silt loam; many medium prominent strong brown (7.5YR 5/8) and common medium distinct brownish yellow (10YR 6/6) mottles; massive; very friable; extremely acid; gradual wavy boundary.

Cg3—56 to 68 inches; light brownish gray (10YR 6/2) silt loam; common medium prominent strong brown (7.5YR 4/6, 5/8) mottles; massive; very friable; few small pockets of fine sandy loam throughout; common medium brown concretions; extremely acid.

In at least one subhorizon within a depth of 30 inches, exchangeable aluminum makes up 20 to 50 percent of the effective cation-exchange capacity.

The A horizon has value of 4 or 5 and chroma of 3 or 4. It is 5 to 10 inches thick. Reaction is very strongly acid or strongly acid.

The C horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It is silt loam or fine sandy loam. Reaction is very strongly acid or strongly acid.

The Cg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 6. In some pedons it is multicolored in shades of gray, brown, and red. The texture is silt loam or fine sandy loam. Reaction ranges from extremely acid to strongly acid.

Keiffer Series

The Keiffer series consists of well drained, slowly permeable soils that are calcareous throughout. These soils formed in loamy and clayey marine sediments mainly of the Cook Mountain Formation of Tertiary age. They are on uplands. Slopes range from 1 to 12 percent.

Soils of the Keiffer series are fine-silty, carbonatic, thermic Rendollic Eutrochrepts.

Keiffer soils commonly are near Nacogdoches and Oktibbeha soils. Nacogdoches soils are higher on the landscape than the Keiffer soils. They have a fine-textured control section. Oktibbeha soils are in the slightly higher landscape positions. They have a very fine-textured control section.

Typical pedon of Keiffer clay loam, 1 to 5 percent slopes; about 0.5 mile north of Dess fire tower, 100 feet east of a woodland road; NE¼NW¼ sec. 12, T. 5 W., R. 12 W., map sheet 53:

A—0 to 5 inches; dark grayish brown (2.5Y 4/2) clay loam; weak fine subangular blocky structure parting to weak fine granular; firm; many fine and medium roots; many wormcasts; many fine and medium lime nodules; mildly alkaline; strong effervescence; clear wavy boundary.

AB—5 to 11 inches; about 60 percent light yellowish brown (2.5Y 6/4) (A) and 40 percent yellow (2.5Y 7/6) (B) silty clay loam; many fine prominent reddish yellow (7.5YR 6/8) mottles; moderate medium prismatic structure parting to weak fine subangular blocky; firm; many fine and medium roots; common fine and very fine black specks and bodies; few fine and medium shell impressions; many fine and medium lime nodules; moderately alkaline; strong effervescence; clear irregular boundary.

Bk1—11 to 18 inches; yellow (2.5Y 7/6) clay loam; many fine prominent brownish yellow (10YR 6/8) mottles; moderate medium prismatic structure parting to weak fine subangular blocky; firm; common fine and very fine roots; many fine and very fine black specks and bodies; many fine and medium shell impressions; many fine and medium lime nodules; moderately alkaline; strong effervescence; clear smooth boundary.

Bk2—18 to 24 inches; yellow (2.5Y 7/6) silty clay loam; common fine prominent yellowish brown (10YR 5/8) and common fine distinct pale yellow (2.5Y 7/4) mottles; weak fine prismatic structure parting to weak fine subangular blocky; firm; few very fine roots; many fine and very fine black specks and bodies; many fine and medium shell impressions; many fine and medium lime nodules; moderately alkaline; strong effervescence; clear smooth boundary.

Bk3—24 to 32 inches; light yellowish brown (2.5Y 6/4) silty clay; many coarse distinct olive yellow (2.5Y 6/6) and many fine distinct pale olive (5Y 6/3) mottles; weak fine subangular blocky structure; firm; many fine and very fine black specks and bodies; many fine and medium shell impressions; many fine and medium soft accumulations of lime; moderately alkaline; strong effervescence; gradual smooth boundary.

Bkss1—32 to 43 inches; pale olive (5Y 6/3) clay; many coarse prominent olive yellow (2.5Y 6/6) mottles; weak fine subangular blocky structure; firm; many intersecting slickensides; brownish yellow seams along vertical and horizontal pressure faces; accumulations of lime in the seams; many fine and very fine black specks and bodies; many fine and medium shell impressions; moderately alkaline; strong effervescence; gradual smooth boundary.

Bkss2—43 to 51 inches; bedded layers of pale olive (5Y 6/3) and brownish yellow (10YR 6/8) silty clay; weak fine subangular blocky structure; firm; strata of lime 1 inch thick and 5 inches apart; many intersecting slickensides; brownish yellow seams along vertical and horizontal faces of slickensides; accumulations of lime in the seams; moderately alkaline; strong effervescence; gradual smooth boundary.

BCk—51 to 96 inches; bedded layers of light olive gray (5Y 6/2) and brownish yellow (10YR 6/8) clay; massive; firm; strata of lime 1 inch thick and 5 inches apart; moderately alkaline; strong effervescence.

The thickness of the solum ranges from 20 to 40 inches. The calcium carbonate equivalent ranges from 40 to 85 percent in the control section. The content of noncarbonitic clay ranges from 18 to 35 percent. Reaction is mildly alkaline or moderately alkaline throughout the profile.

The A horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 to 5, and chroma of 1 or 2. It is 4 to 7 inches thick.

The A part of the AB horizon has hue of 2.5Y or 5Y, value of 3 to 6, and chroma of 2 to 4. The B part has hue of 2.5Y or 5Y, value of 5 to 7, and chroma of 3 to 6. The texture is silty clay loam, silty clay, or clay.

The Bk horizon has hue of 2.5Y or 5Y, value of 5 to 7, and chroma of 3 to 6. It is silty clay loam, silty clay, or clay. The number of accumulations or nodules of lime ranges from few to many (fig. 9).

The Bkss and BCk horizons have hue of 5Y or 10YR, value of 5 or 6, and chroma of 2 to 8. The texture is silty clay loam, silty clay, or clay. The number of intersecting slickensides ranges from few to many.

Keithville Series

The Keithville series consists of moderately well drained, very slowly permeable soils. These soils formed in loamy and clayey marine sediments of Tertiary age. They are on uplands. Slopes range from 1 to 5 percent.

Soils of the Keithville series are fine-silty, siliceous, thermic Glossaquic Paleudalfs.

Keithville soils commonly are near Eastwood, Kirvin, and Sacul soils. These nearby soils have a fine-textured or clayey control section. Eastwood soils are on side slopes. Kirvin soils are higher on the landscape than the Keithville soils. Sacul soils are in the slightly higher areas.

Typical pedon of Keithville very fine sandy loam, 1 to 5 percent slopes; about 2.5 miles south of Pleasant Hill, 0.75 mile east of Spring Ridge on Louisiana State Highway 174, about 600 feet north of a gravel road, 273 feet east of highline poles, 225 feet south of the northern fence line; SE¼NE¼ sec. 9, T. 9 N., R. 11 W., map sheet 10:

Ap—0 to 7 inches; brown (10YR 4/3) very fine sandy loam; weak fine granular structure; friable; many fine roots; strongly acid; clear wavy boundary.

E—7 to 13 inches; yellowish brown (10YR 5/4) very fine sandy loam; common medium prominent yellowish red (5YR 5/8) mottles; weak fine granular structure; friable; few fine roots; very strongly acid; clear wavy boundary.

Bt1—13 to 22 inches; strong brown (7.5YR 5/8) silty clay loam; common medium prominent brownish yellow (10YR 6/6) and yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; extremely acid; gradual smooth boundary.

Bt2—22 to 27 inches; brownish yellow (10YR 6/6) loam; common medium distinct light yellowish brown (10YR 6/4) and common medium prominent red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; common faint clay films on faces of peds; extremely acid; gradual smooth boundary.

B/E—27 to 32 inches; strong brown (7.5YR 5/6) loam (Bt); many medium prominent red (2.5YR 4/8), many coarse prominent light yellowish brown (10YR 6/4), and few fine prominent light brownish gray (10YR 6/2) mottles; about 15 percent coatings of light brownish gray (10YR 6/2) silt (E) 0.08 inch to 2.0 inches thick on faces of peds; moderate medium subangular blocky structure; firm; few faint clay films on faces of peds; extremely acid; abrupt wavy boundary.

2Bt3—32 to 43 inches; mottled brownish yellow (10YR 6/6), light brownish gray (2.5Y 6/2), and red (10R 4/8) clay; weak coarse prismatic structure parting to moderate medium angular blocky; very firm; extremely acid; gradual wavy boundary.

2Bt4—43 to 55 inches; light brownish gray (2.5Y 6/2) silty clay; common medium prominent strong brown (7.5YR 5/8) and yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; very firm; extremely acid; gradual wavy boundary.

2C—55 to 63 inches; light brownish gray (2.5Y 6/2) clay; common medium prominent yellowish red (5YR 5/8) and red (2.5YR 4/8) mottles; massive; very firm and plastic; extremely acid.

The thickness of the solum ranges from 60 to 100 inches. Depth to the clayey 2B horizon ranges from 30 to 40 inches. Reaction ranges from extremely acid to medium acid throughout the profile. In at least one subhorizon within a depth of 30 inches, exchangeable aluminum makes up 50 percent or more of the effective cation-exchange capacity.

The Ap horizon has value of 3 to 6 and chroma of 2 to 4. It is 2 to 7 inches thick.

The E horizon has value of 5 or 6 and chroma of 3 or 4. It is silt loam, loam, or very fine sandy loam. It is 2 to 9 inches thick.

The Bt horizon has hue of 7.5YR, value of 4 or 5, and chroma of 6 to 8. The lower part of the horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 to 8. The horizon is loam, silt loam, or silty clay loam.

The Bt part of the B/E horizon has mottles with hue of 2.5YR to 10YR, value of 3 to 6, and chroma of 3 to 6. It is silt loam, loam, clay loam, or silty clay loam. The E part is grayish silt or very fine sand.

The 2Bt and 2C horizons are mottled in shades of gray, red, and brown. They are silty clay or clay. Some pedons do not have a 2C horizon.

Kenefick Series

The Kenefick series consists of well drained, moderately slowly permeable soils that formed in sandy and loamy stream sediments of Pleistocene age. These soils are on stream terraces. Slopes range from 1 to 3 percent.

Soils of the Kenefick series are fine-loamy, siliceous, thermic Ultic Hapludalfs (fig. 10).

Kenefick soils are similar to Attoyac soils and commonly are near Guyton, Iuka, Latonia, and Sardis soils. Attoyac soils are on uplands. They have a solum that is more than 60 inches thick. Guyton and Sardis soils are lower on the landscape than the Kenefick soils. They are fine-silty. Iuka and Latonia soils are coarse-loamy. Iuka soils are on flood plains. Latonia soils are in the lower areas.

Typical pedon of Kenefick loamy fine sand, 1 to 3 percent slopes; about 2.5 miles north of Oak Grove along Spring Creek, 60 feet east of a gravel parish road, 51 feet north of a woodland road; Spanish Land Grant sec. 38, T. 10 N., R. 12 W., map sheet 3:

A—0 to 3 inches; dark yellowish brown (10YR 4/4) loamy fine sand; weak fine granular structure; friable; many fine and medium roots; very strongly acid; clear smooth boundary.

EB—3 to 10 inches; strong brown (7.5YR 5/6) very fine sandy loam; common fine prominent light yellowish brown (10YR 6/4) and common fine distinct strong brown (7.5YR 5/8) mottles; massive; very friable; many fine and medium roots; few fine red concretions of iron oxide; very strongly acid; clear smooth boundary.

Bt1—10 to 24 inches; red (2.5YR 4/6) loam; few fine prominent light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; firm; many fine and medium roots; common faint clay films on faces of peds; many fine rounded concretions of iron and manganese oxide; strongly acid; gradual wavy boundary.

Bt2—24 to 35 inches; yellowish red (5YR 4/6) loam; few fine prominent light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; firm; common fine roots; few faint clay films on faces of peds; few fine rounded concretions of iron and manganese oxide; very strongly acid; gradual wavy boundary.

B/E—35 to 45 inches; about 95 percent yellowish red (5YR 5/8) (Bt) and 5 percent light yellowish brown (10YR 6/4) (E) very fine sandy loam; few medium prominent red (10R 4/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; few faint clay films on faces of peds; few clean sand grains between peds; strongly acid; gradual wavy boundary.

B/C—45 to 56 inches; about 70 percent yellowish red (5YR 5/8) (Bt) and 30 percent pale brown (10YR 6/3) (E) very fine sandy loam; common medium

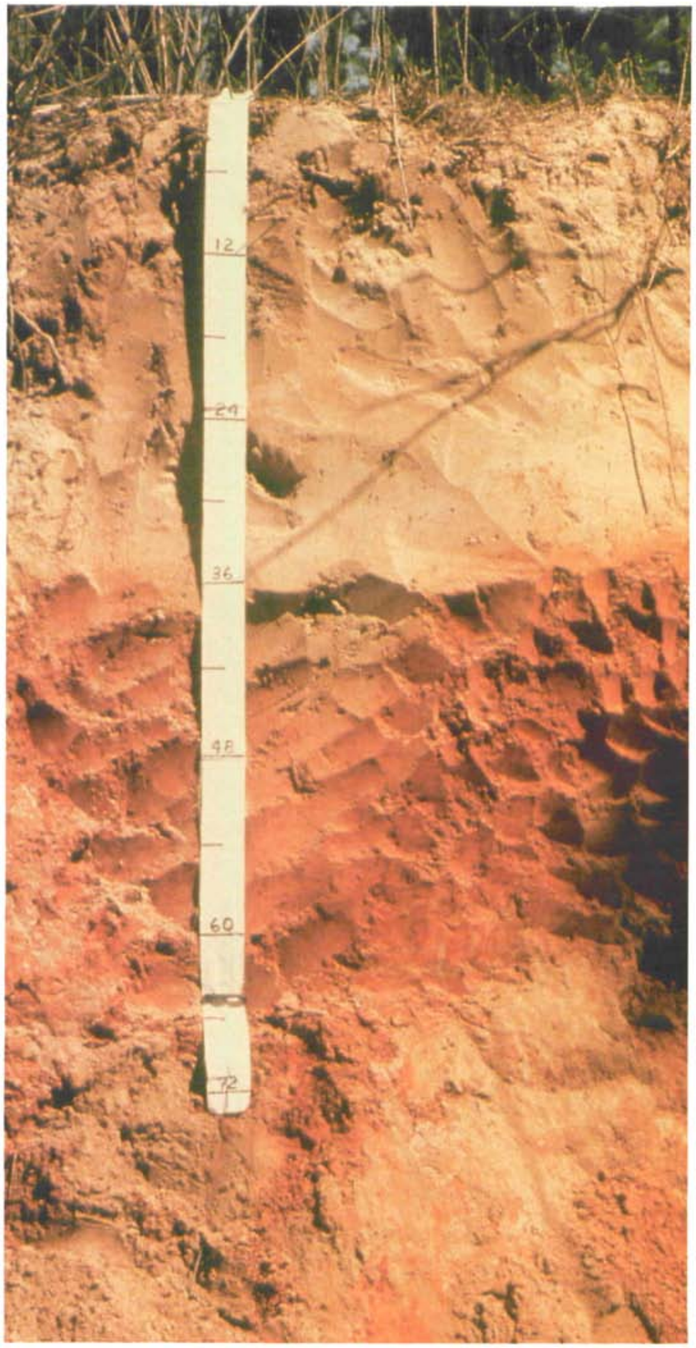

Figure 8.—Profile of Briley loamy fine sand, 1 to 5 percent slopes. The subsurface layer of light yellowish brown fine sandy loam contrasts with the subsoil of red clay. The scale is in meters.

Figure 9.—Profile of Keiffer clay loam, 1 to 5 percent slopes. Nodules of calcium carbonate occur in the subsoil. The scale is in meters.

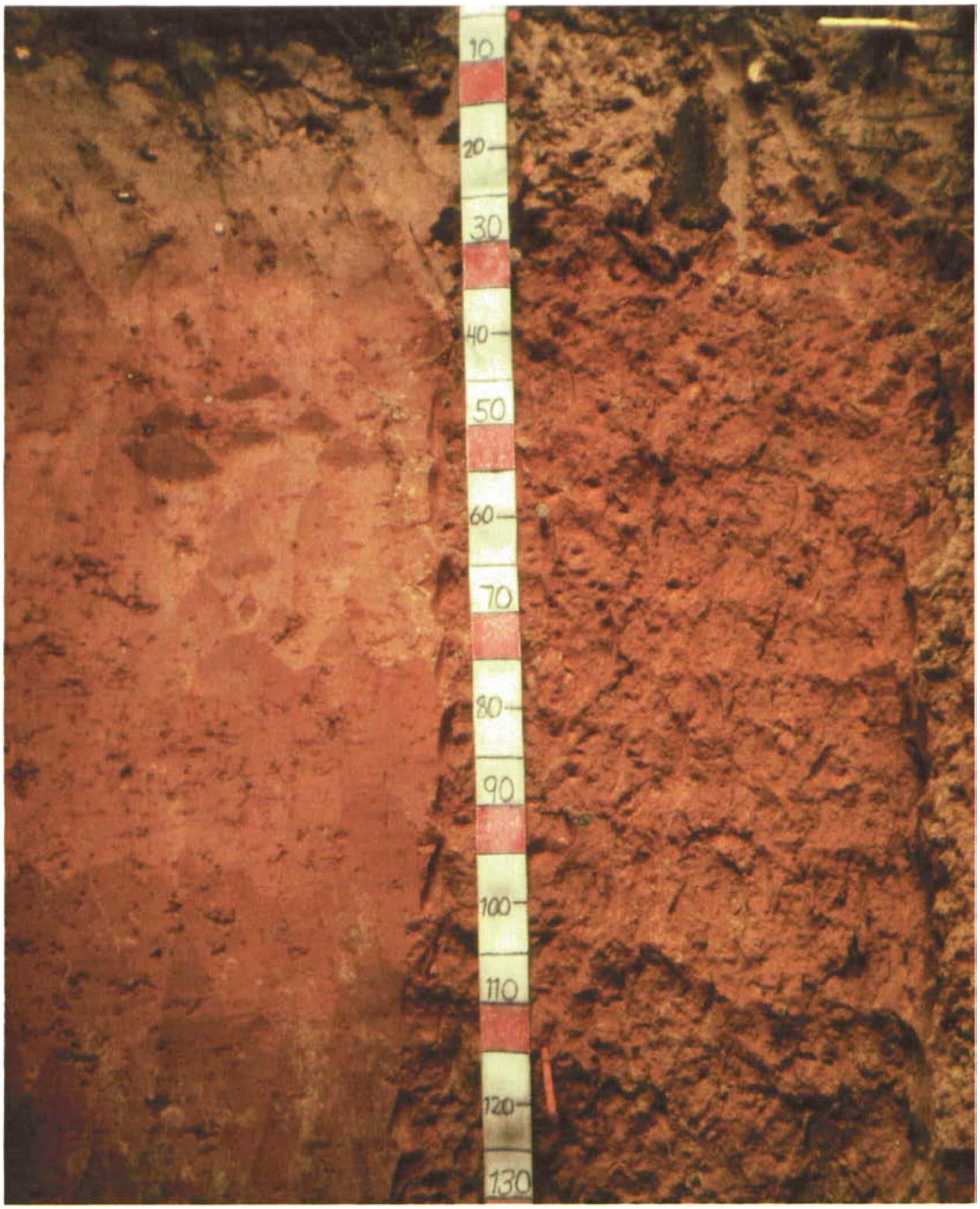

Figure 10.—Profile of Kenefick loamy fine sand, 1 to 3 percent slopes. The brownish sandy surface layer and loamy subsurface layer contrast with the reddish loamy subsoil. The scale is in meters.

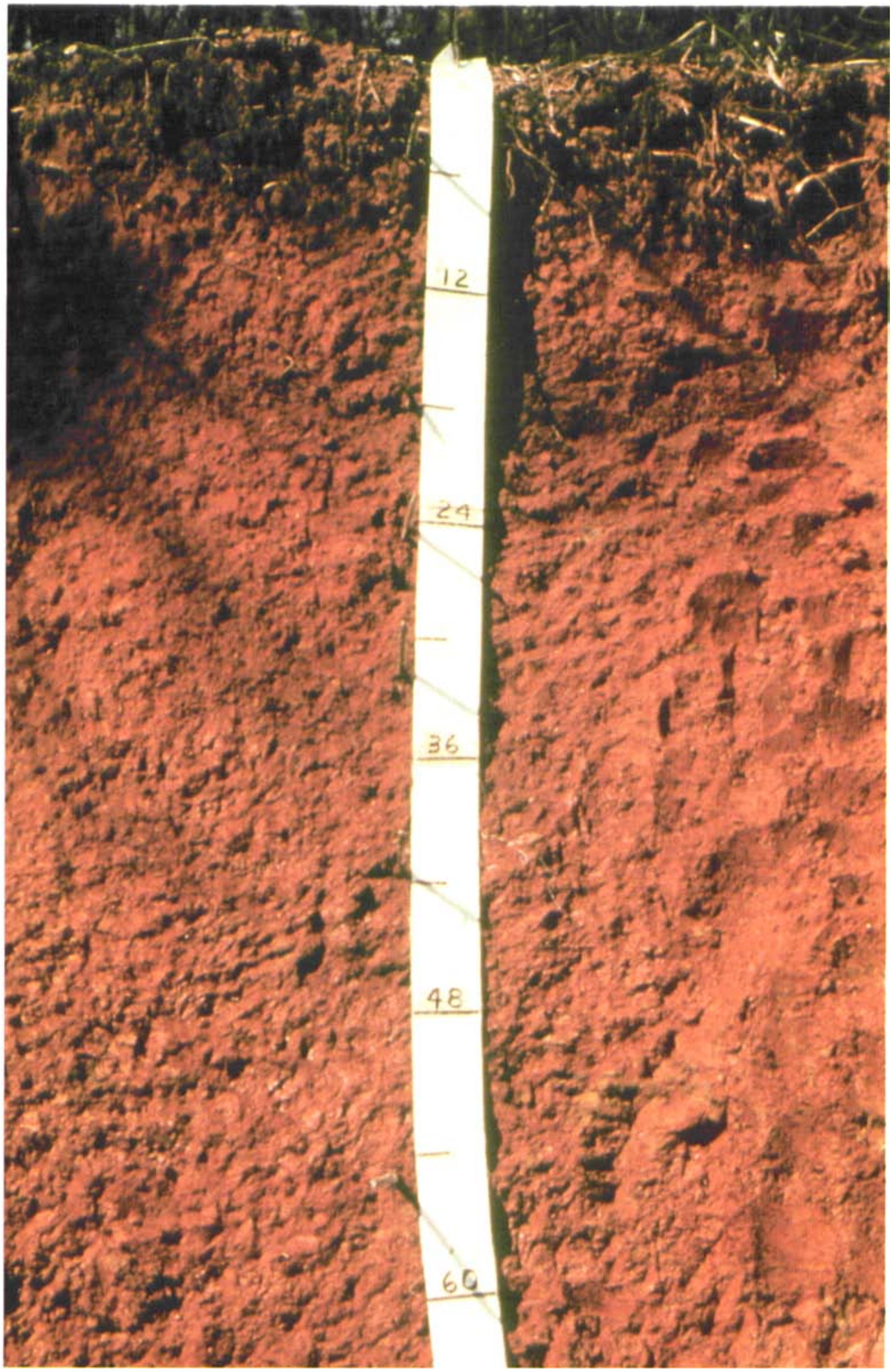

Figure 11.—Profile of Nacogdoches gravelly sandy loam, 1 to 5 percent slopes. This soil has a thin gravelly surface layer and a reddish clayey subsoil. The scale is in centimeters.

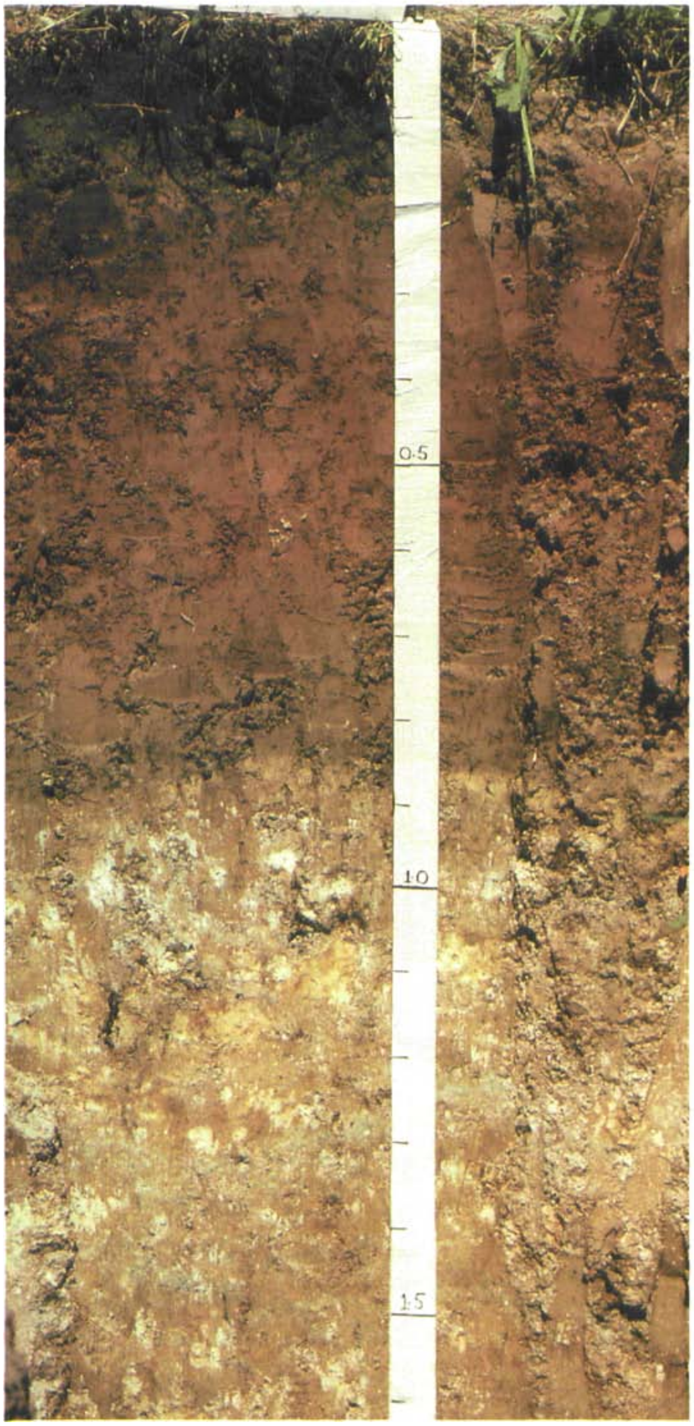

Figure 12.—Profile of Oktibbeka loam, 1 to 5 percent slopes. Small whitish nodules of calcium carbonate occur in the lower part of the profile. The scale is in meters.

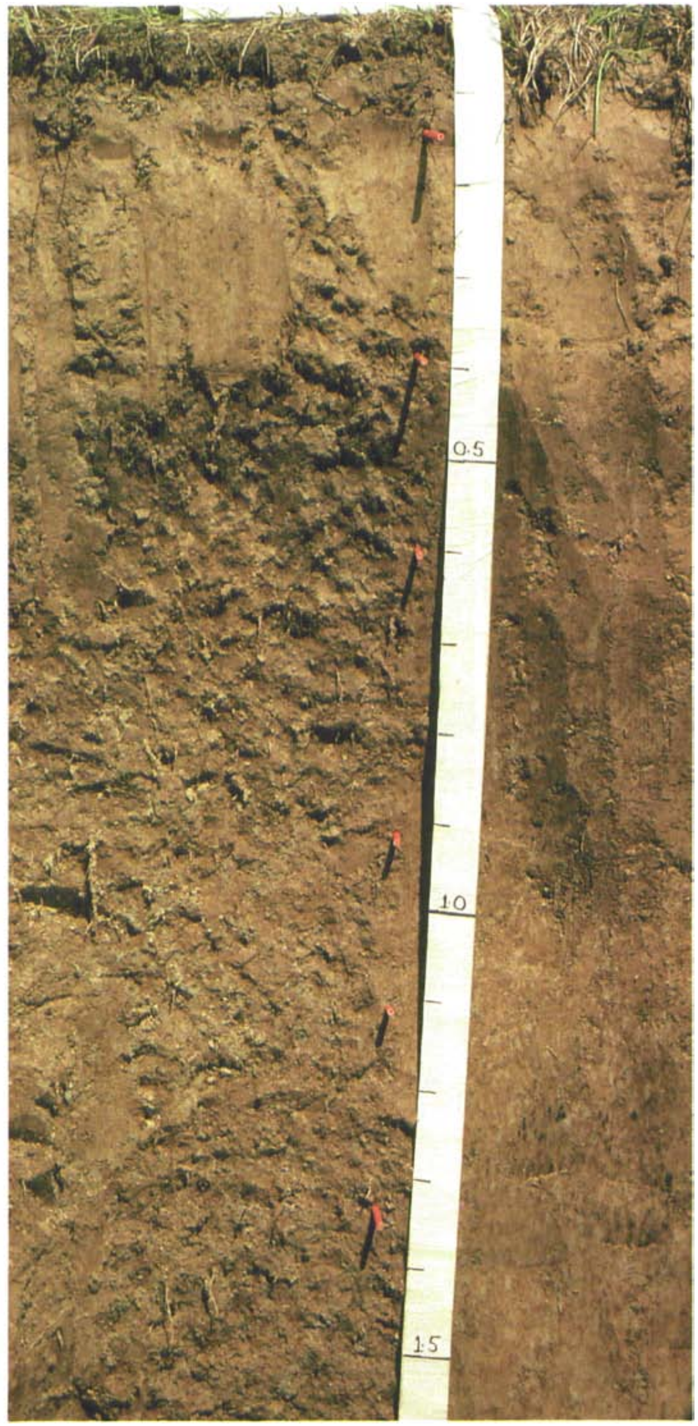

Figure 13.—Profile of Sardis very fine sandy loam in an area of Sardis-Guyton loams, rarely flooded. The soil is brownish and loamy throughout. The scale is in meters.

prominent red (2.5YR 4/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; hard; firm; strongly acid; clear irregular boundary.

C—56 to 76 inches; strong brown (7.5YR 5/8) very fine sandy loam; common medium prominent yellowish red (5YR 5/6) and pale brown (10YR 6/3) mottles; massive; hard; firm; strongly acid.

The thickness of the solum ranges from 40 to 70 inches. In some pedons exchangeable aluminum makes up 20 to 50 percent of the effective cation-exchange capacity.

The A horizon has value of 3 or 4 and chroma of 2 to 4. It is 3 to 8 inches thick. Reaction ranges from very strongly acid to slightly acid.

The EB horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4 or has hue of 7.5YR, value of 5 or 6, and chroma of 6 to 8. It is very fine sandy loam or fine sandy loam. Reaction ranges from very strongly acid to slightly acid.

The Bt horizon has value of 4 or 5 and chroma 6 or 8. It is sandy clay loam, clay loam, or loam. Reaction ranges from very strongly acid to medium acid.

The Bt part of the B/E horizon has the same colors and textures as the Bt horizon. The E part has value of 5 or 6 and chroma of 3 or 4. It is very fine sandy loam or fine sandy loam. Reaction in the B/E horizon ranges from very strongly acid to medium acid.

The B/C horizon has hue of 5YR, value of 4 or 5, and chroma of 6 to 8 or has hue of 10YR, value of 5 or 6, and chroma of 3 to 6. It is very fine sandy loam or fine sandy loam. Reaction ranges from very strongly acid to slightly acid.

The C horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 3 to 8. It is dominantly very fine sandy loam or fine sandy loam. In some pedons it is stratified loamy fine sand and very fine sandy loam. The number of mottles in shades of yellow, brown, and gray ranges from none to many. Reaction ranges from very strongly acid to slightly acid.

Kirvin Series

The Kirvin series consists of well drained, moderately slowly permeable soils that formed in loamy and clayey marine sediments of Tertiary age. These soils are on uplands. Slopes range from 1 to 12 percent.

Soils of the Kirvin series are clayey, mixed, thermic Typic Hapludults.

Kirvin soils commonly are near Briley, Keithville, and Sacul soils. Briley soils are higher on the landscape than the Kirvin soils. They have a loamy control section. Keithville and Sacul soils are in the lower areas. Keithville soils are fine-silty. Sacul soils have gray mottles within a depth of 24 inches from the top of the argillic horizon.

Typical pedon of Kirvin fine sandy loam, 1 to 5 percent slopes; within the city limits of Noble, 0.5 mile west on Sabine Parish Highway 1218 from its junction with U.S. Highway 171, about 0.25 mile north of Sabine Parish Highway 1218, about 132 feet west of an improved parish road, 120 feet south of a woodland road; Las Ormigas Land Grant sec. 38, T. 8 N., R. 13 W., map sheet 16:

A—0 to 6 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; friable; many fine roots; about 10 percent fragments of ironstone; strongly acid; clear smooth boundary.

E—6 to 10 inches; light yellowish brown (10YR 6/4) fine sandy loam; common medium prominent yellowish red (5YR 5/8) mottles; weak fine granular structure; very friable; many fine roots; about 5 percent fragments of ironstone; strongly acid; clear wavy boundary.

Bt1—10 to 20 inches; red (2.5YR 4/6) clay; few medium prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; common distinct clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt2—20 to 29 inches; red (2.5YR 4/8) clay; common medium prominent strong brown (7.5YR 5/8) and light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; firm; many fine roots; common distinct clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt3—29 to 40 inches; red (2.5YR 4/6) clay; common medium prominent strong brown (7.5YR 5/8) and light yellowish brown (10YR 6/4) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm; few faint clay films on faces of peds; common slickensides that do not intersect; very strongly acid; clear wavy boundary.

BC—40 to 60 inches; mottled silty clay that is about 40 percent red (2.5YR 4/6), 30 percent strong brown (7.5YR 5/8), and 30 percent light gray (10YR 6/1); moderate coarse prismatic structure parting to weak coarse subangular blocky; firm; few fine roots between peds; very strongly acid; clear smooth boundary.

C—60 to 75 inches; stratified layers of red (2.5YR 4/6) and strong brown (7.5YR 5/8) clay loam and gray (10YR 6/1) soft shale that has a texture of clay; few medium prominent greenish gray (5BG 5/1) mottles; platy structure; firm; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. In some pedons fragments of ironstone occur in varying amounts throughout the profile. In some pedons exchangeable aluminum makes up 50 percent or more of the effective cation-exchange capacity.

The A horizon has value of 3 to 5 and chroma of 2 or 3. It is 3 to 7 inches thick. Reaction ranges from strongly acid to neutral.

The E horizon has value of 5 or 6 and chroma of 3 or 4. It is fine sandy loam or very fine sandy loam. It is as much as 8 inches thick. Some pedons do not have an E horizon. Reaction ranges from strongly acid to neutral.

The Bt horizon has hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 4 to 8. It is clay, clay loam, or sandy clay. The number of yellowish or brownish mottles ranges from none to common. Reaction ranges from extremely acid to strongly acid.

The BC horizon is multicolored in hue of 2.5YR to 10YR. It is clay loam, sandy clay loam, silty clay, or clay. Reaction is extremely acid or very strongly acid.

The C horizon is stratified sandy clay loam, sandy loam, clay loam, clay, and soft shale that has a texture of clay. It is red, brown, and gray. The loamy material is reddish to brownish, and the clayey material is grayish. Reaction is extremely acid or very strongly acid.

Kisatchie Series

The Kisatchie series consists of well drained, very slowly permeable soils that are moderately deep to sandstone bedrock. These soils formed in loamy and clayey marine sediments over tuffaceous sandstone of Tertiary age. They are on uplands. Slopes range from 5 to 20 percent.

Soils of the Kisatchie series are fine, montmorillonitic, thermic Typic Hapludalfs.

Kisatchie soils commonly are near Herty, Letney, Mayhew, and Rayburn soils. Herty soils are in the lower areas. They have a solum that is thicker than that of the Kisatchie soils. Letney and Rayburn soils are in the slightly higher landscape positions. Letney soils have a thick sandy surface layer and subsurface layer and a loamy subsoil. Rayburn soils have a red clayey subsoil. Mayhew soils are in landscape positions similar to those of the Kisatchie soils. They are not underlain by sandstone bedrock.

Typical pedon of Kisatchie silt loam, in an area of Kisatchie-Mayhew-Rayburn association, 5 to 20 percent slopes; about 700 feet south of Hodges Garden Lake, 40 feet east of a blacktop road leading to a boat dock; SE¼SW¼ sec. 28, T. 5 N., R. 10 W., map sheet 61:

A—0 to 2 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; very friable; many medium, fine, and very fine roots; very strongly acid; clear wavy boundary.

Bt1—2 to 7 inches; yellowish brown (10YR 5/4) silty clay; weak fine subangular blocky structure; firm; many fine and very fine roots; few faint clay films on faces of peds; extremely acid; clear wavy boundary.

Bt2—7 to 14 inches; light olive brown (2.5Y 5/4) silty clay; moderate medium subangular blocky structure; firm; many fine and very fine roots; few faint clay films on faces of peds; extremely acid; clear wavy boundary.

Bt3—14 to 20 inches; light olive gray (5Y 6/2) silty clay; few fine distinct light gray (2.5Y 7/2) mottles; moderate medium subangular blocky structure; firm; common fine and very fine roots; extremely acid; clear wavy boundary.

Bt4—20 to 33 inches; silty clay that is about 60 percent light olive gray (5Y 6/2) and 40 percent light gray (5Y 7/2); moderate medium prismatic structure parting to moderate medium angular blocky; firm; common fine and very fine roots between prisms; many fine and medium chips of sandstone in the lower part; extremely acid; clear smooth boundary.

Cr—33 to 50 inches; light gray (5Y 7/2) sandstone bedrock; weakly cemented; brownish yellow (10YR 6/8) limonite stains between angular cleavage plains; extremely acid.

The thickness of the solum and the depth to sandstone bedrock or a paralithic contact range from 20 to 40 inches.

The A horizon has value of 3 or 4 and chroma of 1 or 2. Reaction is very strongly acid or strongly acid. The horizon is 2 to 5 inches thick.

Some pedons have an E horizon. This horizon has hue of 10YR, value of 4 or 5, and chroma of 2. It is very fine sandy loam, silt loam, or fine sandy loam. Reaction is very strongly acid or strongly acid.

The Bt horizon has hue of 5Y, 2.5Y, or 10YR, value of 5 or 6, and chroma of 2 to 6. The number of mottles in shades of brown or gray ranges from none to common. The texture is silty clay, silty clay loam, or clay loam. Reaction is extremely acid or very strongly acid.

Some pedons have a BC horizon. This horizon has the same textures and colors as the Bt horizon or is multicolored in shades of olive and gray. Reaction ranges from extremely acid to strongly acid. In some pedons the BC horizon contains fragments of siltstone or sandstone that make up 15 to 30 percent of the horizon, by volume.

The Cr horizon is weakly consolidated, tuffaceous siltstone or sandstone bedrock. Some pedons have an R horizon. This horizon is strongly consolidated and cemented sandstone or siltstone bedrock.

Latonia Series

The Latonia series consists of well drained, moderately rapidly permeable soils that formed in loamy stream sediments of Pleistocene age. These soils are on stream terraces. Slopes range from 1 to 5 percent.

Soils of the Latonia series are coarse-loamy, siliceous, thermic Typic Hapludults.

Latonia soils commonly are near Guyton, Keithville, Kenefick, and Sardis soils. Guyton and Sardis soils are lower on the landscape than the Latonia soils. They are fine-silty. Kenefick and Keithville soils are in the higher areas. Kenefick soils are fine-loamy, and Keithville soils are fine-silty.

Typical pedon of Latonia fine sandy loam, 1 to 5 percent slopes; about 1.0 mile south and 1.25 miles east of Mitchell, at the north end of a pasture, 45 feet east of an unimproved road, 72 feet south of a property line; NE¼NW¼ sec. 16, T. 9 N., R. 12 W., map sheet 9:

A—0 to 5 inches; brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable; many fine roots; very strongly acid; clear smooth boundary.

E—5 to 12 inches; yellowish brown (10YR 5/4) very fine sandy loam; many fine distinct brownish yellow (10YR 6/6) mottles; weak fine granular structure; friable; few fine roots; medium acid; clear wavy boundary.

B/E—12 to 19 inches; yellowish brown (10YR 5/6) loam (Bt); few fine prominent strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; about 20 percent pockets of light yellowish brown (10YR 6/4) fine sandy loam (E); few fine roots; strongly acid; gradual wavy boundary.

Bt1—19 to 29 inches; yellowish brown (10YR 5/6) loam; few fine distinct brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; firm; few fine roots; few faint clay films on faces of peds; few medium black concretions; very strongly acid; gradual wavy boundary.

Bt2—29 to 38 inches; brownish yellow (10YR 6/6) loam; common fine prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; common distinct clay films on faces of peds; few medium brown concretions; very strongly acid; gradual wavy boundary.

C—38 to 67 inches; brownish yellow (10YR 6/6) fine sandy loam; common medium prominent strong brown (7.5YR 5/8) mottles; massive; loose; 20 percent pockets and streaks of pale brown (10YR 6/3) fine sandy loam; few medium brown concretions; very strongly acid.

The thickness of the solum ranges from 20 to 45 inches.

The A horizon has value of 4 or 5 and chroma of 2 or 3. It is 2 to 6 inches thick. Reaction ranges from very strongly acid to medium acid.

The E horizon has value of 5 or 6 and chroma of 2 to 4. It is 3 to 8 inches thick. The texture is very fine sandy loam, fine sandy loam, or sandy loam. Reaction ranges from very strongly acid to medium acid.

The Bt/E horizon has value of 5 or 6 and chroma of 2 to 6. The Bt part is loam, fine sandy loam, or sandy loam. Reaction is very strongly acid or strongly acid.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is loam, sandy loam, or fine sandy loam. Reaction is very strongly acid or strongly acid.

The C horizon has value of 4 to 6 and chroma of 3 to 6. It is loamy sand, sand, or fine sandy loam. Reaction is very strongly acid or strongly acid.

Letney Series

The Letney series consists of well drained, moderately rapidly permeable soils that formed in sandy and loamy marine sediments of the Catahoula Formation of Tertiary age. These soils are on uplands. Slopes range from 1 to 12 percent.

Soils of the Letney series are loamy, siliceous, thermic Arenic Paleudults.

Letney soils are similar to Trep soils and commonly are near Bowie, Briley, Corrigan, Mayhew, Rayburn, and Saucier soils. Bowie, Corrigan, Mayhew, Rayburn, and Saucier soils do not have a sandy surface layer and subsurface layer that have a combined thickness of more than 20 inches. Briley soils have a yellowish red and red subsoil. Trep soils have gray mottles in the lower part of the subsoil. Bowie soils are slightly lower on the landscape than the Letney soils. Briley soils are in the slightly higher landscape positions. Corrigan, Mayhew, Rayburn, and Saucier soils are in the lower areas. Trep soils are in watersheds different than those of the Letney soils.

Typical pedon of Letney loamy sand, 5 to 12 percent slopes; in a pasture in Hodges Gardens, about 0.5 mile east of Hodges Garden Lake, 123 feet west of the eastern fence boundary and 400 feet north of the southern fence boundary; SW¼SW¼ sec. 27, T. 5 N., R. 10 W., map sheet 61:

Ap—0 to 7 inches; dark brown (10YR 4/3) loamy sand; single grained; loose; many medium and fine roots; strongly acid; clear smooth boundary.

E1—7 to 15 inches; brown (10YR 5/3) loamy sand; single grained; loose; few fine roots; slightly acid; gradual smooth boundary.

E2—15 to 22 inches; light yellowish brown (10YR 6/4) loamy sand; few fine distinct yellowish brown (10YR 5/6) mottles; single grained; loose; few fine roots; medium acid; gradual smooth boundary.

Bt1—22 to 35 inches; yellowish brown (10YR 5/6) sandy clay loam; common medium prominent yellowish red (5YR 5/8) and few fine distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; few fine roots; coarse sand grains coated and bridged with clay; strongly acid; gradual smooth boundary.

Bt2—35 to 45 inches; brownish yellow (10YR 6/6) sandy clay loam; common medium prominent red (2.5YR 4/8) and few fine distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; few fine and very fine roots; very strongly acid; gradual smooth boundary.

Bt3—45 to 60 inches; brownish yellow (10YR 6/6) sandy clay loam; many medium prominent red (2.5YR 4/8) and common medium distinct very pale brown (10YR 7/3) mottles; weak medium subangular blocky structure; friable; very strongly acid.

The thickness of the solum ranges from 60 to more than 80 inches. The combined thickness of the A and E horizons ranges from 20 to 40 inches. In at least one subhorizon within a depth of 30 inches, exchangeable sodium makes up 50 percent or more of the effective cation-exchange capacity.

The Ap horizon has value of 3 to 5 and chroma of 2 or 3. It is 3 to 8 inches thick. Reaction ranges from very strongly acid to medium acid.

The E horizon has value of 5 or 6 and chroma of 3 to 6. It is 11 to 28 inches thick. The texture is loamy sand or sand. Reaction ranges from very strongly acid to slightly acid.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 6. Mottles are in shades of yellowish red, red, brown, or gray. Mottles with chroma of 2 or less are at a depth of 60 inches or more. The texture is sandy loam or sandy clay loam. In some pedons the horizon contains as much as 5 percent plinthite, by volume. Reaction ranges from very strongly acid to medium acid.

Mayhew Series

The Mayhew series consists of poorly drained, very slowly permeable soils that formed in loamy and clayey marine sediments of Tertiary age. These soils are on uplands. Slopes range from 1 to 12 percent.

Soils of the Mayhew series are fine, montmorillonitic, thermic Vertic Ochraqualfs.

The Mayhew soils in Sabine Parish are taxadjuncts to the Mayhew series because they have a particle-size control section that is very fine textured rather than fine textured. This difference, however, does not significantly affect use and management of the soils.

Mayhew soils commonly are near Corrigan, Herty, Kisatchie, Letney, and Rayburn soils. Corrigan and Kisatchie soils are in landscape positions similar to those of the Mayhew soils. They have a lithic or paralithic contact at a depth of 20 to 40 inches. Herty and Letney soils are in the higher landscape positions. Herty soils are somewhat poorly drained. They have an abrupt change in texture from the subsurface layer to the subsoil. Letney soils have a sandy surface layer and subsurface layer and a loamy subsoil. Rayburn soils are in the lower areas. They have a red clayey subsoil and a paralithic contact at a depth of 40 to 60 inches.

Typical pedon of Mayhew loam, 1 to 5 percent slopes; about 1.75 miles west of Peason, 600 feet north of Peason Artillery Range, 1,200 feet southeast of a gravel road; center of SE¼ sec. 18, T. 5 N., R. 9 W., map sheet 56:

A1—0 to 5 inches; very dark gray (10YR 3/1) loam; weak medium subangular blocky structure; friable; many fine, medium, and coarse roots; very strongly acid; gradual wavy boundary.

A2—5 to 11 inches; dark grayish brown (10YR 4/2) loam; weak medium subangular blocky structure; friable; many fine and medium roots; few dark brown (10YR 4/3) stains along root channels; extremely acid; diffuse wavy boundary.

Btg—11 to 18 inches; grayish brown (10YR 5/2) clay; many medium distinct light brownish gray (2.5Y 6/2) mottles; moderate medium subangular blocky structure parting to moderate medium angular blocky; very firm; plastic and sticky; many fine and medium roots between peds; few faint clay films on faces of peds; few fine concretions of ironstone; extremely acid; diffuse wavy boundary.

Btssg1—18 to 28 inches; grayish brown (2.5Y 5/2) clay; many medium distinct light yellowish brown (2.5Y 6/4) and few fine prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure parting to moderate medium angular blocky; very firm; plastic and sticky; common fine and medium roots between wedges; few faint clay films on faces of peds; common small striated slickensides less than 2 inches apart; many intersecting slickensides as much as 1 inch wide; many distinct pressure faces; few dark yellowish brown (10YR 4/4) root stains between peds; extremely acid; diffuse wavy boundary.

Btssg2—28 to 43 inches; grayish brown (2.5Y 5/2) clay;

many medium faint light brownish gray (2.5Y 6/2) and few fine prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium angular blocky; very firm; plastic and sticky; common fine and medium roots between peds; few faint clay films on faces of peds; many intersecting slickensides; many small striated and large grooved slickensides; many distinct pressure faces; extremely acid; diffuse wavy boundary.

Bssg1—43 to 53 inches; pale olive (5Y 6/3) clay; common medium prominent yellowish red (5YR 5/8) mottles along pressure faces and common coarse prominent strong brown (7.5YR 5/8) mottles in peds; weak coarse prismatic structure parting to moderate medium angular blocky; very firm; plastic and sticky; many intersecting slickensides; many distinct pressure faces; common fine and medium roots between pressure faces; wedges 14 to 16 inches wide and as much as 3 inches thick; grayish brown (2.5Y 5/2) stains on faces of peds; extremely acid; diffuse wavy boundary.

Bssg2—53 to 65 inches; pale olive (5Y 6/3) clay; many coarse prominent strong brown (7.5YR 5/8) mottles; weak coarse prismatic structure parting to moderate medium angular blocky; very firm; plastic and sticky; many intersecting grooved slickensides 6 to 8 inches long; many distinct pressure faces; few fine and medium roots between pressure faces; few brown (7.5YR 5/2) stains on surfaces of slickensides; few fine gypsum crystals; extremely acid.

The thickness of the solum ranges from 40 to 80 inches. Reaction ranges from extremely acid to medium acid throughout the profile. In at least one subhorizon within a depth of 30 inches, exchangeable aluminum makes up 20 to 50 percent of the effective cation-exchange capacity. When dry, the soils crack to a depth of 20 inches or more. The cracks are 0.5 inch to 2.0 inches wide.

The A horizon has value of 3 to 5 and chroma of 1 to 3. It is 2 to 7 inches thick. The A1 horizon is silt loam or loam. The A2 horizon is silt loam, loam, or silty clay loam.

The Btg and Btssg horizons have value of 4 to 6 and chroma of 2. The number of mottles in shades of red, brown, and gray ranges from none to many. The texture is silty clay loam, silty clay, or clay.

The Bssg horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 2 or 3. The number of mottles in shades of gray, brown, olive, or red ranges from few to many. The texture is silty clay loam, silty clay, or clay.

Nacogdoches Series

The Nacogdoches series consists of well drained, moderately slowly permeable soils that formed in loamy and clayey marine sediments of the Cook Mountain Formation of Tertiary age. These soils are on uplands. Slopes range from 1 to 5 percent.

Soils of the Nacogdoches series are fine, kaolinitic, thermic Rhodic Paleudalfs (fig. 11).

Nacogdoches soils commonly are near Eastwood, Keiffer, Kirvin, and Oktibbeha soils. Eastwood, Keiffer, and Oktibbeha soils are lower on the landscape than the Nacogdoches soils. Eastwood soils have montmorillonitic mineralogy. Oktibbeha soils have a very fine-textured control section. Keiffer soils are calcareous throughout. Kirvin soils are in the higher areas. They have mixed mineralogy.

Typical pedon of Nacogdoches gravelly sandy loam, 1 to 5 percent slopes; about 0.25 mile west of Dess, 800 feet south of a blacktop road, 50 feet east of a gravel road; SW¼NE¼ sec. 6, T. 5 N., R. 11 W., map sheet 54:

A—0 to 4 inches; dark reddish brown (2.5YR 3/4) gravelly sandy loam; weak fine granular structure; friable; many very fine, fine, and medium roots; many fine angular fragments of ironstone; slightly acid; clear wavy boundary.

Bt1—4 to 17 inches; dark red (10R 3/6) clay; moderate medium subangular blocky structure; firm; many very fine, fine, and medium roots; thin continuous clay films on faces of peds; few fine angular fragments of ironstone; strongly acid; gradual wavy boundary.

Bt2—17 to 24 inches; dark red (10R 3/6) clay; moderate medium angular blocky structure; firm; few very fine, fine, and medium roots; few faint clay films on faces of peds; many fine angular fragments of ironstone; 15 to 20 percent yellowish brown (10YR 5/6), partially weathered brittle fragments of glauconite; strongly acid; gradual wavy boundary.

Btc1—24 to 32 inches; dark red (2.5YR 3/6) clay; moderate medium and fine angular blocky structure; firm; few very fine and fine roots; few faint clay films on faces of peds; about 10 percent yellowish brown (10YR 5/6), weathered brittle fragments of glauconite about 0.5 inch long; many medium black concretions; strongly acid; gradual wavy boundary.

Btc2—32 to 42 inches; dark red (2.5YR 3/6) clay; moderate medium angular blocky structure parting to moderate fine subangular blocky; firm; few very fine and fine roots between peds; common distinct clay films on faces of peds; about 20 percent yellowish brown (10YR 5/6), weathered brittle fragments of glauconite about 0.5 inch long; pseudomorphic shell impressions in the fragments; few medium black concretions; strongly acid; clear wavy boundary.

Bt3—42 to 54 inches; dark red (2.5YR 3/6) clay; moderate fine subangular blocky structure; firm; many very fine roots between peds; common distinct clay films on faces of peds; about 40 percent light olive brown (2.5YR 5/4), weathered brittle fragments of glauconite about 0.5 inch to 2.0 inches long; strongly acid; clear wavy boundary.

Btom—54 to 60 inches; dark red (2.5YR 3/6) clay and ironstone; moderate medium subangular blocky structure (Bt); firm; fractured and platy ironstone; many very fine roots between peds; common distinct clay films on faces of peds; 10 percent olive yellow (2.5Y 6/6) fragments of weathered glauconite; strongly acid; clear wavy boundary.

B′t—60 to 74 inches; red (2.5YR 4/6) clay; common medium prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; very firm; many very fine roots between peds; common distinct clay films on faces of peds; common fine fragments of ironstone; many old inactive slickensides; very strongly acid.

The thickness of the solum ranges from 60 to more than 80 inches. Base saturation ranges from 35 to 60 percent at a depth of about 72 inches.

The A horizon has a hue of 10R, 2.5YR, or 5YR, value of 2 or 3, and chroma of 2 to 6. Reaction ranges from strongly acid to slightly acid.

Below a depth of 40 inches, the Bt, Btc, and Bom horizons have hue of 10R or 2.5YR, value of 3 or 4, and chroma of 6 to 8. The clay fraction is dominantly tabular halloysite. The content of coarse fragments, dominantly ironstone, ranges from very little to about 15 percent, by volume, throughout the B horizon. Reaction is very strongly acid or strongly acid. In some pedons the Bom horizon has continuous layers of fractured ironstone and weathered glauconite.

The C horizon, if it occurs, contains weathered glauconitic sandstone and greensand material. Pseudomorphic marine shell impressions occur in most pedons. Reaction ranges from strongly acid to moderately alkaline. The texture is clay loam or clay.

Niwana Series

The Niwana series consists of moderately well drained, moderately permeable soils that formed in loamy stream sediments of Pleistocene age. These soils are on stream terraces. Slopes are 0 to 1 percent.

Soils of the Niwana series are coarse-loamy, siliceous, thermic Typic Paleudults.

Niwana soils commonly are near Gessner, Kenefick, and Latonia soils. Gessner soils are lower on the landscape than the Niwana soils. They are grayish throughout. Kenefick and Latonia soils are in the higher areas. Kenefick soils are fine-loamy. Latonia soils have a red and yellowish red subsoil.

Typical pedon of Niwana fine sandy loam, in an area of Niwana-Gessner loams; about 6 miles west of Zwolle, 1.25 miles south of Sabine Parish Highway 3429, about 96 feet south and 75 feet west of a woodland road; NE¼SW¼ sec. 24, T. 7 N., R. 14 W., map sheet 33:

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

E—6 to 15 inches; brown (10YR 5/3) fine sandy loam; weak fine granular structure; very friable; many fine roots; few medium faint dark brown (10YR 4/3) bodies of A material throughout; few medium pebbles of ironstone; very strongly acid; clear wavy boundary.

EB—15 to 21 inches; pale brown (10YR 6/3) fine sandy loam (E); weak fine granular structure; very friable; about 50 percent yellowish brown (10YR 5/4) B material; many fine roots; very strongly acid; clear wavy boundary.

B/E1—21 to 37 inches; yellowish brown (10YR 5/6) fine sandy loam (Bt); weak medium subangular blocky structure; friable; many fine roots; about 20 percent common tongues and pockets of light yellowish brown (10YR 6/4) fine sandy loam (E); few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

B/E2—37 to 51 inches; brownish yellow (10YR 6/6) loam (Bt); few medium distinct brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable; common interfingers of pale brown (10YR 6/3) fine sandy loam (E); few faint clay films on faces of peds; common fine black and brown concretions; very strongly acid; gradual wavy boundary.

B/E3—51 to 60 inches; brownish yellow (10YR 6/6) loam (Bt); many medium distinct yellowish brown (10YR 5/8) mottles; weak fine subangular blocky structure; friable; common interfingers of light brownish gray (10YR 6/2) fine sandy loam (E); many medium black concretions; very strongly acid.

The solum is more than 60 inches thick. In at least one subhorizon within a depth of 30 inches, exchangeable aluminum makes up 50 percent or more of the effective cation-exchange capacity.

The A horizon has value of 4 or 5 and chroma of 2 or 3. Reaction ranges from very strongly acid to medium acid. The horizon is 4 to 6 inches thick.

The E horizon has value of 5 or 6 and chroma of 2 to 4. It is fine sandy loam, very fine sandy loam, or loam. Reaction ranges from very strongly acid to medium acid. The horizon is 8 to 16 inches thick.

The EB horizon has value of 5 to 7 and chroma of 3 to 6. It is fine sandy loam or loam. Reaction is very strongly acid or strongly acid.

The Bt part of the B/E horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 6 to 8. It is fine sandy loam or loam. The E part is less clayey than the Bt part and occurs as interfingers or tongues. It has value of 5 to 7 and chroma of 2 to 4. In some pedons the Bt part includes strong brown or yellowish red mottles or peds that are brittle when moist. Reaction in the B/E horizon is very strongly acid or strongly acid.

Oktibbeha Series

The Oktibbeha series consists of moderately well drained, very slowly permeable soils that formed in loamy and clayey sediments of the Cook Mountain Formation of Tertiary age. These soils are on uplands. Slopes range from 1 to 12 percent.

Soils of the Oktibbeha series are very fine, montmorillonitic, thermic Vertic Hapludalfs (fig. 12).

Oktibbeha soils commonly are near Keiffer and Nacogdoches soils. Keiffer soils are lower on the landscape than the Oktibbeha soils. They are fine-silty and calcareous throughout. Nacogdoches soils are in the higher landscape positions. They have a fine-textured control section. They are dark red and red throughout the subsoil.

Typical pedon of Oktibbeha loam, 1 to 5 percent slopes; about 3.25 miles east of Fisher, 50 feet south of a gravel road; NE¼SE¼ sec. 17, T. 6 N., R. 10 W., map sheet 43:

A—0 to 3 inches; dark grayish brown (10YR 4/2) loam; moderate medium granular structure; friable; many fine, medium, and coarse roots; medium acid; abrupt wavy boundary.

E—3 to 5 inches; light yellowish brown (10YR 6/4) loam; common medium prominent strong brown (7.5YR 5/6) mottles; massive; very friable; many fine, medium, and coarse roots; common fine and medium fragments of ironstone; medium acid; abrupt wavy boundary.

Bt—5 to 12 inches; yellowish red (5YR 5/6) clay; few fine prominent brownish yellow (10YR 6/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; very firm; common fine and very fine roots; common fine and medium fragments of ironstone; strongly acid; gradual wavy boundary.

Bss1—12 to 23 inches; yellowish red (5YR 5/6) clay; many coarse prominent brownish yellow (10YR 6/6) mottles; moderate medium prismatic structure; very firm; few fine and very fine roots; many smoothly polished and striated slickensides that intersect prisms; strongly acid; gradual wavy boundary.

Bss2—23 to 33 inches; light olive brown (2.5Y 5/6) clay; common medium distinct light yellowish brown (2.5Y 6/4) and few medium prominent red (2.5YR 4/8) mottles; moderate medium prismatic structure; very firm; few fine and very fine roots; many smoothly polished and grooved slickensides that intersect prisms; many fine black concretions; slightly acid; gradual wavy boundary.

Bkss—33 to 42 inches; light olive brown (2.5Y 5/6) silty clay; many coarse prominent light brownish gray (2.5Y 6/2) and many medium distinct yellow (2.5Y 7/8) mottles; moderate medium prismatic structure; firm; many intersecting slickensides; many black stains along faces of peds; many fine and medium nodules of calcium carbonate; neutral; gradual wavy boundary.

Bk—42 to 48 inches; mottled olive brown (2.5Y 4/4), olive yellow (2.5Y 6/8), and light brownish gray (2.5Y 6/2) silty clay loam; weak medium prismatic structure parting to weak medium subangular blocky; firm; few strata of glauconitic marl and soft chalk about 1 to 2 inches thick; few streaks of limonite in old cracks; many fine, medium, and coarse nodules of calcium carbonate; mildly alkaline; gradual wavy boundary.

BCk—48 to 70 inches; mottled light olive brown (2.5Y 5/6, 5/4) and light brownish gray (2.5Y 6/2) clay loam; weak moderate prismatic structure parting to weak moderate subangular blocky; firm; few strata of glauconitic marl and soft chalk; streaks of limonite in cracks of strata; many black stains in old compressed root channels; many fine, medium, and coarse nodules of calcium carbonate; mildly alkaline.

The thickness of the solum ranges from 60 to more than 70 inches. When dry, the soils crack to a depth of 20 inches or more. The cracks are 0.5 inch to 2.0 inches wide.

The A horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 to 4. Reaction ranges from very strongly acid to slightly acid. The horizon is 2 to 6 inches thick.

The E horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 or 4. It is loam or fine sandy loam. Reaction ranges from very strongly acid to slightly acid. The horizon is 2 to 5 inches thick. Some pedons do not have an E horizon.

The Bt and Bss1 horizons have hue of 7.5YR, 5YR, or 2.5YR, value of 4 or 5, and chroma of 4 to 8. Reaction ranges from very strongly acid to slightly acid.

The Bss2, Bkss, Bk, and BCk horizons have hue of 2.5Y or 5Y, value of 4 to 6, and chroma of 3 to 8. The Bk and BCk horizons are clay loam, silty clay loam, or silty clay. Reaction in the Bss2, Bkss, Bk, and BCk horizons ranges from slightly acid to moderately alkaline.

Rayburn Series

The Rayburn series consists of moderately well drained, very slowly permeable soils that formed in loamy and clayey marine sediments over consolidated tuffaceous siltstone of Tertiary age. These soils are on uplands. Slopes range from 1 to 20 percent.

Soils of the Rayburn series are fine, montmorillonitic, thermic Vertic Hapludalfs.

The Rayburn soils in Sabine Parish are taxadjuncts to the Rayburn series because they are Ultisols rather than Alfisols and have slightly more than 60 percent clay in the particle-size control section. These differences, however, do not significantly affect use and management of the soils.

Rayburn soils commonly are near Corrigan, Herty, Kisatchie, Letney, and Mayhew soils. Corrigan soils are higher on the landscape than the Rayburn soils. Herty, Kisatchie, and Mayhew soils are in the lower areas. Corrigan and Kisatchie soils have a lithic or paralithic contact at a depth of about 20 to 40 inches. Herty and Mayhew soils have a grayish brown or grayish brown and pale olive subsoil. They do not have a lithic or paralithic contact. Letney soils are in landscape positions similar to those of the Rayburn soils. They have a sandy surface layer and subsurface layer and a loamy subsoil.

Typical pedon of Rayburn fine sandy loam, 1 to 5 percent slopes; about 3.75 miles east of Mount Carmel, 250 feet south of Louisiana State Highway 118; NW¼NE¼ sec. 31, T. 6 W., R. 9 W., map sheet 50:

A—0 to 5 inches; brown (10YR 5/3) fine sandy loam; few fine faint pale brown mottles; moderate fine granular structure; very friable; many fine and medium roots; very strongly acid; abrupt wavy boundary.

Bt1—5 to 14 inches; red (2.5YR 4/6) clay; common fine prominent pale brown (10YR 6/3) mottles; moderate medium angular blocky structure; very firm; many fine and medium roots; few faint clay films on horizontal and vertical faces of peds; very strongly acid; gradual wavy boundary.

Bt2—14 to 20 inches; red (2.5YR 4/8) clay; few fine prominent yellowish brown (10YR 5/8) and common medium prominent brownish yellow (10YR 6/6) and light brownish gray (10YR 6/2) mottles; moderate medium angular blocky structure; very firm; many fine and medium roots; many pressure faces and slickensides that intersect and form wedges; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt3—20 to 31 inches; mottled red (2.5YR 4/6), brownish yellow (10YR 6/6), and light brownish gray (2.5Y 6/2) clay; moderate coarse prismatic structure parting to moderate medium angular blocky; very firm; many fine and medium roots; many slickensides that intersect and form wedges; few faint clay films on faces of peds; extremely acid; gradual wavy boundary.

BCg—31 to 45 inches; light brownish gray (2.5Y 6/2) clay; common coarse prominent red (2.5YR 4/6) and few medium prominent brownish yellow (10YR 6/6) mottles; moderate medium angular blocky structure parting to weak fine angular blocky; very firm; many fine and very fine roots between peds; many pressure faces and slickensides; extremely acid; clear wavy boundary.

Cr—45 to 82 inches; light brownish gray (2.5Y 6/2), weakly consolidated tuffaceous siltstone bedrock; common medium distinct olive yellow (2.5Y 6/6), common medium prominent yellowish red (5YR 5/6), and common coarse prominent brownish yellow (10YR 6/8) mottles; massive; compressed angular cleavage faces; few fine and very fine roots between cleavage faces; extremely acid.

The thickness of the solum and the depth to a paralithic contact range from 40 to 60 inches. When dry, the soils crack in the upper part of the subsoil. The cracks are 0.5 inch or more wide. In at least one subhorizon within a depth of about 30 inches, exchangeable aluminum makes up 50 percent or more of the effective cation-exchange capacity.

The A horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 1 to 3. Reaction ranges from very strongly acid to medium acid. The horizon is 3 to 6 inches thick.

Some pedons have an E horizon. This horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 2 or 3. It is loamy fine sand, fine sandy loam, or loam. Reaction ranges from very strongly acid to medium acid. The horizon is 2 to 5 inches thick.

The upper part of the Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 3 to 8. The number of mottles in shades of brown or gray ranges from none to common.

The lower part of the Bt horizon and the BCg horizon have hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 2 or 3. The Bt and BCg horizons are clay or silty clay. Reaction ranges from extremely acid to strongly acid.

The Cr horizon is mostly weakly consolidated tuffaceous sandstone or siltstone bedrock that is bentonitic and contains volcanic ash, volcanic glass, and other pyroclastic materials. Reaction ranges from extremely acid to medium acid.

Sacul Series

The Sacul series consists of moderately well drained, slowly permeable soils that formed in loamy and clayey marine sediments of Tertiary age. These soils are on uplands. Slopes range from 1 to 30 percent.

Soils of the Sacul series are clayey, mixed, thermic Aquic Hapludults.

Sacul soils are similar to Eastwood soils and commonly are near Keithville and Kirvin soils. Eastwood soils are in watersheds different than those of the Sacul soils. They have base saturation that is more than 35 percent. Keithville soils are lower on the landscape than the Sacul soils. They are fine-silty. Kirvin soils are in the higher landscape positions. They do not have gray mottles within a depth of 24 inches from the upper part of the argillic horizon.

Typical pedon of Sacul fine sandy loam, 1 to 5 percent slopes; about 3 miles south of Pleasant Hill, 0.25 mile west of Louisiana State Highway 175, about 100 feet north of a gravel parish road; SW¼SE¼ sec. 8, T. 9 N., R. 11 W., map sheet 10:

Ap—0 to 4 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; friable; many fine and medium roots; about 10 percent fragments of ironstone; slightly acid; clear wavy boundary.

E—4 to 12 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak fine granular structure; very friable; many fine roots; about 10 percent fragments of ironstone; slightly acid; abrupt smooth boundary.

Bt1—12 to 20 inches; red (2.5YR 4/6) clay; few fine prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; very firm; many fine roots; common distinct clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt2—20 to 29 inches; red (2.5YR 4/8) clay; many medium prominent yellowish brown (10YR 5/6) and many fine prominent pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; very firm; few fine roots; common distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt3—29 to 45 inches; mottled silty clay loam that is 60 percent light brownish gray (10YR 6/2), 30 percent dark yellowish brown (10YR 4/6), and 10 percent light yellowish brown (10YR 6/4); moderate medium subangular blocky structure; firm; common faint clay films on faces of peds; very strongly acid; clear wavy boundary.

C—45 to 60 inches; stratified light brownish gray (2.5Y 6/2), red (2.5YR 5/8), and yellowish brown (10YR 5/8) sandy clay loam and clay loam; moderate thin platy structure; firm; very strongly acid.

The thickness of the solum ranges from 30 to 50 inches. The depth to gray mottles is 10 to 20 inches below the top of the argillic horizon. Fragments of ironstone occur in varying amounts throughout the upper part of the solum. In at least one subhorizon within a depth of 30 inches, exchangeable aluminum makes up 50 percent or more of the effective cation-exchange capacity.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. It is 2 to 7 inches thick. Reaction ranges from very strongly acid to medium acid.

The E horizon has value of 5 or 6 and chroma of 3 or 4. It is 4 to 10 inches thick. The texture is loamy fine sand, fine sandy loam, or very fine sandy loam. Reaction ranges from very strongly acid to medium acid.

The upper part of the Bt horizon has hue of 2.5YR or 5YR, value of 4 to 6, and chroma of 4 to 8. It is clay or silty clay. The lower part of the Bt horizon and the BC horizon, if it occurs, generally are multicolored but in some pedons are red or gray. The texture is silty clay loam, clay loam, or sandy clay loam. Reaction in the Bt and BC horizons ranges from extremely acid to strongly acid.

The C horizon is stratified in colors of gray, red, and brown and in textures of clay loam, sandy clay loam, fine sandy loam, and sandy loam. Reaction ranges from extremely acid to strongly acid.

Sardis Series

The Sardis series consists of somewhat poorly drained, moderately permeable soils that formed in loamy alluvium. These soils are on flood plains. They are subject to rare flooding. Slopes are generally less than 1 percent.

Soils of the Sardis series are fine-silty, siliceous, thermic Fluvaquentic Dystrochrepts (fig. 13).

Sardis soils commonly are near Guyton, Kenefick, and Latonia soils. Guyton soils are on low flats. They are gray throughout. Kenefick and Latonia soils are well drained and are on stream terraces. Kenefick soils are fine-loamy, and Latonia soils are coarse-loamy.

Typical pedon of Sardis loam, in an area of Sardis-Guyton loams, rarely flooded; about 8 miles northeast of Many, 0.25 mile north of Louisiana State Highway 6, about 400 feet northwest of an escarpment; NW¼NE¼ sec. 24, T. 8 N., R. 10 W., map sheet 26:

A—0 to 4 inches; brown (10YR 4/3) loam; weak medium granular structure; friable; many fine, very fine, and medium roots; slightly acid; clear smooth boundary.

Bw1—4 to 14 inches; yellowish brown (10YR 5/4) loam; many medium distinct light brownish gray (10YR 6/2) and few fine faint yellowish brown mottles; weak medium subangular blocky structure; firm; many fine and medium roots; slightly acid; clear smooth boundary.

Bw2—14 to 23 inches; brown (10YR 4/3) silt loam; common medium faint yellowish brown (10YR 5/4) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; many fine and medium roots; many wormcasts; strongly acid; clear smooth boundary.

Bw3—23 to 35 inches; yellowish brown (10YR 5/6) silty clay loam; many medium prominent gray (10YR 6/1) and common fine faint brownish yellow (10YR 6/6) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm; many fine and medium roots; few faint clay films on faces of peds; very strongly acid; clear wavy boundary.

Bw4—35 to 42 inches; mottled silty clay loam that is 60 percent yellowish brown (10YR 5/6) and 40 percent light brownish gray (10YR 6/2); weak coarse prismatic structure parting to moderate medium subangular blocky; firm; many fine and medium roots; few faint clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bw5—42 to 51 inches; mottled silty clay loam that is 60 percent yellowish brown (10YR 5/6) and 40 percent light brownish gray (10YR 6/2); few fine distinct light yellowish brown (10YR 6/4) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm; many fine and medium roots; few faint clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bw6—51 to 62 inches; mottled dark yellowish brown (10YR 4/4), light brownish gray (2.5Y 6/2), and strong brown (7.5YR 5/6) silty clay loam; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; common fine and medium roots throughout; few faint clay films on faces of peds; few fine brown concretions; very strongly acid.

The thickness of the solum ranges from 40 to 70 inches. In at least one subhorizon within a depth of 30 inches, exchangeable aluminum makes up 20 to 50 percent of the effective cation-exchange capacity.

The A horizon has value of 4 or 5 and chroma of 2 to 4. It is 4 to 8 inches thick. Reaction ranges from very strongly acid to slightly acid.

The upper part of the Bw horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 8. Reaction ranges from very strongly acid to slightly acid. Mottles have chroma of 1 to 6. Mottles with chroma of 2 or less are at depths of 8 to 24 inches. The lower part of the Bw horizon is multicolored or has the same colors as the upper part. The Bw horizon is silt loam, silty clay loam, or clay loam. Reaction in the lower part of the Bw horizon ranges from very strongly acid to medium acid.

Saucier Series

The Saucier series consists of moderately well drained, slowly permeable soils that formed in loamy and clayey marine sediments of Tertiary age. These soils are on uplands. Slopes range from 1 to 5 percent.

Soils of the Saucier series are fine-loamy, siliceous, thermic Plinthaquic Paleudults.

Saucier soils commonly are near Bowie, Guyton, Keithville, and Latonia soils. Bowie soils are higher on the landscape than the Saucier soils. They do not have gray mottles within a depth of 30 inches. Guyton soils are on narrow flood plains. They are fine-silty and grayish throughout. Keithville soils are in the higher landscape positions. They are fine-silty and have a subsoil that is clayey in the lower part. Latonia soils are on stream terraces. They are coarse-loamy.

Typical pedon of Saucier fine sandy loam, 1 to 5 percent slopes; about 4 miles south of Pleasant Hill, 170 feet west of Louisiana State Highway 175, about 90 feet north of a driveway; NE¼SE¼ sec. 17, T. 9 N., R. 11 W., map sheet 10:

A—0 to 5 inches; dark brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable; many fine roots; very strongly acid; clear smooth boundary.

E—5 to 8 inches; pale brown (10YR 6/3) fine sandy loam; common medium prominent yellowish brown (10YR 5/8) mottles; weak fine granular structure; very friable; many fine roots; very strongly acid; clear smooth boundary.

E/B—8 to 15 inches; about 60 percent pale brown (10YR 6/3) (E) and 40 percent brownish yellow (10YR 6/6) (Bt) fine sandy loam; common medium distinct yellowish brown (10YR 5/8) mottles; weak fine subangular blocky structure; friable; few fine roots; few fine black concretions; very strongly acid; clear smooth boundary.

Bt—15 to 27 inches; yellowish brown (10YR 5/4) sandy clay loam; common medium distinct yellowish brown (10YR 5/8) and few medium prominent yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; few fine black concretions; very strongly acid; clear smooth boundary.

Btv—27 to 58 inches; yellowish brown (10YR 5/4) silty clay loam; many medium distinct yellowish brown (10YR 5/8), many medium prominent red (2.5YR 4/8), and common medium distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; common distinct clay films on faces of peds; common medium red and brown concretions; very strongly acid; clear smooth boundary.

2Btg—58 to 70 inches; mottled silty clay that is 70 percent light yellowish brown (10YR 6/4) and 30 percent brownish yellow (10YR 6/8); moderate medium subangular blocky structure; firm; common distinct clay films on faces of peds; common medium red and brown concretions; extremely acid.

The thickness of the solum ranges from 60 to 80 inches. The depth to a horizon with 5 percent or more plinthite ranges from 20 to 58 inches. Depth to the 2Btg horizon ranges from 30 to 60 inches. Mottles with chroma of 1 or 2 are at depths of 12 to 30 inches. Except in areas where the surface layer has been limed, reaction ranges from extremely acid to strongly acid throughout the profile. In at least one subhorizon within a depth of 30 inches, exchangeable aluminum makes up 50 percent or more of the effective cation-exchange capacity.

The A horizon has value of 3 or 4 and chroma of 2 or 3. It is 3 to 6 inches thick.

The E horizon has value of 5 or 6 and chroma of 2 or 3. It is sandy loam, fine sandy loam, or loam. The horizon is 2 to 5 inches thick. The number of mottles ranges from none to common.

The E and Bt parts of the E/B horizon have the same colors and textures as the E and Bt horizons, respectively. The number of mottles in shades of brown, yellow, or gray ranges from few to many.

The Bt and Btv horizons have value of 5 or 6 and chroma of 4 to 8. The Bt horizon is loam, sandy clay loam, or clay loam. The Btv horizon is loam, sandy clay loam, clay loam, or silty clay loam. The content of plinthite in the Btv horizon ranges from 5 to 25 percent, by volume.

The 2Btg horizon may be mottled in shades of brown, yellow, gray, or red. The texture is sandy clay loam, clay loam, silty clay, or clay.

Trep Series

The Trep series consists of moderately well drained soils that formed in sandy, loamy, and clayey marine sediments of Tertiary age. These soils are moderately permeable in the upper part of the subsoil and moderately slowly permeable in the lower part. They are on uplands. Slopes range from 1 to 12 percent.

Soils of the Trep series are loamy, siliceous, thermic Arenic Paleudults.

Trep soils commonly are near Bowie, Briley, Kirvin, Sacul, and Saucier soils. Bowie, Kirvin, Sacul, and Saucier soils do not have a sandy surface layer and subsurface layer that have a combined thickness of more than 20 inches. Briley soils have a reddish subsoil. Bowie and Saucier soils are lower on the landscape than the Trep soils. Briley soils are in the slightly higher landscape positions. Kirvin and Sacul soils are in the higher areas.

Typical pedon of Trep loamy fine sand, 1 to 5 percent slopes; about 1.5 miles west of Converse, 400 feet south of Louisiana State Highway 174; Las Ormigas Spanish Land Grant sec. 38, T. 9 N., R. 13 W., map sheet 7:

A—0 to 4 inches; dark grayish brown (10YR 4/2) loamy fine sand; weak fine granular structure; very friable; many medium and fine roots; medium acid; clear smooth boundary.

E—4 to 22 inches; light yellowish brown (10YR 6/4) loamy fine sand; weak fine granular structure; very friable; many fine roots; slightly acid; clear smooth boundary.

Bt1—22 to 30 inches; yellowish brown (10YR 5/8) sandy clay loam; common medium distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; few faint clay films on faces of peds; few medium black and brown nodules; neutral; gradual smooth boundary.

Bt2—30 to 39 inches; yellowish brown (10YR 5/8) sandy clay loam; many coarse prominent red (2.5YR 4/8) and common fine prominent light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; common distinct clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt3—39 to 55 inches; mottled brownish yellow (10YR 6/6), red (10R 4/8), and light brownish gray (10YR 6/2) sandy clay loam; weak medium subangular blocky structure; firm; common faint clay films on faces of peds; extremely acid; gradual smooth boundary.

BC—55 to 60 inches; mottled light brownish gray (10YR

6/2), yellowish brown (10YR 5/8), and red (10R 4/8) sandy clay; weak medium subangular blocky structure; firm; few pockets of red (10R 4/8) fine sandy loam; very strongly acid.

The thickness of the solum ranges from 60 to more than 80 inches.

The combined thickness of the A and E horizons ranges from 20 to 40 inches. The A horizon has value of 4 or 5 and chroma of 2 to 4. It is 4 to 10 inches thick. Unless the soils have been limed, reaction in the A horizon ranges from strongly acid to slightly acid.

The E horizon has value of 5 or 6 and chroma of 3 to 6. It is 14 to 30 inches thick. Reaction ranges from strongly acid to slightly acid. Some pedons have a thin B/E horizon.

The upper part of the Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 to 8. The number of mottles in shades of red or brown is few or common. Mottles with chroma of 2 or less are below a depth of 30 inches. The texture is sandy clay loam or loam. Reaction ranges from very strongly acid to neutral.

Typically, the lower part of the Bt horizon and the BC horizon are mottled in shades of gray, brown, or red. In some pedons they have a grayish or brownish matrix with yellow or red mottles. The lower part of the Bt horizon is clay loam or sandy clay loam. Reaction ranges from extremely acid to strongly acid.

Formation of the Soils

In this section, the processes and factors of soil formation are explained and related to the soils in the survey area and the landforms and surface geology of the parish are described.

Processes of Soil Formation

The processes of soil formation influence the kind and degree of profile development. The factors of soil formation—parent material, climate, living organisms, relief, and time—determine the rate and relative effectiveness of 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 *(13, 26)*.

Many processes occur simultaneously. Examples are the accumulation of organic matter, the development of soil structure, the formation and translocation of clay, and the leaching of bases from some soil horizons. Some processes that have contributed to the formation of the soils in Sabine Parish are described in the following paragraphs.

Organic matter has accumulated in all of the soils, has partly decomposed, and has been incorporated into the soils. Because most organic matter is produced in and above the surface layer, this layer is higher in content of organic matter than the lower horizons. Living organisms decompose, incorporate, and mix organic matter into the soil. Many of the more stable products of decomposition remain as finely divided material that helps to darken the soil, increases the water-holding and cation-exchange capacities and the degree of granulation in the soil, and provides a source of plant nutrients. In Sabine Parish, the conversion of woodland and pasture to cropland has reduced the content of organic matter in many of the soils.

The addition of alluvial sediments on the surface has contributed to the formation of some soils in the parish by providing new parent material. In many areas, new material has accumulated faster than the processes of soil formation could appreciably alter it. The evident depositional strata in Iuka and Sardis soils are the result of this type of accumulation. The addition of alluvial sediments is also occurring in flooded areas of Guyton soils.

Processes resulting in the development of soil structure have occurred in all of the soils. Plant roots and other living organisms help to rearrange soil material into secondary aggregates. Decomposition products or organic residue, secretions of organisms, clays, and the oxides of elements, such as iron, which form during soil development, all serve as cementing agents that help to stabilize structural aggregates.

Alternating periods of wetting and drying and shrinking and swelling contribute to the development of structural aggregates, particularly in soils that have a large amount of clay, such as Bellwood soils.

The poorly drained soils in the survey area have horizons in which the reduction and segregation of iron and manganese compounds are important processes. Reducing conditions prevail for long periods in poorly aerated horizons. Consequently, the relatively soluble reduced forms of iron and manganese are more abundant than the less soluble oxidized forms. Reduced forms of these elements result in the gray colors that are characteristic of the subsoil of Gessner and Guyton soils. In the more soluble reduced forms, appreciable amounts of iron and manganese can be removed from the soil or translocated from one position to another within the soil by water. The browner mottles in predominantly gray horizons indicate segregation and concentration of oxidized iron compounds that resulted from alternating conditions of oxidizing and reducing.

In most of the soils, water moving through the profile has leached soluble bases and any free carbonates that may have been initially present from some horizons. The effects of leaching are the least pronounced in Keiffer and Oktibbeha soils. These soils formed in parent material that initially contained large amounts of free calcium carbonate. Keiffer soils contain free calcium carbonate throughout, and Oktibbeha soils contain free calcium carbonate in the lower part. Except for Keiffer and Oktibbeha soils, all of the soils in the parish are typically acid throughout. Keiffer and Oktibbeha soils are in the Tertiary uplands and formed in clayey sediments. Because water moves at a very slow or slow rate through the profile, carbonates have not been leached from the soils.

The formation, translocation, and accumulation of clay in the profile have been important during the development of all of the soils in the parish, except for Iuka, Keiffer, and Sardis soils. Silicon and aluminum, released as a result of the weathering of such minerals as pyroxenes, amphiboles, and feldspar, can recombine with the components of water to form secondary clay minerals, such as kaolinite. Layer silicate minerals, such as biotite and montmorillonite, can also weather to form other clay minerals, such as vermiculite and kaolinite. Horizons consisting of secondary accumulations of clay result largely from the translocation of clays from the upper to the lower horizons. As water moves downward, it can carry small amounts of clay in suspension. The clay is deposited and accumulates at the depth of water penetration or in horizons where it becomes flocculated or filtered out by fine pores. Over long periods of time, these processes can result in distinct horizons of clay accumulation. Secondary accumulation of calcium carbonate occurs in the lower part of the solum in some soils. Carbonates dissolved from overlying horizons were translocated to this depth by water and redeposited. In most areas of Oktibbeha soils, calcium carbonate is in the lower part of the profile.

Factors of Soil Formation

Soil is produced by soil-forming processes acting on material deposited or accumulated by geologic forces.

The characteristics of the soil at any given point are determined by the physical and mineralogical composition of the parent material, the climate under which the soil has accumulated and existed since accumulation, the plant and animal life on and in the soil, the relief, and the length of time that these forces of soil formation have acted on the soil material *(15)*.

Climate and plant and animal life, chiefly plants, are active factors of soil formation. These factors act on the parent material that has accumulated through the weathering of rocks and slowly change it to a natural body that has genetically related horizons. The effects of climate and plant and animal life are conditioned by relief. The parent material also affects the kind of soil profile that is formed and, in some cases, determines it almost entirely. Time is needed to change the parent material into a soil profile. In most cases, a very long time is needed to develop distinct soil layers.

The factors of soil formation are so closely interrelated in their effects on the soil that few generalizations of any one factor can be made unless conditions are specified for the other four. In the following paragraphs the factors of soil formation are discussed as they relate to soils in the parish.

Climate

Sabine Parish is in a region characterized by a humid, subtropical climate. A detailed description of the climate in the parish is given in the section "General Nature of the Parish."

The climate is relatively uniform throughout the parish. Local differences among the soils are not the result of great differences in climate. The warm, moist climate promotes rapid soil formation. High rates of precipitation favor the rapid weathering of readily weatherable minerals in the soils and the downward movement of colloidal material. Plant remains decompose rapidly because of the warm climate, and thus soils that have a high content of organic matter do not form. The organic acids produced during decomposition hasten the development of clay minerals and the removal of carbonates. Also, the rate of soil development is high because the soils are seldom frozen for prolonged periods.

Living Organisms

Plants, animals, insects, bacteria, fungi, other micro-organisms, and humans are important in the formation of soils in Sabine Parish. Plant growth and animal activity physically alter the soil. The activities of humans, such as the clearing of land and the cultivation of crops, also physically alter the surface layer of soils.

The native vegetation on bottom land and low terraces in Sabine Parish was primarily hardwood forests. The native vegetation in the uplands was primarily mixed hardwood and pine forests. Soils that developed under mixed hardwood and pine forests generally have a lower content of organic matter and a more distinct E horizon than soils that developed under hardwood forests.

Bacteria, fungi, and other micro-organisms are primarily responsible for decomposition of organic matter and oxidation-reduction reactions that affect the physical and chemical properties of the soils. Aerobic bacteria, which are more abundant in well drained soils, decompose organic matter rapidly; anerobic bacteria, which are more abundant in poorly drained soils, decompose organic matter slowly. Therefore, the content of organic matter in well drained soils is lower than that in poorly drained soils.

Parent Material

Parent material is the mass from which soil develops. It affects the color, texture, permeability, mineralogy, and erosion potential of the soil.

The soils of Sabine Parish formed in alluvium deposited by local streams and in Pleistocene and Tertiary sediments *(4)*. The characteristics, distribution, and depositional pattern of the different parent materials in the parish are discussed in more detail in the section "Landforms and Surface Geology."

Relief

Relief influences soil formation by affecting soil drainage, runoff, erosion, deposition, and soil temperature. The influence of relief on soils in Sabine Parish is especially evident in the rate of surface runoff, in internal soil drainage, and in depth to a seasonal high water table. For example, Kisatchie soils are in the highest landscape positions in the parish and are well drained. They have a rapid rate of runoff and a seasonal high water table that is at a depth of more than 6 feet. Conversely, Mayhew soils are generally in the lowest landscape positions and are poorly drained. They have a medium rate of runoff and a seasonal high water table that ranges in depth from near the surface to about 1 foot below.

In some areas in the uplands, relief is great and slopes are steep. Runoff is rapid, and little water enters the soil. Soils in these areas are eroding at rates nearly equal to those of soil formation. Sacul soils, which have a relatively thin solum, are an example of these soils.

Time

In the process of soil formation, many years are required to change the parent material *(15)*. The age of a soil is generally determined by the degree of profile development. For soils that have the same parent material, the soils that exhibit little profile development are immature and those that have a well expressed profile are mature.

Generally, the longer the parent material has remained in place, the more fully developed the soil profile. In Sabine Parish, parent material ranges in age from a few hundred years to many millions of years.

The youngest soils in the parish, including Iuka and Sardis soils, formed in recent alluvium that was deposited by overflow from local streams during the last 500 years. These soils have relatively weakly expressed horizons.

The oldest soils in the parish are in the uplands. They formed in parent material ranging in age from 20,000 years to about 63 million years *(4)*.

Landforms and Surface Geology

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The main physiographic areas in Sabine Parish are the Tertiary uplands and the local alluvial valleys, which drain the uplands. Of minor extent are the Prairie Terrace, which flanks the valleys of all major streams in the parish, the Montgomery Terrace, and older terraces. The older terraces are remnants of isolated, widely separated terraces that cap the Tertiary uplands flanking the Sabine River valley *(4, 25)*.

The Sabine River valley and the adjacent Deweyville Terrace have been completely inundated by the Toledo Bend Reservoir. The Prairie Terrace and the local alluvial valleys make up the most important agricultural area in the parish. The Latonia general soil map unit corresponds to an area of the Prairie Terrace. The Sardis-Guyton and Guyton-Iuka general soil map units correspond to the local alluvial valleys.

In Sabine Parish, the geologic formations dip toward the gulf coast. The surface elevation, however, increases from north to south. The surface topography is hogback or homoclinal. It is incised in the west by the Sabine River valley and in the east by the Red River valley. Tributary streams that drain the parish have channels at a depth of 15 to 30 feet below the adjacent alluvial valleys. The valleys range in width from a few feet to as much as 1.5 miles.

Tertiary Uplands

Eighteen formations of the Tertiary System are exposed in Sabine Parish. They are mainly exposed in a west to northeast pattern and at a slight angle to the gulf coast. In sequence from north to south and from oldest to youngest, they are the Converse, Lime Hill, Hall Summit, Marthaville, Pendleton, Sabinetown, and Corrizo Formations of the Wilcox Group; the Moodys Branch, Yazoo, and Mosley Hill Formations of the Jackson Group; the Sandell and Nash Creek Formations of the Vicksburg Group; and the Catahoula and Fleming Formations of the Miocene Series. Outcrops of these formations are associated with the Sabine Uplift, the Angelina-Caldwell flexure, subsequent fracturing and faulting, and subsequent geologic erosion.

The Sabine Uplift is a flat-topped dome in the northwestern part of Louisiana and the northeastern part of Texas. The southern extension of this uplift, or dome, is the dominant structural feature of the northern half of Sabine Parish. Extensive faulting has accompanied the Sabine Uplift, and thus the soil-geology relationship in the Tertiary uplands is very complex. Similar soils occur on adjacent landscapes that formed from different geologic materials. Some dissimilar soils occur on opposite side slopes as a result of the tilting and faulting of the landscape. The Sacul-Kirvin-Keithville general soil map unit corresponds to the area of the uplift. The soils of this general soil map unit formed mainly in materials of the Converse, Lime Hill, and Hall Summit Formations.

The formations in the area of the Sabine Uplift dip about 45 feet per mile. Further south, in the vicinity of Bayou Lana and Many, the formations dip as much as 250 feet per mile. The area where the dip increases from 45 feet per mile to 250 feet per mile is known as the Angelina-Caldwell flexure point or hinge line. As the continental shelf in the Gulf of Mexico subsides, the maximum movement, or hinging, is absorbed along this hinge line. It is manifested by a series of horsts and graben faults in the upper Wilcox Group and the lower Claiborne Group. These horsts and graben faults control the major geomorphology-soil relationships in the parish. The formations exposed in this area are the Pendleton, Sabinetown, and Carrizo Formations of the Wilcox Group. The Eastwood-Keithville-Bowie and Trep-Briley-Betis general soil map units correspond to areas of these formations.

The Wilcox Group consists of fluviatile sediments deposited in brackish and marine environments. These sediments probably accumulated as a result of a cyclic series of depositions, which are similar to the present pattern of deposition in the Mississippi River delta. Each cycle began when the cessation of deltaic deposition resulted in an encroachment of the sea. The advancing sand sheet or the basal beach sand and marl were deposited first. As the sea advanced inland, they were overlain by fossiliferous clays. The completion of the cycle is marked by recurrent deltaic sedimentation and the seaward extension of the land. Preceding the seaward extension of the land, the raw materials of shales were deposited at the margins of the great deltaic masses. Lignitic shale formed in the prodeltaic sediments. Continued deltaic sedimentation resulted in the deposition of thick masses of sand and lignitic shale, which became incorporated with fluviatile sediments.

Other formations exposed in the area of the Sabine Uplift are the Cane River, Sparta, Cook Mountain, and Cockfield Formations of the Claiborne Group.

The Cane River Formation, which is the basal marine unit of the Claiborne Group, consists of glauconitic fossiliferous sand. The Oktibbeha-Nacogdoches general soil map unit corresponds to an exposure of this formation.

The Sparta Formation has a basal member of massive, fine-grained, cross-bedded sands that are interbedded with sandy clays. The upper member is made up of chocolate-colored shale and lignitic and glauconitic sands *(4)*. The Trep-Briley-Betis general soil map unit corresponds to an exposure of this formation.

The Cook Mountain Formation consists of three members. These members are the Dodson member, which is a basal unit of silty clay and sand; the Milans member, which is a middle unit that is predominantly marl; and the Saline Bayou member, which is an upper unit of glauconitic clay. The Oktibbeha-Nacogdoches general soil map unit corresponds to an area of this formation.

The Cockfield Formation has a basal member of massive to cross-bedded, fine-grained sand that is 30 to 40 feet thick. The basal member is overlain by interbedded clays, silts, and sands. The outcrop of this formation ranges in width from 2.8 to 5.5 miles. The formation dips towards the gulf 250 feet per mile. The Eastwood-Keithville-Bowie general soil map unit corresponds to an area of this formation.

Further south, in the area of Bayou Toro, the topography is slightly less rolling. The formations exposed in this area are the Mosley Hill, Yazoo, and Moodys Branch Formations of the Jackson Group. In Sabine Parish, the Jackson Group has a maximum thickness of 600 feet. It consists principally of clays that have varying quantities of sand, glauconite, and volcanic materials. The outcrop belt of the Jackson Group ranges in width from 1.7 to 3.8 miles. Where the outcrop belt is dissected by Bayou Toro and Middle Creek, the formations are covered by a thin terrace veneer. The Bellwood-Bowie-Keithville general soil map unit corresponds to an area of the Jackson Group.

A major formation exposed in the southeastern and southern parts of the parish is the Catahoula Formation of the Miocene Series. This formation overlies the Jackson and Vicksburg Groups. It outcrops as a band 5 to 8 miles wide that extends southward into the northern part of Vernon Parish. In the western part of Louisiana, the Catahoula Formation is the most extensive formation that contains bentonitic and tuffaceous material. It is largely fluviatile in origin *(4)*. The formation consists of channel and point-bar sandstone, levee and crevasse-splay sandstone, siltstone, and mudstone. Materials of the Catahoula Formation contain volcanic ash, which has weathered to bentonitic clays. Depositions of volcanic ash began during the last part of the Eocene age and continued through the Oligocene age and into part of the Miocene age. The materials were blown from Mexico, New Mexico, and the Transpecos area of Texas. The Mayhew-Letney-Corrigan and Kisatchie-Mayhew-Rayburn general soil map units correspond to an area of the Catahoula Formation.

The stratigraphic sand mass unit that overlies the Catahoula Formation is shown on a geology map of Sabine Parish as Plio-Pleistocene *(25)*. Investigations by the soil survey party and others indicate that this sand unit is probably the Carnahan Bayou member of the Fleming Formation. This member consists of medium-grained, cross-bedded sand about 35 feet thick. The Letney-Briley-Betis general soil map unit corresponds to an area of the Carnahan Bayou member of the Fleming Formation.

References

(1) Adams, F. 1984. Soil acidity and liming. Am. Soc. Agron., Agron. Mono. 12, 2nd ed.

(2) American Association of State Highway and Transportation Officials. 1986. Standard specifications for highway materials and methods of sampling and testing. Ed. 14, 2 vols.

(3) American Society for Testing and Materials. 1993. Standard classification of soils for engineering purposes. ASTM Stand. D 2487.

(4) Anderson, H.V. 1960. Geology of Sabine Parish. La. Dep. Conserv., Geol. Surv. Bull. 34.

(5) Black, C.A. 1968. Soil-plant relationships.

(6) Bray, R.H., and L.T. Kurtz. 1945. Determination of total, organic, and available forms of phophorus in soil. Soil Sci. 59: 39-45.

(7) Briscoe, C.B., and M.D. Ferrill. 1958. Height growth of American sycamore in southeastern Louisiana. La. State Univ. Agric. Exp. Sta. Res. Rel., LSU Forest. Note 19.

(8) Broadfoot, Walter M. 1960. Field guide for evaluating cherrybark oak sites. U.S. Dep. Agric., Forest Serv., South. Forest Exp. Stn. Occas. Pap. 190.

(9) Broadfoot, Walter M. 1960. Field guide for evaluating cottonwood sites. U.S. Dep. Agric., Forest Serv., South. Forest Exp. Stn. Occas. Pap. 178.

(10) Broadfoot, Walter M. 1963. Guide for evaluating water oak sites. U.S. Dep. Agric., Forest Serv., South. Forest Exp. Stn. Res. Pap. SO-1.

(11) Broadfoot, Walter M., and R.M. Krinard. 1959. Guide for evaluating sweetgum sites. U.S. Dep. Agric., Forest Serv., South. Forest Exp. Stn. Occas. Pap. 176.

(12) Brupbacher, R.H., and others. 1970. Fertility levels and lime status of soils in Louisiana. La. Agric. Exp. Stn. Bull. 644.

(13) Buol, S.W., F.D. Hole, and R.J. McCracken. 1980. Soil genesis and classification. 2nd ed.

(14) Durham, C.O., Jr. 1964. Iron ore of central north Louisiana. La. Dep. Conserv., Geol. Surv. Bull. 41.

(15) Jenny, Hans. 1941. Factors of soil formation.

(16) Khasawneh, F.E., E.C. Sample, and E.J. Kamprath, eds. 1980. The role of phosphorus in agriculture. Am. Soc. Agron.

(17) Kilmer, V.J., S.E. Younts, and N.C. Brady, eds. 1968. The role of potassium in agriculture. Am. Soc. Agron.

(18) Louisiana Cooperative Extension Service. 1987. Summary of agricultural and natural resources.

(19) Lurry, D.L. 1987. Pumpage of water in Louisiana, 1985. La. Dep. Trans. and Dev., Off. Pub. Works, Water Resourc. Spec. Rep. 4.

(20) Mehlich, A. 1953. Determination of P, Ca, Mg, K, Na, and NH_4. North Carolina Soil Test Div., mimeo. 1953.

(21) Munson, R.D., ed. 1985. Potassium in agriculture. Am. Soc. Agron.

(22) Olson, S.R., C.V. Cole, F.S. Watanabe, and L.A. Dean. 1954. Estimation of available phosphorus in soils by extraction with sodium bicarbonate. U.S. Dep. Agric. Circ. 939: 1-19.

(23) Page, A.L., ed. 1982. Methods of soil analysis, part 2. Ed. 2, Am. Soc. Agron., Agron. Mono. 9.

(24) Page, Leland V., Roy Newcome, Jr., and George D. Graeff, Jr. 1963. Water resources of Sabine Parish, Louisiana.

(25) Pope, D.E., J.I. Snead, and R.P. McCulloh. 1984. Geologic map of Louisiana. La. Geol. Surv.

(26) Simonson, Roy W. 1959. Outline of a generalized theory of soil genesis. Soil Sci. Soc. Am. Proc. 23: 152-156.

(27) Stevenson, F.J. 1982. Humus chemistry.

(28) Stevenson, F.J., ed. 1982. Nitrogen in agricultural soils. Am. Soc. Agron., Agron. Mono. 22.

(29) Thomas, C.E., and C.V. Bylin. 1980. Louisiana mid-cycle survey shows change in forest resource trends. U.S. Dep. Agric., Forest Serv., South. Forest Exp. Stn.

(30) United States Department of Agriculture. 1919. Soil survey of Sabine Parish, Louisiana. Bur. of Soils.

(31) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 436.

(32) United States Department of Agriculture. 1984 (rev.). Procedures for collecting soil samples and methods of analysis for soil survey. Soil Surv. Invest. Rep. 1.

(33) United States Department of Agriculture. 1993. Soil survey manual. U.S. Dep. Agric. Handb. 18.

(34) Walsh, L.M., and J.D. Beaton, eds. 1973. Soil testing and plant analysis. Soil Sci. Soc. Am.

(35) Woodward, T.P., and A.J. Gueno, Jr. 1941. The sand and gravel deposits of Louisiana. La. Geol. Surv., Geol. Bull. 19.

Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well-aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

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.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic)—Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated)—Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

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.

Fine textured soil. Sandy clay, silty clay, or clay.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Forb. Any herbaceous plant that is not a grass or a sedge.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai. Commonly, a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of clayey soils that shrink and swell considerably with changes in moisture content.

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 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of the 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.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material. 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

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

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).

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

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, such as 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.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Rippable bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 drawbar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

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.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

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 refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

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). An otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). An excessive amount of toxic substances in the soil, such as aluminum, severely hinders the establishment of vegetation or severely restricts plant growth.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited in stream valleys by heavily loaded streams.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1953-77 at Converse, Louisiana)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	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-----	57.1	33.0	45.1	80	10	63	4.02	1.70	5.91	7	0.4
February----	62.4	35.8	49.1	81	17	95	3.96	2.14	5.44	6	.4
March-------	68.5	42.4	55.5	86	22	229	4.52	2.05	6.52	7	.4
April-------	77.2	51.9	64.6	89	29	438	4.57	1.56	6.96	5	.0
May---------	83.5	58.9	71.2	92	40	657	5.61	3.06	7.69	7	.0
June--------	88.8	65.2	77.0	96	52	810	3.90	1.26	6.02	5	.0
July--------	92.6	68.8	80.7	100	58	952	3.66	1.21	5.60	6	.0
August------	92.3	67.1	79.7	101	54	921	2.96	.88	4.62	5	.0
September---	87.7	62.2	75.0	97	44	750	4.10	1.32	6.31	5	.0
October-----	79.1	49.1	64.2	93	31	440	2.95	1.18	4.38	4	.0
November----	68.6	40.6	54.5	86	18	188	3.83	1.74	5.53	6	.0
December----	60.6	34.5	47.6	80	15	86	4.76	2.22	6.83	7	.0
Yearly:											
Average---	76.5	50.8	63.7	---	---	---	---	---	---	---	---
Extreme---	---	---	---	101	10	---	---	---	---	---	---
Total-----	---	---	---	---	---	5,629	48.84	36.92	59.79	70	1.2

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1953-77 at Converse, 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--	Mar. 14	Mar. 28	Apr. 12
2 years in 10 later than--	Mar. 6	Mar. 23	Apr. 7
5 years in 10 later than--	Feb. 20	Mar. 12	Mar. 29
First freezing temperature in fall:			
1 year in 10 earlier than--	Nov. 3	Oct. 27	Oct. 16
2 years in 10 earlier than--	Nov. 10	Nov. 2	Oct. 22
5 years in 10 earlier than--	Nov. 24	Nov. 12	Nov. 4

TABLE 3.--GROWING SEASON

(Recorded in the period 1953-77 at Converse, 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	249	222	197
8 years in 10	259	230	205
5 years in 10	277	244	219
2 years in 10	295	259	233
1 year in 10	305	267	240

TABLE 4.--SUITABILITY AND LIMITATIONS OF MAP UNITS ON THE GENERAL SOIL MAP FOR MAJOR LAND USES

Map unit	Percent of area	Cultivated crops	Pasture	Woodland	Urban uses	Intensive recreational areas
Guyton-Iuka	13	Generally not suited: flooding, wetness.	Poorly suited: flooding, wetness.	Moderately well suited: flooding, wetness, restricted use of equipment, seedling mortality, compaction.	Poorly suited:[1] flooding, wetness.	Poorly suited: flooding, wetness.
Sardis-Guyton	1	Moderately well suited: wetness, low fertility, potentially toxic levels of aluminum.	Moderately well suited: wetness, low fertility.	Moderately well suited: wetness, restricted use of equipment, seedling mortality, compaction.	Poorly suited: flooding, wetness, restricted permeability, low strength on sites for roads.	Poorly suited: flooding, wetness.
Latonia	6	Well suited	Well suited	Well suited	Moderately well suited: restricted permeability, shrink-swell potential, slope, seepage.	Well suited.
Sacul-Kirvin-Keithville	25	Sacul:[2] poorly suited--slope, low fertility, potentially toxic levels of aluminum. Kirvin and Keithville:[2] moderately well suited--slope, low fertility, potential toxic levels of aluminum.	Sacul:[3] moderately well suited--slope, low fertility. Kirvin and Keithville:[3] well suited.	Well suited	Sacul: poorly suited--restricted permeability, slope, shrink-swell potential, low strength on sites for roads. Kirvin and Keithville:[4] moderately well suited--slope, restricted permeability, shrink-swell potential, wetness, low strength on sites for roads.	Moderately well suited: slope, restricted permeability, small stones on surface.

See footnotes at end of table.

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	Pasture	Woodland	Urban uses	Intensive recreational areas
Oktibbeha-Nacogdoches--------	2	Moderately well suited:[2] slope, low and medium fertility, droughtiness.	Moderately well suited:[3] slope, low and medium fertility, droughtiness.	Oktibbeha: well suited. Nacogdoches: moderately well suited--gravelly surface layer, restricted use of equipment.	Oktibbeha: poorly suited--shrink-swell potential, slope, restricted permeability, clayey texture, low strength on sites for roads. Nacogdoches: moderately well suited--shrink-swell potential, slope, restricted permeability, low strength on sites for roads.	Oktibbeha: poorly suited--restricted permeability, slope. Nacogdoches: moderately well suited--restricted permeability, slope, small stones on surface.
Bellwood-Bowie-Keithville----	6	Bellwood:[2] poorly suited--slope, low fertility, poor tilth, potentially toxic levels of aluminum. Bowie and Keithville:[5] moderately well suited--slope, low fertility, potentially toxic levels of aluminum.	Bellwood:[3] moderately well suited--slope, low fertility. Bowie and Keithville:[6] well suited.	Bellwood: moderately well suited--wetness, clayey subsoil, restricted use of equipment, seedling mortality, compaction. Bowie and Keithville: well suited.	Bellwood: poorly suited--slope, restricted permeability, shrink-swell potential, wetness, low strength on sites for roads. Bowie and Keithville: moderately well suited--slope, wetness, restricted permeability, low strength on sites for roads.	Bellwood: poorly suited--restricted permeability, slope. Bowie:[7] well suited. Keithville: moderately well suited--restricted permeability, slope.

See footnotes at end of table.

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	Pasture	Woodland	Urban uses	Intensive recreational areas
Letney-Briley-Betis	2	Moderately well suited: droughtiness, slope, low fertility, poor trafficability, potentially toxic levels of aluminum.	Moderately well suited: droughtiness, low fertility.	Letney and Briley: well suited. Betis: moderately well suited--droughtiness, restricted use of equipment, seedling mortality.	Moderately well suited: slope, sandy texture, seepage on sites for sanitary facilities, cutbanks cave, droughtiness.	Moderately well suited: sandy surface layer, slope, droughtiness.
Sacul-Saucier-Kirvin	6	Sacul:[2] poorly suited--slope, low fertility, potentially toxic levels of aluminum. Saucier: well suited. Kirvin:[2] moderately well suited--slope low fertility, potentially toxic levels of aluminum.	Sacul:[3] moderately well suited--slope, low fertility. Saucier and Kirvin:[3] well suited.	Well suited	Sacul: poorly suited--slope, restricted permeability, shrink-swell potential, wetness, low strength on sites for roads. Saucier and Kirvin:[4] moderately well suited--wetness, restricted permeability, slope, shrink-swell potential.	Sacul and Kirvin: moderately well suited--restricted permeability, slope, small stones on surface. Saucier: well suited.

See footnotes at end of table.

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	Pasture	Woodland	Urban uses	Intensive recreational areas
Eastwood-Keithville-Bowie	24	Eastwood:[2] poorly suited--slope, low fertility, potentially toxic levels of aluminum. Keithville and Bowie:[5] moderately well suited--slope, low fertility, potentially toxic levels of aluminum.	Eastwood:[3] moderately well suited--slope, low fertility. Keithville and Bowie:[6] well suited.	Well suited.	Eastwood: poorly suited--restricted permeability, shrink-swell potential, slope, low strength on sites for roads. Keithville and Bowie: moderately well suited--wetness, restricted permeability, slope, low strength on sites for roads.	Eastwood: poorly suited--restricted permeability, slope. Keithville: moderately well suited--restricted permeability, slope. Bowie:[7] well suited.
Mayhew-Letney-Corrigan	3	Mayhew and Letney:[8] moderately well suited--slope, low fertility, wetness, droughtiness. Corrigan: poorly suited--slope, low fertility, wetness.	Moderately well suited: slope, wetness, low fertility, droughtiness.	Mayhew: moderately well suited--wetness, restricted use of equipment, seedling mortality, compaction. Letney and Corrigan: well suited.	Mayhew and Corrigan: poorly suited--wetness, restricted permeability, shrink-swell potential, low strength on sites for roads. Letney: moderately well suited--seepage on sites for sanitary facilities, droughtiness, cutbanks cave.	Mayhew and Corrigan: poorly suited--wetness, restricted permeability, slope. Letney: moderately well suited--slope, droughtiness, sandy surface layer.
Trep-Briley-Betis	6	Moderately well suited:[8] droughtiness, low fertility, slope, poor trafficability, potentially toxic levels of aluminum.	Moderately well suited: droughtiness, slope, low fertility.	Trep and Briley: well suited. Betis: moderately well suited--sandy surface layer, restricted use of equipment, seedling mortality.	Moderately well suited: seepage on sites for sanitary facilities, sandy texture, slope, droughtiness, cutbanks cave, wetness, restricted permeability.	Moderately well suited: slope, sandy surface layer, droughtiness.

See footnotes at end of table.

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	Pasture	Woodland	Urban uses	Intensive recreational areas
Sacul	3	Generally not suited: slope.	Generally not suited: slope.	Well suited[9]	Poorly suited: slope, restricted permeability, wetness, shrink-swell potential, low strength on sites for roads.	Poorly suited:[10] slope.
Kisatchie-Mayhew-Rayburn	3	Generally not suited: slope, rock outcrops, low fertility, gullies, wetness.	Poorly suited: slope, low fertility, wetness, gullies, rock outcrops.	Moderately well suited: slope, gullies, rock outcrops, hazard of erosion, seedling mortality, restricted use of equipment, compaction.	Poorly suited: slope, restricted permeability, rock outcrops, depth to bedrock, wetness, low strength on sites for roads.	Poorly suited: slope, restricted permeability, wetness, rock outcrops.

1 These soils generally are not suited to use as homesites because of frequent flooding.

2 The moderately sloping and strongly sloping soils generally are not suited to crops because of the slope and a severe hazard of erosion.

3 The moderately sloping and strongly sloping soils generally are poorly suited to pasture because of the slope and a severe hazard of erosion.

4 The moderately sloping and strongly sloping Kirvin soils are poorly suited to urban uses mainly because of the slope.

5 The moderately sloping Bowie soils are poorly suited to crops.

6 The moderately sloping Bowie soils are moderately well suited to pasture.

7 The moderately sloping Bowie soils are moderately well suited to intensive recreational areas.

8 The moderately sloping and strongly sloping soils are poorly suited to crops.

9 The moderately steep and steep Sacul soils are moderately well suited to woodland because of the slope and a severe hazard of erosion.

10 The moderately sloping and strongly sloping Sacul soils are moderately well suited to intensive recreational areas.

TABLE 5.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AtC	Attoyac fine sandy loam, 1 to 5 percent slopes	1,500	0.2
BlC	Bellwood silty clay loam, 1 to 5 percent slopes	11,100	1.7
BLE	Bellwood silty clay loam, 5 to 12 percent slopes	11,100	1.7
BtC	Betis loamy fine sand, 1 to 5 percent slopes	4,100	0.6
BTE	Betis loamy fine sand, 5 to 12 percent slopes	2,900	0.4
BwC	Bowie fine sandy loam, 1 to 5 percent slopes	17,000	2.6
BwD	Bowie fine sandy loam, 5 to 8 percent slopes	4,000	0.6
ByC	Briley loamy fine sand, 1 to 5 percent slopes	7,400	1.1
BYE	Briley loamy fine sand, 5 to 12 percent slopes	3,800	0.6
CoC	Corrigan fine sandy loam, 1 to 5 percent slopes	1,800	0.3
EdC	Eastwood fine sandy loam, 1 to 5 percent slopes	52,800	8.2
EDE	Eastwood fine sandy loam, 5 to 12 percent slopes	54,200	8.4
GYA	Guyton-Iuka association, frequently flooded	73,300	11.4
HtC	Herty very fine sandy loam, 1 to 5 percent slopes	1,800	0.3
KaC	Keiffer clay loam, 1 to 5 percent slopes	500	0.1
KAE	Keiffer clay loam, 5 to 12 percent slopes	600	0.1
KeC	Keithville very fine sandy loam, 1 to 5 percent slopes	35,900	5.5
KhB	Kenefick loamy fine sand, 1 to 3 percent slopes	1,300	0.2
KnC	Kirvin fine sandy loam, 1 to 5 percent slopes	14,000	2.2
KNE	Kirvin fine sandy loam, 5 to 12 percent slopes	4,900	0.8
KSF	Kisatchie-Mayhew-Rayburn association, 5 to 20 percent slopes	16,300	2.5
LaC	Latonia fine sandy loam, 1 to 5 percent slopes	28,500	4.4
LtC	Letney loamy sand, 1 to 5 percent slopes	6,900	1.1
LTE	Letney loamy sand, 5 to 12 percent slopes	3,600	0.6
MhC	Mayhew loam, 1 to 5 percent slopes	6,200	1.0
NcC	Nacogdoches gravelly sandy loam, 1 to 5 percent slopes	2,100	0.3
NgA	Niwana-Gessner loams	3,700	0.6
OtC	Oktibbeha loam, 1 to 5 percent slopes	3,300	0.5
OTE	Oktibbeha loam, 5 to 12 percent slopes	2,100	0.3
RbC	Rayburn fine sandy loam, 1 to 5 percent slopes	2,000	0.3
ScC	Sacul fine sandy loam, 1 to 5 percent slopes	51,800	8.0
SCE	Sacul fine sandy loam, 5 to 12 percent slopes	65,700	10.1
SCF	Sacul fine sandy loam, 12 to 30 percent slopes	12,600	1.9
SDA	Sardis-Guyton loams, rarely flooded	10,600	1.6
SeC	Saucier fine sandy loam, 1 to 5 percent slopes	15,100	2.3
TpC	Trep loamy fine sand, 1 to 5 percent slopes	8,600	1.3
TPE	Trep loamy fine sand, 5 to 12 percent slopes	4,200	0.6
	Water	100,100	15.6
	Total	647,400	100.0

TABLE 6.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland)

Map symbol	Soil name
AtC	Attoyac fine sandy loam, 1 to 5 percent slopes
BwC	Bowie fine sandy loam, 1 to 5 percent slopes
Kac	Keiffer clay loam, 1 to 5 percent slopes
KeC	Keithville very fine sandy loam, 1 to 5 percent slopes
KhB	Kenefick loamy fine sand, 1 to 3 percent slopes
LaC	Latonia fine sandy loam, 1 to 5 percent slopes
NcC	Nacogdoches gravelly sandy loam, 1 to 5 percent slopes
OtC	Oktibbeha loam, 1 to 5 percent slopes
ScC	Sacul fine sandy loam, 1 to 5 percent slopes
SeC	Saucier fine sandy loam, 1 to 5 percent slopes

TABLE 7.--LAND CAPABILITY AND YIELDS PER ACRE OF PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Bahiagrass	Common bermudagrass	Improved bermudagrass
		AUM*	AUM*	AUM*
AtC----------------------- Attoyac	IIIe	7.0	6.0	8.0
BlC----------------------- Bellwood	IVe	5.5	5.0	10.0
BLE----------------------- Bellwood	VIe	5.5	5.0	9.0
BtC----------------------- Betis	IIIs	---	---	8.0
BTE----------------------- Betis	IVe	5.0	---	7.0
BwC----------------------- Bowie	IIIe	7.5	5.5	12.0
BwD----------------------- Bowie	IVe	7.0	5.0	10.0
ByC----------------------- Briley	IIIe	6.5	---	9.0
BYE----------------------- Briley	IVe	6.0	---	8.0
CoC----------------------- Corrigan	IVe	4.5	4.0	7.0
EdC----------------------- Eastwood	IVe	6.0	6.0	10.0
EDE----------------------- Eastwood	VIe	5.5	5.5	9.0
GYA**---------------------	Vw			
Guyton--------------------		---	5.0	---
Iuka----------------------		7.0	6.0	8.0
HtC----------------------- Herty	IVe	6.0	5.0	8.0
KaC----------------------- Keiffer	IIIe	5.0	---	8.0
KAE----------------------- Keiffer	VIe	---	---	7.5
KeC----------------------- Keithville	IIIe	6.3	4.5	10.0
KhB----------------------- Kenefick	IIe	7.5	6.0	12.0

See footnotes at end of table.

TABLE 7.--LAND CAPABILITY AND YIELDS PER ACRE OF PASTURE--Continued

Soil name and map symbol	Land capability	Bahiagrass	Common bermudagrass	Improved bermudagrass
		AUM*	AUM*	AUM*
KnC: Kirvin	IIIe	8.0	5.5	10.0
KNE: Kirvin	VIe	6.0	5.0	9.0
KSF**:				
Kisatchie	VIe	5.0	3.5	4.5
Mayhew	IVe	7.0	6.0	10.0
Rayburn	VIe	5.0	3.5	4.5
LaC: Latonia	IIe	8.0	5.0	9.5
LtC: Letney	IIIs	6.5	---	8.0
LTE: Letney	IVe	5.0	---	7.0
MhC: Mayhew	IIIe	7.5	6.5	10.5
NcC: Nacogdoches	IIIe	6.0	---	7.0
NgA**:				
Niwana	IIw	8.0	6.0	10.0
Gessner	IVw	6.0	5.5	8.0
OtC: Oktibbeha	IIIe	5.5	5.0	10.0
OTE: Oktibbeha	VIe	5.5	5.0	9.0
RbC: Rayburn	IVe	5.0	4.0	5.0
ScC: Sacul	IVe	7.5	6.5	7.5
SCE: Sacul	VIe	6.5	5.5	9.5
SCF: Sacul	VIIe	6.0	5.0	8.5
SDA**:				
Sardis	IIw	7.5	8.0	10.0
Guyton	IIIw	9.5	6.5	8.0
SeC: Saucier	IIe	8.5	6.0	9.0
TpC: Trep	IIIe	6.0	6.0	9.0

See footnotes at end of table.

TABLE 7.--LAND CAPABILITY AND YIELDS PER ACRE OF PASTURE--Continued

Soil name and map symbol	Land capability	Bahiagrass	Common bermudagrass	Improved bermudagrass
		AUM*	AUM*	AUM*
TPE----------------------- Trep	IVe	5.0	5.0	8.0

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
AtC------------- Attoyac	9A	Slight	Slight	Slight	Slight	Loblolly pine-------	90	9	Loblolly pine.
						Shortleaf pine------	84	10	
						Sweetgum------------	90	7	
						Southern red oak----	80	4	
BlC, BLE-------- Bellwood	8C	Slight	Severe	Moderate	Moderate	Loblolly pine-------	78	8	Loblolly pine.
						Shortleaf pine------	68	7	
						White oak-----------	70	4	
						Southern red oak----	75	4	
BtC, BTE-------- Betis	7S	Slight	Moderate	Severe	Slight	Shortleaf pine------	63	7	Loblolly pine.
						Loblolly pine-------	70	6	
BwC, BwD-------- Bowie	9A	Slight	Slight	Slight	Slight	Loblolly pine-------	86	9	Loblolly pine.
						Shortleaf pine------	80	9	
ByC, BYE-------- Briley	8S	Slight	Moderate	Moderate	Slight	Loblolly pine-------	80	8	Loblolly pine.
						Shortleaf pine------	70	8	
						Slash pine----------	---	---	
CoC------------- Corrigan	8C	Moderate	Moderate	Moderate	Slight	Loblolly pine-------	84	8	Loblolly pine, longleaf pine.
						Shortleaf pine------	70	8	
						Longleaf pine-------	80	7	
EdC------------- Eastwood	10C	Slight	Moderate	Slight	Slight	Loblolly pine-------	93	10	Loblolly pine.
						Shortleaf pine------	---	---	
						Sweetgum------------	---	---	
						Southern red oak----	---	---	
						Hickory-------------	---	---	
EDE------------- Eastwood	9C	Moderate	Moderate	Slight	Slight	Loblolly pine-------	86	9	Loblolly pine.
						Shortleaf pine------	77	9	
						Sweetgum------------	---	---	
						Southern red oak----	---	---	
						Hickory-------------	---	---	
GYA**:									
Guyton---------	6W	Slight	Severe	Severe	Severe	Willow oak----------	93	6	Willow oak, Nuttall oak, overcup oak, green ash.
						Sweetgum------------	---	---	
						Green ash-----------	---	---	
						Nuttall oak---------	---	---	
						Eastern cottonwood--	---	---	
						Loblolly pine-------	95	10	
						Water oak-----------	---	---	
Iuka-----------	9W	Slight	Moderate	Moderate	Severe	Loblolly pine-------	100	9	Loblolly pine, water oak.
						Sweetgum------------	100	10	
						Eastern cottonwood--	105	---	
						Water oak-----------	100	---	
HtC------------- Herty	8C	Slight	Moderate	Moderate	Moderate	Loblolly pine-------	80	8	Loblolly pine.
						Shortleaf pine------	70	8	
						Water oak-----------	80	5	
						Southern red oak----	70	4	
						Post oak------------	---	---	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi-nation symbol	Management concerns: Erosion hazard	Equip-ment limita-tion	Seedling mortal-ity	Plant competi-tion	Potential productivity: Common trees	Site index	Produc-tivity class*	Trees to plant
KaC, KAE-------- Keiffer	3C	Slight	Moderate	Moderate	Slight	Eastern redcedar----	37	3	Eastern redcedar.
KeC------------- Keithville	9W	Slight	Moderate	Slight	Moderate	Loblolly pine-------	90	9	Loblolly pine.
						Shortleaf pine------	80	9	
						Sweetgum------------	---	---	
KhB------------- Kenefick	11A	Slight	Slight	Slight	Moderate	Loblolly pine-------	100	11	Loblolly pine.
						Shortleaf pine------	90	10	
						Sweetgum------------	---	---	
						Southern red oak----	---	---	
KnC, KNE-------- Kirvin	8A	Slight	Slight	Slight	Slight	Loblolly pine-------	85	8	Loblolly pine.
						Shortleaf pine------	75	8	
KSF**:									
Kisatchie------	6D	Moderate	Moderate	Severe	Severe	Loblolly pine-------	65	6	Loblolly pine.
						Shortleaf pine------	55	5	
Mayhew---------	9W	Slight	Moderate	Moderate	Severe	Loblolly pine-------	90	9	Loblolly pine.
						Water oak-----------	80	5	
						White oak-----------	---	---	
						Sweetgum------------	90	7	
Rayburn--------	9C	Moderate	Moderate	Moderate	Moderate	Loblolly pine-------	87	9	Loblolly pine, slash pine.
						Shortleaf pine------	---	---	
						Longleaf pine-------	74	6	
LaC------------- Latonia	9A	Slight	Slight	Slight	Slight	Loblolly pine-------	90	9	Loblolly pine.
						Longleaf pine-------	70	6	
LtC, LTE-------- Letney	9S	Slight	Moderate	Moderate	Moderate	Loblolly pine-------	86	9	Loblolly pine.
						Shortleaf pine------	---	---	
						Longleaf pine-------	81	7	
MhC------------- Mayhew	9W	Slight	Moderate	Moderate	Severe	Loblolly pine-------	90	9	Loblolly pine.
						Water oak-----------	80	5	
						White oak-----------	---	---	
						Sweetgum------------	90	7	
NcC------------- Nacogdoches	6F	Slight	Moderate	Slight	Slight	Loblolly pine-------	70	6	Loblolly pine.
						Shortleaf pine------	60	6	
NgA**:									
Niwana---------	9A	Slight	Slight	Slight	Slight	Loblolly pine-------	96	9	Loblolly pine.
						Longleaf pine-------	---	---	
						Sweetgum------------	---	---	
Gessner--------	8W	Slight	Severe	Severe	Severe	Loblolly pine-------	80	8	Loblolly pine.
						Water oak-----------	80	5	
						Sweetgum------------	80	6	
OtC, OTE-------- Oktibbeha	7C	Slight	Moderate	Moderate	Moderate	Loblolly pine-------	76	7	Loblolly pine.
						Shortleaf pine------	66	7	
						Eastern redcedar----	45	4	
						Southern red oak----	70	4	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
RbC------------- Rayburn	9C	Slight	Moderate	Moderate	Moderate	Loblolly pine-------	87	9	Loblolly pine.
						Shortleaf pine------	---	---	
						Longleaf pine-------	74	6	
ScC, SCE-------- Sacul	8C	Slight	Moderate	Slight	Moderate	Loblolly pine-------	84	8	Loblolly pine, shortleaf pine.
						Shortleaf pine------	74	8	
SCF------------- Sacul	8R	Moderate	Moderate	Slight	Moderate	Loblolly pine-------	84	8	Loblolly pine, shortleaf pine.
						Shortleaf pine------	74	8	
SDA**:									
Sardis---------	9W	Slight	Moderate	Moderate	Severe	Loblolly pine-------	96	9	Loblolly pine, water oak, cherrybark oak.
						Sweetgum------------	100	10	
						Water oak-----------	96	7	
Guyton---------	9W	Slight	Severe	Moderate	Severe	Loblolly pine-------	90	9	Loblolly pine, water oak, cherrybark oak.
						Sweetgum------------	---	---	
						Green ash-----------	---	---	
						Southern red oak----	---	---	
						Water oak-----------	---	---	
SeC------------- Saucier	8W	Slight	Moderate	Slight	Moderate	Loblolly pine-------	80	8	Loblolly pine.
						Longleaf pine-------	60	4	
						Shortleaf pine------	---	---	
TpC, TPE-------- Trep	9S	Slight	Moderate	Moderate	Moderate	Loblolly pine-------	90	9	Loblolly pine.
						Shortleaf pine------	80	9	

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe")

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AtC------------------- Attoyac	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
BlC------------------- Bellwood	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Severe: erodes easily.	Slight.
BLE------------------- Bellwood	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: slope.
BtC------------------- Betis	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy, slope.	Moderate: too sandy.	Moderate: droughty, too sandy.
BTE------------------- Betis	Moderate: too sandy, slope.	Moderate: too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: droughty, slope, too sandy.
BwC------------------- Bowie	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
BwD------------------- Bowie	Slight----------	Slight----------	Severe: slope.	Slight----------	Slight.
ByC------------------- Briley	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
BYE------------------- Briley	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: droughty, slope.
CoC------------------- Corrigan	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
EdC------------------- Eastwood	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Severe: erodes easily.	Slight.
EDE------------------- Eastwood	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: slope.
GYA*:					
Guyton---------------	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Iuka-----------------	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
HtC------------------- Herty	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
KaC------------------- Keiffer	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope.	Slight----------	Slight.
KAE------------------- Keiffer	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----------	Moderate: slope.
KeC------------------- Keithville	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight----------	Slight.
KhB------------------- Kenefick	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight----------	Moderate: droughty.
KnC------------------- Kirvin	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope.	Slight----------	Slight.
KNE------------------- Kirvin	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
KSF*:					
Kisatchie------------	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Slight----------	Moderate: slope, depth to rock.
Mayhew---------------	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: slope, wetness, percs slowly.	Severe: wetness, erodes easily.	Severe: wetness.
Rayburn--------------	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: slope.
LaC------------------- Latonia	Slight----------	Slight----------	Moderate: slope.	Slight----------	Moderate: droughty.
LtC------------------- Letney	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy, slope.	Moderate: too sandy.	Moderate: droughty.
LTE------------------- Letney	Moderate: too sandy, slope.	Moderate: too sandy, slope.	Severe: slope.	Moderate: too sandy.	Moderate: droughty, slope.
MhC------------------- Mayhew	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
NcC------------------- Nacogdoches	Moderate: percs slowly, small stones.	Moderate: percs slowly, small stones.	Severe: small stones.	Slight----------	Moderate: small stones.
NgA*:					
Niwana---------------	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
Gessner--------------	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
OtC: Oktibbeha	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Severe: erodes easily.	Slight.
OTE: Oktibbeha	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: slope.
RbC: Rayburn	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight	Slight.
ScC: Sacul	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly, small stones.	Slight	Slight.
SCE: Sacul	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
SCF: Sacul	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
SDA*:					
Sardis	Severe: flooding.	Moderate: wetness.	Moderate: wetness.	Slight	Moderate: wetness.
Guyton	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
SeC: Saucier	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
TpC: Trep	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy, slope.	Moderate: too sandy.	Slight.
TPE: Trep	Moderate: too sandy.	Moderate: too sandy.	Severe: slope.	Moderate: too sandy.	Slight.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor")

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AtC Attoyac	Fair	Good	Good	Fair	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BlC Bellwood	Fair	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
BLE Bellwood	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BtC, BTE Betis	Poor	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
BwC Bowie	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
BwD Bowie	Fair	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ByC Briley	Poor	Fair	Good	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
BYE Briley	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CoC Corrigan	Fair	Fair	Good	Good	Good	Good	Fair	Very poor.	Fair	Good	Very poor.
EdC Eastwood	Fair	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EDE Eastwood	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
GYA*:											
Guyton	Poor	Fair	Fair	Fair	Fair	Poor	Good	Good	Poor	Fair	Good.
Iuka	Poor	Fair	Fair	Good	Good	Fair	Poor	Poor	Fair	Good	Poor.
HtC Herty	Fair	Good	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
KaC, KAE Keiffer	Fair	Fair	Fair	Poor	Fair	Poor	Poor	Very poor.	Fair	Poor	Very poor.
KeC Keithville	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
KhB Kenefick	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
KnC Kirvin	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
KNE Kirvin	Poor	Good	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hard-wood trees	Conif-erous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Open-land wild-life	Wood-land wild-life	Wetland wild-life
KSF*:											
Kisatchie	Poor	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Mayhew	Poor	Fair	Good	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
Rayburn	Fair	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LaC Latonia	Good	Good	Good	Good	Poor	Good	Very poor.	Very poor.	Good	Good	Very poor.
LtC, LTE Letney	Poor	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
MhC Mayhew	Poor	Fair	Good	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
NcC Nacogdoches	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
NgA*:											
Niwana	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Gessner	Poor	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
OtC Oktibbeha	Fair	Fair	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Poor.
OTE Oktibbeha	Fair	Fair	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
RbC Rayburn	Fair	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ScC Sacul	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
SCE Sacul	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
SCF Sacul	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
SDA*:											
Sardis	Fair	Good	Good	Good	Fair	Good	Fair	Fair	Good	Good	Fair.
Guyton	Fair	Fair	Fair	Fair	Fair	Good	Good	Good	Fair	Fair	Good.
SeC Saucier	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
TpC Trep	Poor	Fair	Good	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
TPE Trep	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AtC: Attoyac	Slight	Slight	Slight	Moderate: low strength.	Slight.
BlC: Bellwood	Severe: cutbanks cave, wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
BLE: Bellwood	Severe: cutbanks cave, wetness.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.
BtC: Betis	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: droughty, too sandy.
BTE: Betis	Severe: cutbanks cave.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope, too sandy.
BwC: Bowie	Moderate: wetness.	Slight	Slight	Moderate: low strength.	Slight.
BwD: Bowie	Moderate: wetness.	Slight	Moderate: slope.	Moderate: low strength.	Slight.
ByC: Briley	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: droughty.
BYE: Briley	Severe: cutbanks cave.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
CoC: Corrigan	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.	Severe: wetness.
EdC: Eastwood	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
EDE: Eastwood	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: slope.
GYA*:					
Guyton	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
Iuka	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
HtC: Herty	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.	Severe: wetness.
KaC: Keiffer	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
KAE: Keiffer	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: slope.
KeC: Keithville	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: low strength, wetness.	Slight.
KhB: Kenefick	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, low strength.	Moderate: droughty.
KnC: Kirvin	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
KNE: Kirvin	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
KSF*:					
Kisatchie	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: slope, depth to rock.
Mayhew	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell, slope.	Severe: wetness, shrink-swell, low strength.	Severe: wetness.
Rayburn	Moderate: too clayey, wetness, slope.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.
LaC: Latonia	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: droughty.
LtC: Letney	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: droughty.
LTE: Letney	Severe: cutbanks cave.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
MhC: Mayhew	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell, low strength.	Severe: wetness.
NcC: Nacogdoches	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength.	Moderate: small stones.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
NgA*:					
Niwana	Moderate: wetness.	Slight	Slight	Slight	Slight.
Gessner	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
OtC Oktibbeha	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
OTE Oktibbeha	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: slope.
RbC Rayburn	Moderate: too clayey, wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
ScC Sacul	Moderate: too clayey, wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
SCE Sacul	Moderate: too clayey, slope, wetness.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.
SCF Sacul	Severe: slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.	Severe: slope.
SDA*:					
Sardis	Severe: wetness.	Severe: flooding.	Severe: flooding.	Severe: low strength.	Moderate: wetness.
Guyton	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: wetness.
SeC Saucier	Moderate: wetness.	Slight	Slight	Slight	Slight.
TpC Trep	Severe: cutbanks cave.	Slight	Slight	Moderate: low strength.	Slight.
TPE Trep	Severe: cutbanks cave.	Slight	Slight	Moderate: low strength.	Slight.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AtC: Attoyac	Slight	Moderate: seepage, slope.	Slight	Slight	Good.
BlC: Bellwood	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
BLE: Bellwood	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
BtC: Betis	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage.
BTE: Betis	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: seepage.
BwC, BwD: Bowie	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
ByC: Briley	Slight	Moderate: seepage, slope.	Slight	Severe: seepage.	Good.
BYE: Briley	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: seepage.	Fair: slope.
CoC: Corrigan	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock.	Severe: depth to rock, wetness, too clayey.	Severe: depth to rock, wetness.	Poor: depth to rock, too clayey, hard to pack.
EdC: Eastwood	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
EDE: Eastwood	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
GYA*:					
Guyton	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Iuka	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
HtC----------------- Herty	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
KaC----------------- Keiffer	Severe: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight-----------	Poor: too clayey, hard to pack.
KAE----------------- Keiffer	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
KeC----------------- Keithville	Severe: wetness, percs slowly.	Moderate: slope.	Moderate: wetness, too clayey.	Moderate: wetness.	Poor: thin layer.
KhB----------------- Kenefick	Severe: percs slowly.	Severe: seepage.	Severe: seepage.	Slight-----------	Fair: too clayey.
KnC----------------- Kirvin	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight-----------	Poor: too clayey, hard to pack.
KNE----------------- Kirvin	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
KSF*:					
Kisatchie-----------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
Mayhew--------------	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Rayburn-------------	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: depth to rock, too clayey.	Moderate: depth to rock, wetness, slope.	Poor: too clayey, hard to pack.
LaC----------------- Latonia	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
LtC----------------- Letney	Slight-----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Good.
LTE----------------- Letney	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: slope.
MhC----------------- Mayhew	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
NcC----------------- Nacogdoches	Severe: percs slowly.	Moderate: slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey, hard to pack.
NgA*:					
Niwana-------------	Moderate: wetness, percs slowly.	Moderate: wetness, seepage.	Severe: wetness.	Severe: seepage.	Good.
Gessner------------	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
OtC----------------- Oktibbeha	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight-----------	Poor: too clayey, hard to pack.
OTE----------------- Oktibbeha	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
RbC----------------- Rayburn	Severe: wetness, percs slowly.	Severe: wetness.	Severe: depth to rock, too clayey.	Moderate: wetness, depth to rock.	Poor: too clayey, hard to pack.
ScC----------------- Sacul	Severe: percs slowly, wetness.	Moderate: slope.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
SCE----------------- Sacul	Severe: percs slowly, wetness.	Severe: slope.	Severe: too clayey.	Moderate: slope, wetness.	Poor: too clayey, hard to pack.
SCF----------------- Sacul	Severe: percs slowly, slope, wetness.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
SDA*:					
Sardis-------------	Severe: wetness.	Severe: wetness.	Moderate: wetness, flooding.	Moderate: wetness, flooding.	Fair: wetness, too clayey.
Guyton-------------	Severe: wetness, percs slowly.	Slight-----------	Severe: wetness.	Severe: wetness.	Poor: wetness.
SeC----------------- Saucier	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
TpC----------------- Trep	Severe: percs slowly, wetness.	Severe: seepage.	Moderate: wetness.	Slight-----------	Fair: too clayey.
TPE----------------- Trep	Severe: percs slowly, wetness.	Severe: seepage, slope.	Moderate: wetness.	Slight-----------	Fair: too clayey.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AtC: Attoyac	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
BlC, BLE: Bellwood	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
BtC: Betis	Good	Improbable: thin layer.	Improbable: too sandy.	Fair: too sandy.
BTE: Betis	Good	Improbable: thin layer.	Improbable: too sandy.	Fair: too sandy, slope.
BwC, BwD: Bowie	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
ByC: Briley	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
BYE: Briley	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, slope.
CoC: Corrigan	Poor: depth to rock, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
EdC, EDE: Eastwood	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
GYA*:				
Guyton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Iuka	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
HtC: Herty	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, too clayey.
KaC, KAE: Keiffer	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
KeC: Keithville	Fair: low strength, thin layer, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer, too clayey.
KhB: Kenefick	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
KnC, KNE-------------- Kirvin	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
KSF*:				
Kisatchie------------	Poor: depth to rock, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Mayhew---------------	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
Rayburn--------------	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
LaC------------------ Latonia	Good-----------------	Probable-------------	Improbable: too sandy.	Fair: small stones, thin layer.
LtC------------------ Letney	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
LTE------------------ Letney	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, slope.
MhC------------------ Mayhew	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
NcC------------------ Nacogdoches	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
NgA*:				
Niwana---------------	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Good.
Gessner--------------	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
OtC, OTE------------- Oktibbeha	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
RbC------------------ Rayburn	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
ScC, SCE------------- Sacul	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
SCF------------------ Sacul	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
SDA*:				
Sardis	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Guyton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
SeC: Saucier	Fair: thin layer, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
TpC, TPE: Trep	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
AtC Attoyac	Moderate: seepage.	Moderate: piping.	Deep to water	Slope	Favorable	Favorable.
BlC Bellwood	Moderate: slope.	Severe: hard to pack.	Percs slowly, slope.	Slope, wetness.	Erodes easily, wetness.	Erodes easily, percs slowly.
BLE Bellwood	Severe: slope.	Severe: hard to pack.	Percs slowly, slope.	Slope, wetness.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
BtC Betis	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, slope.	Favorable	Droughty.
BTE Betis	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, slope.	Slope	Slope, droughty.
BwC, BwD Bowie	Severe: slow refill.	Moderate: piping, wetness.	Deep to water	Slope, rooting depth.	Favorable	Rooting depth.
ByC Briley	Moderate: seepage.	Moderate: piping.	Deep to water	Droughty, fast intake, slope.	Soil blowing	Droughty.
BYE Briley	Moderate: seepage.	Moderate: piping.	Deep to water	Droughty, fast intake, slope.	Slope, soil blowing.	Droughty, slope.
CoC Corrigan	Moderate: depth to rock.	Severe: hard to pack, wetness.	Percs slowly, depth to rock, slope.	Wetness, percs slowly, depth to rock.	Depth to rock, erodes easily, wetness.	Wetness, erodes easily, depth to rock.
EdC Eastwood	Slight	Severe: hard to pack.	Deep to water	Slope, percs slowly, erodes easily.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
EDE Eastwood	Slight	Severe: hard to pack.	Deep to water	Slope, percs slowly, erodes easily.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
GYA*:						
Guyton	Moderate: seepage.	Severe: piping, wetness.	Percs slowly, flooding.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Iuka	Moderate: seepage.	Severe: piping, wetness.	Flooding	Wetness, flooding.	Erodes easily, wetness.	Erodes easily, wetness.
HtC Herty	Slight	Severe: wetness.	Percs slowly, slope.	Wetness, percs slowly, slope.	Erodes easily, wetness.	Wetness, erodes easily, percs slowly.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
KaC---------------- Keiffer	Moderate: seepage, slope.	Severe: thin layer.	Deep to water	Slope, percs slowly.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
KAE---------------- Keiffer	Severe: slope.	Severe: thin layer.	Deep to water	Slope, percs slowly.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
KeC---------------- Keithville	Moderate: slope.	Moderate: piping, wetness.	Percs slowly, slope.	Wetness, percs slowly, slope.	Erodes easily, wetness.	Erodes easily, percs slowly.
KhB---------------- Kenefick	Moderate: seepage.	Moderate: thin layer, piping.	Deep to water	Droughty, soil blowing.	Soil blowing---	Droughty.
KnC---------------- Kirvin	Slight---------	Severe: hard to pack.	Deep to water	Percs slowly, slope.	Erodes easily	Erodes easily.
KNE---------------- Kirvin	Slight---------	Severe: hard to pack.	Deep to water	Percs slowly, slope.	Slope, erodes easily.	Slope, erodes easily.
KSF*:						
Kisatchie--------	Severe: slope.	Severe: thin layer.	Deep to water	Slope, percs slowly.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Mayhew-----------	Severe: slope.	Severe: hard to pack, wetness.	Percs slowly, slope.	Wetness, percs slowly, slope.	Slope, erodes easily, wetness.	Wetness, slope, erodes easily.
Rayburn----------	Moderate: depth to rock.	Severe: hard to pack.	Percs slowly, slope.	Wetness, percs slowly.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
LaC---------------- Latonia	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, slope.	Too sandy------	Droughty.
LtC---------------- Letney	Severe: seepage.	Slight---------	Deep to water	Droughty, fast intake, slope.	Favorable------	Droughty.
LTE---------------- Letney	Severe: seepage.	Slight---------	Deep to water	Droughty, fast intake, slope.	Slope----------	Slope, droughty.
MhC---------------- Mayhew	Moderate: slope.	Severe: hard to pack, wetness.	Percs slowly, slope.	Wetness, percs slowly, slope.	Erodes easily, wetness.	Wetness, erodes easily.
NcC---------------- Nacogdoches	Slight---------	Severe: hard to pack.	Deep to water	Slope----------	Favorable------	Favorable.
NgA*:						
Niwana-----------	Moderate: seepage.	Moderate: piping.	Deep to water	Favorable------	Favorable------	Favorable.
Gessner----------	Moderate: seepage.	Severe: piping, ponding.	Ponding--------	Ponding, erodes easily.	Erodes easily, ponding.	Wetness, erodes easily.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
OtC Oktibbeha	Moderate: slope.	Moderate: hard to pack.	Deep to water	Percs slowly, slope.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
OTE Oktibbeha	Severe: slope.	Moderate: hard to pack.	Deep to water	Percs slowly, slope.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
RbC Rayburn	Moderate: depth to rock.	Severe: hard to pack.	Percs slowly, slope.	Wetness, percs slowly.	Erodes easily, wetness.	Erodes easily, percs slowly.
ScC Sacul	Slight	Moderate: hard to pack, wetness.	Percs slowly, slope.	Slope, percs slowly, wetness.	Wetness, soil blowing.	Percs slowly.
SCE Sacul	Slight	Moderate: hard to pack, wetness.	Percs slowly, slope.	Slope, percs slowly, wetness.	Slope, wetness, soil blowing.	Slope, percs slowly.
SCF Sacul	Severe: slope.	Moderate: hard to pack, wetness.	Percs slowly, slope.	Slope, percs slowly, wetness.	Slope, wetness, soil blowing.	Slope, percs slowly.
SDA*:						
Sardis	Moderate: seepage.	Severe: piping.	Favorable	Wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
Guyton	Moderate: seepage.	Severe: piping, wetness.	Percs slowly	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
SeC Saucier	Moderate: seepage.	Severe: piping.	Slope	Wetness, percs slowly, slope.	Wetness, percs slowly.	Favorable.
TpC, TPE Trep	Severe: seepage.	Slight	Deep to water	Fast intake, slope.	Favorable	Favorable.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
AtC-------------- Attoyac	0-14	Fine sandy loam	SC-SM, CL-ML, ML, SM	A-4	0	98-100	95-100	70-100	40-65	<23	NP-7
	14-66	Sandy clay loam, loam, fine sandy loam.	CL, SC	A-4, A-6	0	98-100	95-100	80-100	45-75	23-40	7-24
BlC-------------- Bellwood	0-6	Silty clay loam	CH, CL	A-7, A-6	0	100	100	95-100	75-95	35-60	15-35
	6-72	Silty clay, clay	CH, MH	A-7	0	100	100	100	90-95	60-90	35-50
BLE-------------- Bellwood	0-4	Silty clay loam	CH, CL	A-7, A-6	0	100	100	95-100	75-95	35-60	15-35
	4-72	Silty clay, clay	CH, MH	A-7	0	100	100	100	90-95	60-90	35-50
BtC-------------- Betis	0-28	Loamy fine sand	SM, SP-SM	A-2	0	100	97-100	90-100	10-35	---	NP
	28-72	Loamy fine sand	SM, SP-SM	A-2	0	100	97-100	90-100	10-35	---	NP
BTE-------------- Betis	0-50	Loamy fine sand	SM, SP-SM	A-2	0	100	97-100	90-100	10-35	---	NP
	50-72	Loamy fine sand	SM, SP-SM	A-2	0	100	97-100	90-100	10-35	---	NP
BwC-------------- Bowie	0-15	Fine sandy loam	SM, SC-SM, ML, CL-ML	A-2-4, A-4	0	97-100	94-100	90-100	30-55	<25	NP-6
	15-45	Sandy clay loam, clay loam, fine sandy loam.	SC, CL	A-4, A-6	0	90-100	87-100	80-100	40-72	20-40	8-25
	45-62	Sandy clay loam, clay loam, fine sandy loam.	SC, CL	A-4, A-6, A-2	0	80-100	70-100	65-100	34-77	20-40	8-25
BwD-------------- Bowie	0-16	Fine sandy loam	SM, SC-SM, ML, CL-ML	A-2-4, A-4	0	97-100	94-100	90-100	30-55	<25	NP-6
	16-47	Sandy clay loam, clay loam, fine sandy loam.	SC, CL	A-4, A-6	0	90-100	87-100	80-100	40-72	20-40	8-25
	47-67	Sandy clay loam, clay loam, fine sandy loam.	SC, CL	A-4, A-6, A-2	0	80-100	70-100	65-100	34-77	20-40	8-25
ByC-------------- Briley	0-5	Loamy fine sand	SM	A-2-4, A-4	0	95-100	95-100	80-100	17-45	<25	NP-4
	5-21	Loamy fine sand	SM	A-2-4, A-4	0	97-100	95-100	80-100	17-45	<25	NP-4
	21-60	Fine sandy loam, sandy clay loam.	SC, CL	A-4, A-6	0	95-100	95-100	85-100	36-65	22-39	8-22
BYE-------------- Briley	0-5	Loamy fine sand	SM	A-2-4, A-4	0	95-100	95-100	80-100	17-45	<25	NP-4
	5-22	Loamy fine sand	SM	A-2-4, A-4	0	97-100	95-100	80-100	17-45	<25	NP-4
	22-60	Fine sandy loam, sandy clay loam.	SC, CL	A-4, A-6	0	95-100	95-100	85-100	36-65	22-39	8-22
CoC-------------- Corrigan	0-12	Fine sandy loam	ML, CL-ML, SM, SC-SM	A-4	0	100	100	70-100	36-55	21-30	2-7
	12-36	Clay, silty clay	CH	A-7	0	100	100	90-100	65-95	52-76	30-50
	36-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
EdC-------------- Eastwood	0-7	Fine sandy loam	SM, SC-SM, CL-ML, ML	A-4, A-6	0	98-100	98-100	90-100	40-75	20-33	3-13
	7-48	Clay, silty clay	CH, CL	A-7-6	0	100	95-100	90-100	70-98	40-75	25-48
	48-56	Clay loam, silty clay loam, loam.	CL, CH	A-6, A-7-6	0	100	95-100	90-100	55-99	35-65	15-45
	56-90	Stratified fine sandy loam to shaly clay.	CL, SC, CL-ML, CH	A-6, A-4, A-7-6	0	95-100	95-100	90-100	40-98	25-68	5-44
EDE-------------- Eastwood	0-11	Fine sandy loam	SM, SC-SM, CL-ML, ML	A-4, A-6	0	98-100	98-100	90-100	40-75	20-33	3-13
	11-30	Clay, silty clay	CH, CL	A-7-6	0	100	95-100	90-100	70-98	40-75	25-48
	30-49	Clay loam, silty clay loam, loam.	CL, CH	A-6, A-7-6	0	100	95-100	90-100	55-99	35-65	15-45
	49-60	Stratified fine sandy loam to shaly clay.	CL, SC, CL-ML, CH	A-6, A-4, A-7-6	0	95-100	95-100	90-100	40-98	25-68	5-44
GYA*:											
Guyton-----------	0-27	Silt loam--------	ML, CL-ML	A-4	0	100	100	95-100	65-90	<27	NP-7
	27-80	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-6, A-4	0	100	100	94-100	75-95	22-40	6-18
Iuka-------------	0-6	Silt loam--------	ML, CL-ML	A-4	0	95-100	95-100	80-95	50-80	<30	NP-7
	6-56	Fine sandy loam, loam, silt loam.	SM, SC-SM, ML, CL-ML	A-4	0	95-100	85-100	65-100	36-75	<30	NP-7
	56-68	Fine sandy loam, silt loam.	SM, ML, CL-ML, SM-SC	A-4	0	95-100	90-100	65-100	36-75	<30	NP-7
HtC-------------- Herty	0-10	Very fine sandy loam.	CL, CL-ML	A-4, A-6	0	98-100	98-100	95-100	51-90	18-35	4-15
	10-28	Clay loam, clay, silty clay loam.	CL	A-6, A-7-6	0	98-100	98-100	95-100	75-95	30-50	15-32
	28-68	Clay, sandy clay, sandy clay loam.	CL, SC	A-7-6, A-6	0	98-100	98-100	85-95	45-85	30-50	15-32
KaC-------------- Keiffer	0-5	Clay loam--------	ML, CL-ML, CL	A-4, A-6	0	100	98-100	95-100	70-95	20-40	5-20
	5-32	Silty clay loam, silty clay, clay.	CL, CH	A-7-6, A-6	0	100	98-100	95-100	85-95	35-55	16-32
	32-51	Silty clay, clay, silty clay loam.	CH, CL	A-7-6, A-6	0	100	98-100	95-100	85-95	45-65	22-42
	51-96	Silty clay, clay, silty clay loam.	CH, CL	A-7-6, A-6	0	100	98-100	95-100	85-95	45-65	22-42
KAE-------------- Keiffer	0-7	Clay loam--------	ML, CL-ML, CL	A-4, A-6	0	100	98-100	95-100	70-95	20-40	5-20
	7-21	Silty clay loam, silty clay, clay.	CL, CH	A-7-6, A-6	0	100	98-100	95-100	85-95	35-55	16-32
	21-45	Silty clay, clay, silty clay loam.	CH, CL	A-7-6, A-6	0	100	98-100	95-100	85-95	45-65	22-42
	45-72	Silty clay, clay, silty clay loam.	CH, CL	A-7-6, A-6	0	100	98-100	95-100	85-95	45-65	22-42

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
KeC-------------- Keithville	0-13	Very fine sandy loam.	ML, CL-ML	A-4	0	100	100	85-100	50-90	<25	NP-6
	13-32	Silt loam, loam, silty clay loam.	CL	A-6, A-4	0	100	100	90-100	65-95	25-35	8-16
	32-63	Silty clay, clay	CH, CL	A-7-6	0	100	100	95-100	65-95	41-66	22-38
KhB-------------- Kenefick	0-3	Loamy fine sand	SM	A-2-4	0	100	100	65-95	15-35	<20	NP-4
	3-35	Loam, clay loam, very fine sandy loam.	CL	A-6	0	100	100	80-100	55-85	29-38	10-15
	35-56	Sandy clay loam	CL, SC, CL-ML	A-4, A-6	0	100	100	80-100	40-70	23-30	7-11
	56-76	Fine sandy loam, very fine sandy loam.	SM, ML, SM-SC, CL-ML	A-4	0	100	100	75-100	40-55	<21	NP-6
KnC-------------- Kirvin	0-10	Fine sandy loam	SM, ML, CL, SC	A-4	0-2	85-100	78-98	70-95	36-70	<30	NP-8
	10-40	Clay loam, sandy clay, clay.	CL, CH	A-7	0-1	95-100	90-100	85-100	53-95	42-67	24-43
	40-60	Sandy clay loam, clay loam, clay.	CL, CH	A-6, A-7	0-1	95-100	90-100	75-100	51-90	32-59	16-32
	60-75	Stratified sandy clay loam to shaly clay.	SC, CL, CH	A-4, A-6, A-7	0-1	95-100	90-100	50-90	36-80	25-52	9-32
KNE-------------- Kirvin	0-4	Fine sandy loam	SM, ML, CL, SC	A-4	0-2	85-100	78-98	70-95	36-70	<30	NP-8
	4-29	Clay loam, sandy clay, clay.	CL, CH	A-7	0-1	95-100	90-100	85-100	53-95	42-67	24-43
	29-36	Sandy clay loam, clay loam, clay.	CL, CH	A-6, A-7	0-1	95-100	90-100	75-100	51-90	32-59	16-32
	36-60	Stratified sandy clay loam to shaly clay.	SC, CL, CH	A-4, A-6, A-7	0-1	95-100	90-100	50-90	36-80	25-52	9-32
KSF*: Kisatchie-------	0-2	Silt loam--------	ML, CL-ML	A-4	0	100	100	85-100	50-75	<25	NP-4
	2-20	Silty clay, silty clay loam, clay loam.	CH, CL	A-7-6	0	100	100	90-100	85-95	45-65	22-36
	20-33	Silty clay, channery clay loam.	CH, CL	A-7-6	0-5	85-95	65-75	55-65	50-60	45-65	22-36
	33-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Mayhew----------	0-2	Silt loam--------	CL	A-6, A-7	0	100	100	90-100	70-95	36-50	15-28
	2-23	Silty clay loam, silty clay, clay.	CH, CL	A-7	0	100	100	95-100	85-95	46-75	25-50
	23-72	Silty clay, clay, silty clay loam.	CH, CL	A-7	0	100	90-100	90-100	75-90	45-80	25-50
Rayburn---------	0-3	Fine sandy loam	CL-ML, ML, SM, SC-SM	A-4, A-2-4	0	100	100	70-99	25-65	<25	NP-7
	3-40	Clay, silty clay	CH	A-7	0	100	100	90-100	75-95	51-80	25-50
	40-67	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
LaC-------------- Latonia	0-5	Fine sandy loam	SM	A-2-4, A-4	0	90-100	85-100	60-75	30-50	<20	NP
	5-38	Sandy loam, loam, fine sandy loam.	SM	A-2-4, A-4	0	90-100	85-100	60-85	30-50	<20	NP
	38-67	Sand, loamy sand, fine sandy loam.	SM, SP-SM	A-2-4, A-4	0	90-100	85-100	50-75	10-40	<20	NP
LtC-------------- Letney	0-27	Loamy sand-------	SM, SP-SM	A-2	0	95-100	95-100	50-75	10-30	<20	NP
	27-60	Sandy clay loam, sandy loam.	SC, SC-SM	A-6, A-4	0	95-100	95-100	65-90	36-50	20-40	5-20
LTE-------------- Letney	0-22	Loamy sand-------	SM, SP-SM	A-2	0	95-100	95-100	50-75	10-30	<20	NP
	22-60	Sandy clay loam, sandy loam.	SC, SC-SM	A-6, A-4	0	95-100	95-100	65-90	36-50	20-40	5-20
MhC-------------- Mayhew	0-11	Loam-------------	CL	A-6, A-7	0	100	100	90-100	70-95	36-50	15-28
	11-18	Silty clay loam, silty clay, clay.	CH, CL	A-7	0	100	100	95-100	85-95	46-75	25-50
	18-65	Silty clay, clay, silty clay loam.	CH, CL	A-7	0	100	90-100	90-100	75-90	45-80	25-50
NcC-------------- Nacogdoches	0-4	Gravelly sandy loam.	SM, SC-SM	A-4, A-2-4	1-5	70-80	65-80	60-70	20-40	20-30	2-7
	4-60	Clay-------------	CL, CH, MH	A-7	0	90-100	75-98	70-95	51-75	41-60	18-30
	60-74	Clay loam, clay	CL, CH, MH, ML	A-7	0	90-100	75-98	70-95	51-70	41-60	17-28
NgA*:											
Niwana----------	0-21	Fine sandy loam	SM, ML, CL-ML, SC-SM	A-4	0	98-100	95-100	90-100	45-70	<25	NP-7
	21-37	Loam, fine sandy loam.	CL-ML, CL	A-4	0	98-100	95-100	90-100	55-80	18-30	4-10
	37-60	Loam, fine sandy loam.	CL, CL-ML	A-4	0	98-100	95-100	90-100	55-80	18-30	4-10
Gessner---------	0-15	Loam-------------	CL-ML, CL, SC, SC-SM	A-4	0	98-100	95-100	85-95	45-75	17-28	4-10
	15-60	Loam, fine sandy loam.	CL-ML, CL	A-4, A-6	0	98-100	95-100	85-95	51-70	20-40	5-20
OtC-------------- Oktibbeha	0-5	Loam-------------	CL, CL-ML	A-6, A-4	0	100	95-100	85-95	60-90	20-40	4-20
	5-42	Clay, silty clay	CH	A-7	0	100	95-100	95-100	95-100	55-65	30-40
	42-70	Silty clay, silty clay loam, clay loam.	CL, ML, CH	A-7	0-5	95-100	90-100	90-100	75-95	41-55	11-33
OTE-------------- Oktibbeha	0-3	Loam-------------	CL, CL-ML	A-6, A-4	0	100	95-100	85-95	60-90	20-40	4-20
	3-46	Clay, silty clay	CH	A-7	0	100	95-100	95-100	95-100	55-65	30-40
	46-60	Silty clay, silty clay loam, clay loam.	CL, ML, CH	A-7	0-5	95-100	90-100	90-100	75-95	41-55	11-33
RbC-------------- Rayburn	0-5	Fine sandy loam	CL-ML, ML, SM, SC-SM	A-4, A-2-4	0	100	100	70-99	25-65	<25	NP-7
	5-45	Clay, silty clay	CH	A-7	0	100	100	90-100	75-95	51-80	25-50
	45-82	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
ScC--------------- Sacul	0-4	Fine sandy loam	SM, SC-SM	A-4, A-2	0	75-100	75-100	45-85	25-50	<25	NP-7
	4-12	Very fine sandy loam, fine sandy loam, loamy fine sand.	SM, ML, SC-SM, CL-ML	A-2, A-4, A-1	0	75-100	75-100	40-95	12-75	<30	NP-10
	12-29	Clay, silty clay, clay loam.	CH, CL, SC	A-7	0	85-100	85-100	70-100	40-95	45-70	20-40
	29-60	Silty clay loam, clay loam, sandy clay loam.	CL, SC	A-6, A-7, A-4, A-2	0	85-100	85-100	65-100	30-95	25-48	8-25
SCE--------------- Sacul	0-4	Fine sandy loam	SM, SC-SM	A-4, A-2	0	75-100	75-100	45-85	25-50	<25	NP-7
	4-8	Very fine sandy loam, fine sandy loam, loamy fine sand.	SM, ML, SC-SM, CL-ML	A-2, A-4, A-1	0	75-100	75-100	40-95	12-75	<30	NP-10
	8-32	Clay, silty clay, clay loam.	CH, CL, SC	A-7	0	85-100	85-100	70-100	40-95	45-70	20-40
	32-80	Silty clay loam, clay loam, sandy clay loam.	CL, SC	A-6, A-7, A-4, A-2	0	85-100	85-100	65-100	30-95	25-48	8-25
SCF--------------- Sacul	0-3	Fine sandy loam	SM, SC-SM	A-4, A-2	0	75-100	75-100	45-85	25-50	<25	NP-7
	3-7	Very fine sandy loam, fine sandy loam, loamy fine sand.	SM, ML, SC-SM, CL-ML	A-2, A-4, A-1	0	75-100	75-100	40-95	12-75	<30	NP-10
	7-27	Clay, silty clay, clay loam.	CH, CL, SC	A-7	0	85-100	85-100	70-100	40-95	45-70	20-40
	27-60	Silty clay loam, clay loam, sandy clay loam.	CL, SC	A-6, A-7, A-4, A-2	0	85-100	85-100	65-100	30-95	25-48	8-25
SDA*:											
Sardis-----------	0-4	Loam-------------	ML, CL-ML, CL	A-4	0	100	100	85-100	50-90	<30	NP-10
	4-62	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-95	25-40	5-20
Guyton-----------	0-27	Silt loam--------	ML, CL-ML	A-4	0	100	100	95-100	65-90	<27	NP-7
	27-80	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-6, A-4	0	100	100	94-100	75-95	22-40	6-18
SeC--------------- Saucier	0-15	Fine sandy loam	SM, ML, SC-SM	A-4	0	90-100	85-100	70-86	40-55	<20	NP-4
	15-27	Loam, clay loam, sandy clay loam.	CL, SC-SM, SC, CL-ML	A-6, A-4	0	80-100	78-95	75-95	40-75	25-38	5-15
	27-58	Silty clay loam, clay loam, sandy clay loam.	CL, SC-SM, SC, CL-ML	A-7, A-6, A-4	0	80-100	75-100	70-100	40-95	28-48	6-25
	58-70	Clay, silty clay, clay loam.	CH, CL	A-7	0	100	90-100	90-100	80-90	47-60	22-34
TpC--------------- Trep	0-22	Loamy fine sand	SM	A-2-4	0	100	95-100	90-95	15-30	<25	NP-3
	22-55	Sandy clay loam, loam.	SC, CL	A-6	0	100	95-100	80-90	40-70	25-40	11-20
	55-60	Sandy clay-------	CL	A-6, A-7	0	100	95-100	85-95	55-75	25-45	11-27

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
TPE--------------	0-22	Loamy fine sand	SM	A-2-4	0	100	95-100	90-95	15-30	<25	NP-3
Trep	22-65	Sandy clay loam, loam.	SC, CL	A-6	0	100	95-100	80-90	40-70	25-40	11-20
	65-81	Sandy clay-------	CL	A-6, A-7	0	100	95-100	85-95	55-75	25-45	11-27

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--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)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
AtC--------------	0-14	8-20	1.30-1.50	2.0-6.0	0.11-0.15	5.1-6.5	Low----------	0.32	5	<1
Attoyac	14-66	18-32	1.40-1.65	0.6-2.0	0.12-0.17	5.1-6.5	Low----------	0.32		
BlC--------------	0-6	27-65	1.15-1.50	<0.06	0.14-0.20	3.6-5.0	High---------	0.37	5	.5-5
Bellwood	6-72	45-75	1.05-1.35	<0.06	0.14-0.18	3.6-5.0	High---------	0.28		
BLE--------------	0-4	27-65	1.15-1.50	<0.06	0.14-0.20	3.6-5.0	High---------	0.37	5	.5-5
Bellwood	4-72	45-75	1.05-1.35	<0.06	0.14-0.18	3.6-5.0	High---------	0.28		
BtC--------------	0-28	2-10	1.20-1.50	6.0-20	0.05-0.09	4.5-6.0	Low----------	0.17	5	<1
Betis	28-72	2-10	1.20-1.50	6.0-20	0.05-0.09	4.5-6.0	Low----------	0.17		
BTE--------------	0-50	2-10	1.20-1.50	6.0-20	0.05-0.09	4.5-6.0	Low----------	0.17	5	<1
Betis	50-72	2-10	1.20-1.50	6.0-20	0.05-0.09	4.5-6.0	Low----------	0.17		
BwC--------------	0-15	3-15	1.40-1.69	2.0-6.0	0.10-0.15	4.5-6.5	Low----------	0.32	5	.5-3
Bowie	15-45	18-35	1.60-1.69	0.6-2.0	0.11-0.18	4.5-5.5	Low----------	0.32		
	45-62	18-35	1.60-1.80	0.2-0.6	0.11-0.18	4.5-5.5	Low----------	0.32		
BwD--------------	0-16	3-15	1.40-1.69	2.0-6.0	0.10-0.15	4.5-6.5	Low----------	0.32	5	.5-3
Bowie	16-47	18-35	1.60-1.69	0.6-2.0	0.11-0.18	4.5-5.5	Low----------	0.32		
	47-67	18-35	1.60-1.80	0.2-0.6	0.11-0.18	4.5-5.5	Low----------	0.32		
ByC--------------	0-5	5-18	1.50-1.65	6.0-20	0.07-0.11	4.5-6.0	Low----------	0.20	5	.5-3
Briley	5-21	5-18	1.50-1.65	6.0-20	0.07-0.11	4.5-6.0	Low----------	0.20		
	21-60	15-35	1.55-1.69	0.6-2.0	0.13-0.17	4.5-6.0	Low----------	0.24		
BYE--------------	0-5	5-18	1.50-1.65	6.0-20	0.07-0.11	4.5-6.0	Low----------	0.20	5	.5-3
Briley	5-22	5-18	1.50-1.65	6.0-20	0.07-0.11	4.5-6.0	Low----------	0.20		
	22-60	15-35	1.55-1.69	0.6-2.0	0.13-0.17	4.5-6.0	Low----------	0.24		
CoC--------------	0-12	5-15	1.20-1.45	0.6-2.0	0.11-0.15	4.5-6.0	Low----------	0.43	2	.5-3
Corrigan	12-36	40-60	1.20-1.35	<0.06	0.12-0.18	3.6-5.5	High---------	0.32		
	36-60	---	---	---	---	---	-------------	----		
EdC--------------	0-7	3-18	1.20-1.60	0.6-2.0	0.11-0.15	4.5-6.0	Low----------	0.49	4	.5-2
Eastwood	7-48	40-65	1.20-1.45	<0.06	0.12-0.18	3.6-5.5	High---------	0.32		
	48-56	25-40	1.20-1.50	0.06-0.2	0.12-0.20	3.6-6.5	High---------	0.32		
	56-90	15-50	1.35-1.65	0.06-0.2	0.10-0.15	4.5-7.3	Moderate-----	0.37		
EDE--------------	0-11	3-18	1.20-1.60	0.6-2.0	0.11-0.15	4.5-6.0	Low----------	0.49	4	.5-2
Eastwood	11-30	40-65	1.20-1.45	<0.06	0.12-0.18	3.6-5.5	High---------	0.32		
	30-49	25-40	1.20-1.50	0.06-0.2	0.12-0.20	3.6-6.5	High---------	0.32		
	49-60	15-50	1.35-1.65	0.06-0.2	0.10-0.15	4.5-7.3	Moderate-----	0.37		
GYA*:										
Guyton-----------	0-27	7-25	1.35-1.65	0.6-2.0	0.20-0.23	3.6-6.0	Low----------	0.43	5	.5-4
	27-80	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-6.0	Low----------	0.37		
Iuka-------------	0-6	6-15	---	0.6-2.0	0.15-0.20	4.5-5.5	Low----------	0.37	5	.5-2
	6-56	8-18	---	0.6-2.0	0.10-0.20	3.6-5.5	Low----------	0.28		
	56-68	5-15	---	0.6-2.0	0.10-0.20	3.6-5.5	Low----------	0.20		
HtC--------------	0-10	6-15	1.40-1.60	0.6-2.0	0.11-0.20	4.5-6.0	Low----------	0.49	5	<1
Herty	10-28	35-45	1.20-1.60	<0.06	0.12-0.18	3.6-5.5	High---------	0.37		
	28-68	25-45	1.20-1.60	<0.06	0.12-0.20	3.6-5.5	High---------	0.37		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
KaC-------------- Keiffer	0-5	16-38	1.35-1.65	0.6-2.0	0.12-0.22	7.4-8.4	Moderate-----	0.32	5	2-5
	5-32	35-50	1.20-1.50	0.06-2.0	0.12-0.17	7.4-8.4	High---------	0.37		
	32-51	35-59	1.20-1.50	0.06-2.0	0.12-0.17	7.4-8.4	High---------	0.37		
	51-96	35-55	1.20-1.50	0.06-2.0	0.12-0.17	7.4-8.4	High---------	0.37		
KAE-------------- Keiffer	0-7	16-38	1.35-1.65	0.6-2.0	0.12-0.22	7.4-8.4	Moderate-----	0.32	5	2-5
	7-21	35-50	1.20-1.50	0.06-2.0	0.12-0.17	7.4-8.4	High---------	0.37		
	21-45	35-59	1.20-1.50	0.06-2.0	0.12-0.17	7.4-8.4	High---------	0.37		
	45-72	35-55	1.20-1.50	0.06-2.0	0.12-0.17	7.4-8.4	High---------	0.37		
KeC-------------- Keithville	0-13	8-22	1.35-1.65	0.2-2.0	0.15-0.20	3.6-6.0	Low----------	0.49	5	.5-2
	13-32	18-35	1.35-1.70	0.2-0.6	0.15-0.20	3.6-6.0	Low----------	0.37		
	32-63	40-60	1.20-1.60	<0.06	0.15-0.18	3.6-6.0	High---------	0.32		
KhB-------------- Kenefick	0-3	3-12	1.35-1.50	6.0-20	0.07-0.11	4.5-6.5	Low----------	0.17	5	.5-2
	3-35	15-34	1.35-1.55	0.2-0.6	0.12-0.18	4.5-6.5	Moderate-----	0.32		
	35-56	10-34	1.35-1.65	0.6-2.0	0.12-0.17	4.5-6.0	Low----------	0.37		
	56-76	5-20	1.35-1.65	2.0-6.0	0.06-0.14	4.5-6.5	Low----------	0.24		
KnC-------------- Kirvin	0-10	2-15	1.20-1.40	2.0-6.0	0.11-0.16	5.1-7.3	Low----------	0.37	4	.5-2
	10-40	35-60	1.24-1.45	0.2-0.6	0.10-0.15	3.6-5.5	Moderate-----	0.32		
	40-60	25-50	1.35-1.60	0.2-0.6	0.10-0.16	3.6-5.0	Moderate-----	0.32		
	60-75	20-45	1.40-1.65	0.06-0.2	0.08-0.16	3.6-5.0	Moderate-----	0.32		
KNE-------------- Kirvin	0-4	2-15	1.20-1.40	2.0-6.0	0.11-0.16	5.1-7.3	Low----------	0.37	4	.5-5
	4-29	35-60	1.24-1.45	0.2-0.6	0.10-0.15	3.6-5.5	Moderate-----	0.32		
	29-36	25-50	1.35-1.60	0.2-0.6	0.10-0.16	3.6-5.0	Moderate-----	0.32		
	36-60	20-45	1.40-1.65	0.06-0.2	0.08-0.16	3.6-5.0	Moderate-----	0.32		
KSF*:										
Kisatchie-------	0-2	10-27	1.35-1.65	0.6-2.0	0.12-0.20	4.5-5.5	Low----------	0.49	2	.5-2
	2-20	35-55	1.20-1.70	<0.06	0.15-0.18	3.6-5.0	High---------	0.32		
	20-33	27-55	1.20-1.70	<0.06	0.10-0.15	3.6-5.0	High---------	0.32		
	33-60	---	---	---	---	---	-------------	----		
Mayhew----------	0-2	10-40	1.35-1.45	0.06-0.2	0.20-0.22	4.5-6.0	Moderate-----	0.37	5	1-4
	2-23	35-60	1.20-1.55	<0.06	0.18-0.20	4.5-6.0	High---------	0.32		
	23-72	35-75	1.20-1.55	<0.06	0.18-0.20	4.5-6.0	High---------	0.32		
Rayburn---------	0-3	8-20	1.20-1.40	0.6-2.0	0.11-0.15	4.5-6.0	Low----------	0.43	3	.5-2
	3-40	40-60	1.30-1.50	<0.06	0.12-0.18	3.6-5.5	High---------	0.37		
	40-67	---	---	---	---	---	-------------	----		
LaC-------------- Latonia	0-5	10-20	1.40-1.50	2.0-6.0	0.10-0.15	4.5-6.0	Low----------	0.20	4	.5-3
	5-38	10-16	1.40-1.50	2.0-6.0	0.10-0.15	4.5-6.0	Low----------	0.20		
	38-67	3-20	1.40-1.50	6.0-20	0.05-0.15	4.5-5.5	Very low-----	0.17		
LtC-------------- Letney	0-27	2-8	1.50-1.65	6.0-20	0.06-0.10	4.5-6.5	Low----------	0.20	5	.5-1
	27-60	18-35	1.55-1.70	2.0-6.0	0.12-0.17	4.5-6.0	Low----------	0.24		
LTE-------------- Letney	0-22	2-8	1.50-1.65	6.0-20	0.06-0.10	4.5-6.5	Low----------	0.20	5	.5-1
	22-60	18-35	1.55-1.70	2.0-6.0	0.12-0.17	4.5-6.0	Low----------	0.24		
MhC-------------- Mayhew	0-11	10-40	1.35-1.45	0.06-0.2	0.20-0.22	3.6-6.0	Moderate-----	0.37	5	1-4
	11-18	35-60	1.40-1.55	<0.06	0.18-0.20	3.6-6.0	High---------	0.32		
	18-65	35-75	1.40-1.55	<0.06	0.18-0.20	3.6-6.0	High---------	0.32		
NcC-------------- Nacogdoches	0-4	8-30	1.35-1.70	0.6-2.0	0.08-0.12	5.1-6.5	Low----------	0.20	5	<1
	4-60	40-60	1.20-1.70	0.2-0.6	0.12-0.18	4.5-5.5	Moderate-----	0.32		
	60-74	30-55	1.20-1.65	0.2-0.6	0.12-0.18	5.1-8.4	Moderate-----	0.32		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
NgA*:										
Niwana----------	0-21	5-12	1.20-1.40	2.0-6.0	0.11-0.15	4.5-6.0	Low----------	0.24	5	.5-2
	21-37	8-15	1.40-1.60	0.6-2.0	0.15-0.20	4.5-5.5	Low----------	0.32		
	37-60	8-15	1.40-1.60	0.6-2.0	0.15-0.20	4.5-5.5	Low----------	0.32		
Gessner---------	0-15	6-15	1.35-1.60	0.6-2.0	0.10-0.15	3.5-6.5	Low----------	0.37	5	0-2
	15-60	12-18	1.40-1.70	0.6-2.0	0.15-0.20	4.5-7.3	Low----------	0.43		
OtC-------------- Oktibbeha	0-5	15-27	1.20-1.50	0.6-2.0	0.15-0.22	4.5-6.5	Low----------	0.37	4	2-6
	5-42	45-80	1.00-1.30	<0.06	0.12-0.16	4.5-8.4	High---------	0.32		
	42-70	35-60	1.10-1.40	<0.06	0.05-0.10	6.1-8.4	High---------	0.32		
OTE-------------- Oktibbeha	0-3	15-27	1.20-1.50	0.6-2.0	0.15-0.22	4.5-6.5	Low----------	0.37	4	2-6
	3-46	40-80	1.00-1.30	<0.06	0.12-0.16	4.5-8.4	High---------	0.32		
	46-60	36-60	1.10-1.40	<0.06	0.05-0.10	6.1-8.4	High---------	0.32		
RbC-------------- Rayburn	0-5	8-20	1.20-1.40	0.6-2.0	0.11-0.15	4.5-6.0	Low----------	0.43	3	.5-2
	5-45	40-60	1.30-1.50	<0.06	0.12-0.18	3.6-5.5	High---------	0.37		
	45-82	---	---	---	---	---	-------------	----		
ScC-------------- Sacul	0-4	5-20	1.30-1.50	0.6-2.0	0.09-0.12	4.5-6.0	Low----------	0.28	5	1-4
	4-12	2-25	1.40-1.60	0.6-2.0	0.07-0.17	4.5-6.0	Low----------	0.28		
	12-29	35-60	1.25-1.40	0.06-0.2	0.15-0.18	3.6-5.5	High---------	0.32		
	29-60	15-40	1.30-1.45	0.2-0.6	0.14-0.18	3.6-5.5	Low----------	0.28		
SCE-------------- Sacul	0-4	5-20	1.30-1.50	0.6-2.0	0.09-0.12	4.5-6.0	Low----------	0.28	5	1-4
	4-8	2-25	1.40-1.60	0.6-2.0	0.07-0.17	4.5-6.0	Low----------	0.28		
	8-32	35-60	1.25-1.40	0.06-0.2	0.15-0.18	3.6-5.5	High---------	0.32		
	32-80	15-40	1.30-1.45	0.2-0.6	0.14-0.18	3.6-5.5	Low----------	0.28		
SCF-------------- Sacul	0-3	5-20	1.30-1.50	0.6-2.0	0.09-0.12	4.5-6.0	Low----------	0.28	5	1-4
	3-7	2-25	1.40-1.60	0.6-2.0	0.07-0.17	4.5-6.0	Low----------	0.28		
	7-27	35-60	1.25-1.40	0.06-0.2	0.15-0.18	3.6-5.5	High---------	0.32		
	27-60	15-40	1.30-1.45	0.2-0.6	0.14-0.18	3.6-5.5	Low----------	0.28		
SDA*:										
Sardis----------	0-4	10-25	1.25-1.60	0.6-2.0	0.15-0.24	4.5-6.5	Low----------	0.37	5	1-3
	4-62	14-35	1.25-1.60	0.6-2.0	0.15-0.24	4.5-6.5	Low----------	0.37		
Guyton----------	0-27	7-25	1.35-1.65	0.6-2.0	0.20-0.23	3.6-6.0	Low----------	0.43	5	.5-4
	27-80	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-6.5	Low----------	0.37		
SeC-------------- Saucier	0-15	8-18	1.50-1.55	2.0-6.0	0.12-0.15	3.6-5.5	Low----------	0.24	4	1-3
	15-27	18-35	1.55-1.60	0.6-2.0	0.16-0.19	3.6-5.5	Low----------	0.32		
	27-58	18-38	1.55-1.60	0.06-0.2	0.16-0.20	3.6-5.5	Low----------	0.32		
	58-70	35-50	1.35-1.45	0.06-0.2	0.16-0.20	3.6-5.5	Moderate-----	0.32		
TpC-------------- Trep	0-22	4-12	1.45-1.65	6.0-20	0.05-0.11	5.1-6.5	Low----------	0.17	5	.5-3
	22-55	18-35	1.50-1.70	0.6-2.0	0.11-0.16	4.5-6.0	Low----------	0.24		
	55-60	35-50	1.60-1.70	0.2-0.6	0.12-0.18	3.6-5.5	Moderate-----	0.24		
TPE-------------- Trep	0-22	4-12	1.45-1.65	6.0-20	0.05-0.11	5.1-6.5	Low----------	0.17	5	.5-3
	22-65	18-35	1.50-1.70	0.6-2.0	0.11-0.16	4.5-6.0	Low----------	0.24		
	65-81	35-50	1.60-1.70	0.2-0.6	0.12-0.18	3.6-5.5	Moderate-----	0.24		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In			
AtC: Attoyac	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
BlC, BLE: Bellwood	D	None	---	---	2.0-4.0	Apparent	Dec-Apr	>60	---	High	Moderate.
BtC, BTE: Betis	A	None	---	---	>6.0	---	---	>60	---	Low	Moderate.
BwC, BwD: Bowie	B	None	---	---	3.5-5.0	Perched	Jan-Apr	>60	---	Moderate	High.
ByC, BYE: Briley	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
CoC: Corrigan	D	None	---	---	0-3.0	Perched	Dec-Mar	20-40	Soft	High	High.
EdC, EDE: Eastwood	D	None	---	---	>6.0	---	---	>60	---	High	High.
GYA*:											
Guyton	D	Frequent	Brief	Dec-Apr	0-1.5	Perched	Dec-May	>60	---	High	High.
Iuka	C	Frequent	Brief	Dec-Apr	1.0-3.0	Apparent	Dec-Apr	>60	---	Moderate	High.
HtC: Herty	D	None	---	---	0.5-1.0	Perched	Jan-Apr	>60	---	High	High.
KaC, KAE: Keiffer	C	None	---	---	>6.0	---	---	>60	---	Moderate	Low.
KeC: Keithville	C	None	---	---	2.0-3.0	Perched	Dec-Apr	>60	---	High	Moderate.
KhB: Kenefick	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
KnC, KNE: Kirvin	C	None	---	---	>6.0	---	---	>60	---	High	High.
KSF*:											
Kisatchie	D	None	---	---	>6.0	---	---	20-40	Soft	High	High.
Mayhew	D	None	---	---	0-1.0	Apparent	Jan-Mar	>60	---	High	High.
Rayburn	D	None	---	---	2.5-4.5	Perched	Dec-Feb	40-60	Soft	High	High.
LaC: Latonia	B	None	---	---	>6.0	---	---	>60	---	Low	Moderate.
LtC, LTE: Letney	A	None	---	---	>6.0	---	---	>60	---	Low	High.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In			
MhC: Mayhew	D	None	---	---	0-1.0	Apparent	Jan-Mar	>60	---	High	High.
NcC: Nacogdoches	B	None	---	---	>6.0	---	---	>60	---	High	High.
NgA*:											
Niwana	B	None	---	---	4.0-6.0	Apparent	Jan-Mar	>60	---	Moderate	High.
Gessner	D	None	---	---	+1-2.0	Apparent	Nov-May	>60	---	High	Low.
OtC, OTE: Oktibbeha	D	None	---	---	>6.0	---	---	>60	---	High	High.
RbC: Rayburn	D	None	---	---	2.5-4.5	Perched	Dec-Feb	40-60	Soft	High	High.
ScC, SCE, SCF: Sacul	C	None	---	---	2.0-4.0	Perched	Dec-Apr	>60	---	High	High.
SDA*:											
Sardis	C	Rare	---	---	1.5-3.0	Perched	Jan-May	>60	---	High	Moderate.
Guyton	D	Rare	---	---	0-1.5	Perched	Dec-May	>60	---	High	High.
SeC: Saucier	C	None	---	---	2.5-4.0	Perched	Jan-Mar	>60	---	Moderate	High.
TpC, TPE: Trep	B	None	---	---	3.5-5.0	Perched	Nov-May	>60	---	High	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--FERTILITY TEST DATA FOR SELECTED SOILS

(Analyses by the Soil Fertility Laboratory, Louisiana Agricultural Experiment Station. Dashes indicated that analyses were not made. The symbol < means less than)

Soil name and sample number	Horizon	Depth	Organic matter content	pH 1:1 H_2O	Extractable phosphorus	Exchangeable cations: Ca	Mg	K	Na	Al	H	Total acidity	Cation-exchange capacity (sum)	Cation-exchange capacity (effective)	Base saturation (sum)	Saturation: Sum of cation-exchange capacity Na	Effective cation-exchange capacity Al	Ca/Mg
		In	Pct		Ppm	Milliequivalents/100 grams of soil									Pct	Pct	Pct	
Attoyac fine sandy loam:[1] (S86LA-085-15)	A	0-6	0.14	5.5	<5	2.6	0.5	0.1	0.0	0.0	0.5	5.4	8.6	3.7	37.2	0.0	0.0	5.2
	E	6-15	0.59	5.6	<5	1.1	0.3	0.0	0.0	0.0	0.2	2.4	3.8	1.6	36.8	0.0	0.0	3.7
	Bt1	15-26	0.15	4.8	<5	0.7	1.7	0.1	0.0	3.5	0.7	10.8	13.3	6.7	18.8	0.0	52.2	0.4
	Bt2	26-36	0.01	4.8	<5	0.4	1.0	0.1	0.0	4.7	0.3	11.1	12.6	6.5	11.9	0.0	72.3	0.4
	B/E	36-41	0.06	4.8	<5	0.4	0.8	0.1	0.0	4.8	0.2	10.8	12.1	6.3	10.7	0.0	76.2	0.5
	B't1	41-56	0.06	4.8	<5	0.4	0.7	0.1	0.0	4.1	0.3	10.5	11.7	5.6	10.3	0.0	73.2	0.6
	B't2	56-71	0.01	4.7	<5	0.4	0.5	0.0	0.0	3.8	0.2	7.8	8.7	4.9	10.3	0.0	77.6	0.8
Attoyac fine sandy loam:[2] (S87LA-085-19)	A	0-9	0.56	5.0	9	2.3	0.2	0.0	0.0	1.1	0.5	6.0	8.5	4.1	29.4	0.0	26.8	11.5
	E	9-14	0.14	5.5	8	1.3	0.1	0.0	0.0	0.4	0.0	2.4	3.8	1.8	36.8	0.0	22.2	13.0
	B/E	14-21	0.03	5.4	10	3.0	0.4	0.0	0.0	0.2	0.0	3.0	6.4	3.6	58.1	0.0	5.6	7.5
	Bt1	21-36	0.02	5.4	11	4.1	1.0	0.1	0.0	0.2	1.2	4.8	10.0	5.6	52.0	0.0	3.6	4.1
	Bt2	36-46	0.00	5.5	11	4.0	1.0	0.1	0.0	0.4	1.0	3.0	8.1	6.5	63.0	0.0	6.2	4.0
	Bt3	46-57	0.00	5.3	10	4.0	1.0	0.1	0.0	0.2	0.2	3.0	8.1	5.5	63.0	0.0	3.6	4.0
	Bt4	57-67	0.00	5.2	12	3.2	1.0	0.1	0.0	0.4	0.2	7.8	12.1	4.9	35.5	0.0	8.2	3.2
	Bt5	67-75	0.00	5.3	11	2.2	1.0	0.1	0.0	0.3	0.3	3.6	6.9	3.9	47.8	0.0	7.7	2.2
Bellwood silty clay loam:[3] (S87LA-085-15)	A	0-6	1.59	4.4	17	11.0	2.0	0.3	0.1	4.3	0.5	15.0	28.4	18.2	47.2	0.4	23.6	5.5
	Bw1	6-16	0.46	4.3	9	4.4	1.0	0.2	0.2	10.0	1.5	19.8	25.6	17.3	22.7	0.8	57.8	4.4
	Bw2	16-33	0.17	4.1	11	5.0	1.3	0.4	1.0	22.0	0.0	28.2	35.9	29.7	21.4	2.8	74.1	3.8
	Bw3	33-47	0.09	3.7	14	8.2	2.0	1.0	1.0	19.0	0.0	28.8	41.0	31.2	29.8	2.4	60.9	4.1
	BC	47-53	0.04	3.5	17	11.3	2.0	1.0	2.0	16.3	0.4	27.0	43.3	33.0	37.6	4.6	49.4	5.7
	C	53-72	0.05	3.5	35	15.0	2.4	1.0	3.0	17.0	0.4	25.8	47.2	38.8	45.3	6.4	43.8	6.2
Bellwood silty clay loam:[4] (S87LA-085-16)	A	0-4	1.87	4.6	21	14.0	2.0	0.5	0.1	3.0	0.1	15.0	31.6	19.7	52.5	0.1	15.2	7.0
	Bw1	4-8	0.63	4.3	15	11.0	1.4	0.4	0.1	9.0	0.4	18.6	31.5	22.3	41.0	0.1	40.4	7.9
	Bw2	8-13	0.40	4.2	14	9.0	1.2	0.5	0.1	13.0	0.0	19.8	30.6	23.8	35.3	0.1	54.6	7.5
	Bw3	13-22	0.31	3.9	17	13.0	2.0	0.7	0.3	18.0	0.4	23.4	39.4	34.4	40.6	0.3	52.3	6.5
	BC1	22-34	0.20	4.1	17	18.0	2.0	0.8	0.4	16.0	0.5	24.6	45.8	37.7	46.3	0.4	42.4	9.0
	BC2	34-51	0.17	4.0	19	22.1	2.0	0.7	0.5	9.4	0.0	19.2	44.5	34.7	56.9	0.5	27.1	11.1
	C1	51-60	0.04	3.9	66	87.0	1.2	0.6	0.4	2.3	1.3	12.6	101.8	92.8	87.6	0.4	2.5	72.5
	C2	60-73	0.00	4.5	173	189.0	2.0	0.8	0.7	0.5	0.5	9.6	202.1	193.5	95.2	0.7	0.3	94.5

See footnotes at end of table.

TABLE 18.--FERTILITY TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Organic matter content	pH 1:1 H_2O	Extractable phosphorus	Exchangeable cations: Ca	Mg	K	Na	Al	H	Total acidity	Cation-exchange capacity (sum)	Cation-exchange capacity (effective)	Base saturation (sum)	Saturation: Sum of cation-exchange capacity Na	Saturation: Effective cation-exchange capacity Al	Ca/Mg
		In	Pct		Ppm	Milliequivalents/100 grams of soil									Pct	Pct	Pct	
Betis loamy fine sand:[3] (S86LA-085-05)	A	0-4	0.63	5.1	8	0.8	0.2	0.0	0.0	0.4	0.2	3.0	4.0	1.6	25.0	0.0	25.0	4.0
	E	4-28	0.01	5.4	<5	0.7	0.2	0.0	0.0	0.1	0.1	1.2	2.1	1.1	42.9	0.0	9.1	3.5
	Bw	28-45	0.06	5.4	<5	0.7	0.1	0.0	0.0	0.2	0.0	0.6	1.4	1.0	57.1	0.0	20.0	7.0
	E/Bt	45-72	0.01	5.5	<5	0.7	0.2	0.0	0.0	0.2	0.0	1.2	2.1	1.1	42.9	0.0	18.2	3.5
Betis loamy fine sand:[5] (S86LA-085-06)	A	0-5	0.81	5.4	<5	1.5	0.3	0.0	0.0	0.0	0.2	3.6	5.4	2.0	33.3	0.0	0.0	5.0
	E1	5-28	0.00	5.5	<5	0.6	0.2	0.0	0.0	0.2	0.0	1.2	2.0	1.0	40.0	0.0	20.0	3.0
	E2	28-51	0.00	5.6	<5	0.7	0.1	0.0	0.0	0.0	0.2	1.2	2.0	1.0	40.0	0.0	0.0	7.0
	E/B1	51-69	0.06	5.9	<5	1.0	0.2	0.0	0.0	0.0	0.2	0.6	1.8	1.4	66.7	0.0	0.0	5.0
	E/B2	69-73	0.15	6.0	8	1.3	0.3	0.0	0.0	---	---	1.5	3.1	---	30.4	0.0	---	4.3
Bowie fine sandy loam:[6] (S86LA-085-07)	Ap	0-5	2.18	5.6	49	3.9	0.6	0.1	0.0	0.0	0.2	4.8	9.4	4.8	48.9	0.0	0.0	6.5
	E	5-15	0.46	5.9	<5	1.8	0.2	0.1	0.0	0.0	0.2	1.5	3.6	2.3	58.3	0.0	0.0	9.0
	Bt	15-23	0.15	5.5	<5	3.5	0.4	0.1	0.0	0.2	0.0	4.5	8.5	4.2	47.1	0.0	4.8	8.8
	Btv1	23-31	0.19	4.7	<5	2.6	1.0	0.1	0.0	2.4	0.2	9.0	12.7	6.3	29.1	0.0	38.1	2.6
	Btv2	31-45	0.10	4.8	<5	1.5	1.5	0.1	0.0	3.8	0.0	9.9	13.0	6.9	23.8	0.0	55.1	1.0
	B't	45-62	0.01	4.6	<5	0.7	0.9	0.1	0.0	5.2	0.0	11.4	13.1	6.9	13.0	0.0	75.4	0.8
Bowie fine sandy loam:[7] (S86LA-085-08)	A	0-5	0.59	4.6	16	0.7	0.2	0.0	0.0	0.4	0.4	6.0	6.9	1.7	13.0	0.0	23.5	3.5
	E	5-16	0.10	5.5	20	0.9	0.2	0.0	0.0	0.0	0.2	1.5	2.6	1.3	42.3	0.0	0.0	4.5
	Bt	16-23	0.15	5.8	<5	3.2	1.3	0.3	0.0	0.0	0.2	4.8	9.6	5.0	50.0	0.0	0.0	2.5
	Btv1	23-32	0.06	5.4	<5	2.6	1.4	0.2	0.0	0.4	0.4	5.4	9.6	5.0	43.7	0.0	8.0	1.9
	Btv2	32-48	0.15	5.0	<5	0.3	1.0	0.2	0.0	0.7	0.3	4.8	6.3	2.5	23.8	0.0	28.0	0.3
	Btv3	48-68	0.06	4.8	6	0.3	0.7	0.1	0.0	0.4	0.2	3.6	4.7	1.7	23.4	0.0	23.5	0.4
Briley loamy fine sand:[3] (S86LA-085-02)	A	0-6	2.22	4.6	16	0.7	0.2	0.0	0.0	0.4	0.4	6.0	6.9	1.7	13.0	0.0	0.4	6.0
	E1	6-10	0.37	5.5	20	0.9	0.2	0.0	0.0	0.0	0.2	1.5	2.6	1.3	42.3	0.0	0.2	1.5
	E2	10-21	0.10	5.8	<5	3.2	1.3	0.3	0.0	0.0	0.2	4.8	9.6	5.0	50.0	0.0	0.2	4.8
	B1E	21-29	0.10	5.4	<5	2.6	1.4	0.2	0.0	0.4	0.4	5.4	9.6	5.0	43.7	0.0	0.4	5.4
	Bt1	29-37	0.10	5.0	<5	0.3	1.0	0.2	0.0	0.7	0.3	4.8	6.3	2.5	23.8	0.0	0.3	4.8
	Bt2	37-60	0.01	4.8	6	0.3	0.7	0.1	0.0	0.4	0.2	3.6	4.7	1.7	23.4	0.0	0.2	3.6

See footnotes at end of table.

TABLE 18.--FERTILITY TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Organic matter content	pH 1:1 H_2O	Extractable phosphorus	Exchangeable cations: Ca	Mg	K	Na	Al	H	Total acidity	Cation-exchange capacity (sum)	Cation-exchange capacity (effective)	Base saturation (sum)	Saturation: Sum of cation-exchange capacity Na	Saturation: Effective cation-exchange capacity Al	Ca/Mg
		In	Pct		Ppm	Milliequivalents/100 grams of soil									Pct	Pct	Pct	
Briley loamy fine sand:[8] (S86LA-085-03)	A	0-7	0.72	5.2	<5	1.5	0.2	0.0	0.0	0.2	0.2	3.9	5.6	2.1	30.4	0.0	9.5	7.5
	E	7-21	0.06	5.5	<5	0.7	0.2	0.0	0.0	0.2	0.2	2.4	3.3	1.3	27.3	0.0	15.4	3.5
	B/E	21-29	0.01	5.4	<5	1.5	0.5	0.1	0.0	0.2	0.2	2.1	4.2	2.5	50.0	0.0	8.0	3.0
	Bt1	29-41	0.01	5.5	<5	2.3	0.7	0.1	0.0	0.2	0.2	3.6	6.7	3.5	46.3	0.0	5.7	3.3
	Bt2	41-60	0.00	5.6	<5	1.9	0.8	0.1	0.0	0.2	0.0	3.0	5.8	3.0	48.3	0.0	6.7	2.4
Eastwood fine sandy loam:[9] (S87LA-085-11)	A	0-3	1.84	5.0	52	5.2	2.6	0.2	0.3	4.0	0.8	10.2	18.5	13.1	44.9	1.6	30.5	2.0
	E	3-7	0.41	4.8	12	2.3	0.8	0.1	0.1	8.3	0.3	8.2	11.5	11.9	28.7	0.9	69.7	2.9
	Bt1	7-23	0.26	4.5	16	4.0	5.0	0.2	0.6	12.1	0.1	18.0	27.8	22.0	35.3	2.2	55.0	0.8
	Bt2	23-36	0.10	4.5	15	1.3	6.0	0.2	1.1	10.1	0.7	18.0	26.6	19.4	32.3	4.1	52.1	0.2
	Bt3	36-48	0.09	4.7	18	1.4	6.0	0.2	1.2	0.7	0.3	15.6	24.4	9.8	36.1	4.9	7.1	0.2
	B/Cr	48-56	0.03	4.6	21	2.2	6.4	0.1	1.5	0.4	0.2	10.2	20.4	10.8	50.0	7.4	3.7	0.3
	Cr	56-71	0.03	4.7	27	4.4	7.3	0.2	2.1	0.3	0.2	6.0	20.0	14.5	70.0	10.5	2.1	0.6
Eastwood fine sandy loam:[10] (S87LA-085-12)	A	0-7	0.56	4.8	9	3.0	0.3	0.1	0.0	4.0	0.8	6.6	10.0	8.2	34.0	0.0	48.8	10.0
	E	7-11	0.29	4.9	8	2.3	0.3	0.1	0.0	5.0	0.9	6.0	8.7	8.6	31.0	0.0	58.1	7.7
	Bt1	11-16	0.29	4.3	13	6.2	2.0	0.4	0.1	9.0	0.6	16.2	24.9	18.3	34.9	0.4	49.2	3.1
	Bt2	16-28	0.10	4.3	13	4.0	2.0	0.4	0.1	13.1	0.7	19.8	26.3	20.3	24.7	0.4	64.5	2.0
	BC	28-45	0.09	4.0	12	2.0	2.0	0.4	0.2	16.0	0.0	22.2	26.8	20.6	17.2	0.7	77.7	1.0
	C	45-60	0.02	3.7	11	1.4	2.0	0.5	0.4	19.4	0.6	24.0	28.3	24.3	15.2	0.4	79.8	0.7
Gessner loam:[3] (S87LA-085-09)	A	0-5	0.49	4.2	12	2.0	0.2	0.1	0.0	0.5	0.1	6.0	8.3	2.9	27.7	0.0	17.2	10.0
	Eg	5-15	0.13	4.9	8	2.0	0.2	0.0	0.2	2.6	0.5	6.0	8.4	5.5	28.6	2.4	47.3	10.0
	Btg/E	15-25	0.10	5.3	8	3.4	0.7	0.0	0.9	0.4	0.0	1.8	6.8	5.4	73.5	13.2	7.4	4.9
	Btg1	25-33	0.01	4.8	8	4.1	0.9	0.1	1.6	0.5	0.1	4.2	10.9	7.3	61.5	14.7	6.8	4.6
	Btg2	33-60	0.00	4.7	13	8.0	2.0	0.1	4.0	0.5	0.1	7.8	21.9	14.7	64.4	18.3	3.4	4.0
Guyton silt loam:[11] (S86LA-085-09)	A	0-5	1.34	4.9	31	3.5	1.8	0.1	0.1	1.2	0.4	12.3	17.8	7.1	30.9	0.6	16.9	1.9
	Eg	5-28	0.46	4.7	15	2.1	1.6	0.1	0.1	3.4	0.4	12.6	16.5	7.7	23.6	0.6	44.2	1.3
	B/E	28-60	0.19	4.6	6	2.5	2.8	0.2	0.7	4.5	0.5	13.8	20.0	11.2	31.0	3.5	40.2	0.9
	Btg	60-80	0.15	4.5	6	2.6	2.7	0.2	1.9	4.5	0.5	12.0	19.4	12.4	38.1	8.9	26.1	1.0
Guyton silt loam:[12] (S87LA-085-17)	Ap	0-6	1.02	4.8	47	10.0	3.0	0.3	0.3	3.1	0.5	13.2	26.8	17.2	50.7	1.1	18.0	3.3
	Eg	6-12	0.43	3.6	26	8.0	2.4	0.2	1.0	3.1	0.5	13.2	24.8	15.2	46.8	4.0	20.4	3.3
	Btg1	12-26	0.17	5.1	22	7.0	3.2	0.3	1.3	4.0	0.4	13.2	25.0	16.2	47.2	5.2	24.7	2.2
	Btg2	26-36	0.11	5.0	32	9.1	4.0	0.3	2.2	1.4	0.6	10.2	25.8	17.6	60.5	8.5	8.0	2.3
	Btg3	36-60	0.11	5.2	50	14.0	5.0	0.4	4.0	0.5	0.1	9.6	33.0	24.0	70.9	12.1	2.1	2.8

See footnotes at end of table.

TABLE 18.--FERTILITY TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Hori- zon	Depth	Organic matter content	pH 1:1 H_2O	Ex- tract- able- phos- phorus	Exchangeable cations: Ca	Mg	K	Na	Al	H	Total acid- ity	Cation- exchange capacity (sum)	Cation- exchange capacity (effec- tive)	Base satura- tion (sum)	Saturation: Sum of cation- exchange capacity Na	Saturation: Effective cation- exchange capacity Al	Ca/Mg
		In	Pct		Ppm	Milliequivalents/100 grams of soil									Pct	Pct	Pct	
Iuka silt loam:[3] (S86LA-085-10)	A	0-6	0.90	5.1	36	2.9	0.9	0.1	0.0	0.9	0.1	7.8	11.7	4.9	33.3	0.0	18.4	3.2
	C1	6-14	0.41	4.8	9	1.9	0.5	0.1	0.0	2.0	0.4	8.1	10.6	4.9	23.6	0.0	40.8	3.8
	C2	14-25	0.28	4.7	7	1.4	0.6	0.1	0.0	2.5	0.5	8.4	10.5	5.1	20.0	0.0	49.0	2.3
	Cg1	25-39	0.19	4.3	14	1.3	1.6	0.1	0.6	2.7	0.5	9.0	12.6	6.8	28.6	4.8	39.7	0.8
	Cg2	39-56	0.19	4.3	15	0.7	2.1	0.1	1.4	7.2	1.5	9.0	13.3	13.0	32.3	10.5	55.4	0.3
	Cg3	56-68	0.15	4.2	<5	1.3	2.0	0.1	2.0	7.0	1.8	8.4	14.3	14.2	37.8	14.0	49.3	0.7
Keithville very fine sandy loam:[3] (S85LA-085-11)	Ap	0-7	1.65	5.2	<5	4.0	0.8	0.1	0.0	0.0	0.0	4.3	9.2	4.9	53.3	0.0	0.0	5.0
	E	7-13	0.85	4.7	<5	3.1	0.7	0.1	0.1	0.6	0.2	4.8	8.8	4.8	45.5	1.1	12.5	4.5
	Bt1	13-22	0.54	4.2	<5	2.2	1.5	0.1	0.2	3.6	1.0	12.0	16.0	8.6	25.0	1.3	41.9	1.4
	Bt2	22-27	0.46	4.2	<5	0.8	1.5	0.1	0.2	2.6	2.0	10.6	13.2	7.2	19.7	1.0	36.1	0.6
	B/E	27-32	0.37	4.1	7	1.0	1.4	0.1	0.2	4.4	0.0	10.6	13.3	7.1	20.3	1.0	62.0	0.7
	2Bt3	32-43	0.28	3.9	<5	0.6	5.7	0.3	0.8	11.2	0.0	20.6	28.0	18.6	26.4	2.9	60.2	0.1
	2Bt4	43-55	0.24	3.9	<5	0.5	5.0	0.2	0.7	8.0	0.0	14.6	21.0	14.4	30.5	3.3	55.5	0.1
	2C	55-63	0.28	3.8	<5	0.6	6.3	0.2	0.9	3.6	0.0	13.2	21.2	11.6	39.4	4.2	31.0	0.1
Kenefick loamy fine sand:[13] (S86LA-085-04)	A	0-5	0.41	5.0	<5	0.5	0.2	0.1	0.0	0.7	0.1	3.6	4.4	1.6	18.2	0.0	43.7	2.5
	E	5-10	0.46	5.1	<5	0.8	0.4	0.0	0.0	0.5	0.1	4.2	5.4	1.8	22.2	0.0	27.8	2.0
	Bt1	10-23	0.06	5.5	<5	3.8	1.4	0.2	0.0	0.4	0.1	4.5	9.9	5.9	54.5	0.0	6.8	2.7
	Bt2	23-36	0.01	5.3	<5	4.0	1.5	0.2	0.0	0.7	0.1	5.4	11.1	6.5	51.4	0.0	10.8	2.7
	B/E	36-45	0.00	5.1	<5	3.2	1.2	0.2	0.0	1.4	0.2	5.4	10.0	6.2	46.0	0.0	22.6	2.7
	B/C	45-66	0.01	5.1	<5	3.2	1.2	0.1	0.0	0.9	0.3	4.8	9.3	5.7	48.4	0.0	15.8	2.7
Kirvin fine sandy loam:[14] (S86LA-085-14)	A	0-6	2.22	5.2	6	2.3	0.7	0.1	0.0	0.2	0.2	10.8	13.9	3.5	22.3	0.0	5.7	3.3
	E	6-10	0.54	5.3	<5	1.1	0.6	0.1	0.0	0.4	1.0	6.9	8.7	3.2	20.7	0.0	12.5	1.8
	Bt1	10-20	1.69	4.7	<5	1.3	3.2	0.4	0.0	7.0	0.8	18.0	22.9	12.7	21.4	0.0	55.1	0.4
	Bt2	20-30	0.24	4.7	<5	0.6	1.1	0.2	0.0	8.6	1.4	18.6	20.5	11.9	9.3	0.0	72.3	0.5
	Bt3	30-41	0.24	4.8	<5	0.5	0.9	0.3	0.1	11.6	0.9	21.6	23.4	14.3	7.7	0.4	81.1	0.6
	BC	41-60	0.24	4.8	<5	0.4	5.2	0.3	0.2	14.8	1.2	24.0	30.1	22.1	20.3	0.7	67.0	0.1
Kirvin fine sandy loam:[15] (S87LA-085-10)	A	0-4	0.93	5.5	35	7.0	1.3	0.2	0.0	0.2	0.2	2.4	10.9	8.9	78.0	0.0	2.2	5.4
	Bt1	4-18	0.53	4.5	19	10.1	5.0	1.0	0.2	5.4	0.6	15.0	31.3	22.3	52.1	0.6	24.2	2.0
	Bt2	18-30	0.09	4.4	16	5.4	5.0	0.4	0.3	9.0	0.4	15.0	26.1	20.5	42.5	1.1	48.9	1.1
	BC	30-36	0.04	4.1	16	4.0	5.4	0.4	1.0	10.3	0.3	16.2	27.0	21.4	40.0	3.7	48.1	0.7
	C	36-60	0.07	4.6	30	2.2	6.0	0.3	1.0	10.0	0.1	16.8	26.3	19.6	36.1	3.8	51.0	0.4

See footnotes at end of table.

TABLE 18.--FERTILITY TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Organic matter content	pH 1:1 H_2O	Extractable phosphorus	Exchangeable cations: Ca	Exchangeable cations: Mg	Exchangeable cations: K	Exchangeable cations: Na	Exchangeable cations: Al	Exchangeable cations: H	Total acidity	Cation-exchange capacity (sum)	Cation-exchange capacity (effective)	Base saturation (sum)	Saturation: Sum of cation-exchange capacity Na	Saturation: Effective cation-exchange capacity Al	Ca/Mg
		In	Pct		Ppm	---------Milliequivalents/100 grams of soil---------									Pct	Pct	Pct	
Latonia fine sandy loam:[16] (S87LA-085-18)	A	0-5	0.82	5.5	44	3.1	0.2	0.0	0.1	0.4	0.0	7.8	11.2	3.8	30.4	0.9	10.5	15.5
	E	5-10	0.26	5.8	21	4.0	0.2	0.0	0.1	0.2	0.3	8.0	7.9	4.9	54.4	1.3	6.1	20.0
	B/E	10-20	0.06	5.9	13	3.4	0.3	0.0	0.1	0.2	0.0	5.1	9.2	4.0	41.3	1.1	5.0	11.8
	Bt1	20-30	0.05	5.0	13	3.3	0.4	0.1	0.2	1.3	0.3	7.2	11.8	5.6	33.9	1.7	28.2	8.3
	Bt2	30-38	0.05	4.8	12	2.0	1.0	0.1	0.2	3.0	0.0	8.4	11.7	6.3	28.2	1.7	47.6	2.0
	C	38-68	0.00	4.1	12	1.0	0.4	0.1	0.1	2.0	0.4	9.0	10.6	4.0	15.1	0.9	50.0	2.5
Letney loamy fine sand:[3] (S87LA-085-14)	Ap	0-7	0.69	5.1	119	3.2	0.2	0.1	0.0	2.0	0.5	4.2	7.7	6.0	45.5	0.0	33.3	16.0
	E1	7-15	0.25	6.1	75	2.0	0.1	0.0	0.0	0.0	0.0	3.6	5.7	2.1	36.8	0.0	0.0	20.0
	E2	15-22	0.16	5.7	23	2.0	0.1	0.1	0.0	0.2	0.2	3.0	5.2	2.6	42.3	0.0	7.7	20.0
	Bt1	22-35	0.20	5.1	13	4.0	1.0	0.1	0.0	13.0	0.6	5.4	10.5	18.7	48.6	0.0	69.5	4.0
	Bt2	35-45	0.05	4.7	10	2.0	1.0	0.2	0.1	15.0	0.2	7.2	10.5	18.5	31.4	1.0	81.1	2.0
	Bt3	45-60	0.01	4.6	7	1.0	0.4	0.1	0.0	3.0	0.0	5.4	6.9	4.5	21.7	0.0	66.7	2.5
Niwana loam:[3] (S87LA-085-08)	A	0-6	1.05	5.1	14	3.2	0.2	0.1	0.0	3.0	0.5	5.4	8.9	7.0	39.3	0.0	42.9	16.0
	E	6-15	0.11	5.0	<5	0.8	0.0	0.0	0.0	3.0	0.6	4.8	5.6	4.4	14.3	0.0	68.2	0.0
	EB	15-21	0.04	4.9	<5	0.6	0.2	0.0	0.0	0.5	0.1	1.8	2.6	1.4	30.8	0.0	35.7	3.0
	B/E1	21-37	0.02	4.9	2	0.7	0.3	0.1	0.0	0.5	0.3	2.4	3.5	1.9	31.4	0.0	26.3	2.3
	B/E2	37-51	0.01	4.6	10	0.6	0.4	0.1	0.0	0.9	0.7	4.2	5.3	2.7	20.8	0.0	33.3	1.5
	B/E3	51-60	0.00	4.5	8	0.4	0.3	0.1	0.0	1.6	0.4	4.8	5.6	2.8	14.3	0.0	57.1	1.3
Sacul fine sandy loam:[3] (S86LA-085-11)	Ap	0-4	1.43	6.3	6	4.8	0.3	0.0	0.0	---	---	4.8	9.9	---	51.5	0.0	---	16.0
	E	4-12	0.72	6.4	<5	2.7	0.2	0.0	0.0	---	---	3.6	6.5	---	44.6	0.0	---	13.5
	Bt1	12-20	0.81	4.8	<5	1.3	1.8	0.2	0.0	7.0	1.8	22.2	25.5	12.1	12.9	0.0	57.9	0.7
	Bt2	20-29	0.19	4.9	<5	0.7	1.5	0.2	0.1	9.4	1.9	17.7	20.2	13.8	12.4	0.5	68.1	0.5
	Bt3	29-45	0.10	4.8	<5	0.3	1.0	0.2	0.1	12.9	3.2	19.5	21.1	17.7	7.6	0.5	72.9	0.3
	C	45-60	0.06	4.7	<5	0.3	1.2	0.2	0.3	15.3	1.1	23.4	25.4	18.4	7.9	1.2	83.2	0.3
Sacul fine sandy loam:[17] (S86LA-085-12)	A	0-4	1.03	5.7	6	2.5	1.1	0.1	0.0	0.0	0.2	7.5	11.2	3.9	33.0	0.0	0.0	2.3
	E	4-8	0.46	5.2	<5	1.4	1.1	0.1	0.0	1.4	0.4	7.8	10.4	4.4	25.0	0.0	31.8	1.3
	Bt1	8-16	0.46	5.0	<5	2.0	4.9	0.3	0.5	9.4	1.1	21.9	29.6	18.2	26.0	1.7	51.6	0.4
	Bt2	16-23	0.46	4.7	<5	2.7	8.3	0.4	0.7	12.9	1.1	26.4	38.5	26.1	31.4	1.8	49.4	0.3
	Bt3	23-32	0.19	5.2	<5	3.3	8.3	0.4	0.6	10.3	0.7	20.4	33.0	23.6	38.2	1.8	43.6	0.4
	BC	32-37	0.15	5.3	<5	4.2	8.3	0.4	0.8	7.5	1.5	18.0	31.7	22.7	43.2	2.5	33.0	0.5
	Cr1	37-55	0.10	4.9	<5	6.0	8.3	0.4	1.3	3.6	0.6	13.8	29.8	20.2	53.7	4.4	17.8	0.7
	Cr2	55-63	0.06	5.7	10	7.9	8.3	0.4	1.9	0.4	0.5	7.8	26.3	19.4	70.3	7.2	2.1	1.0
	Cr3	63-81	0.01	6.0	21	7.3	8.3	0.4	2.5	---	---	6.9	25.4	---	72.8	9.8	---	0.9

See footnotes at end of table.

TABLE 18.--FERTILITY TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Organic matter content	pH 1:1 H_2O	Extractable phosphorus	Exchangeable cations Ca	Mg	K	Na	Al	H	Total acidity	Cation-exchange capacity (sum)	Cation-exchange capacity (effective)	Base saturation (sum)	Saturation: Sum of cation-exchange capacity Na	Saturation: Effective cation-exchange capacity Al	Ca/Mg
		In	Pct		Ppm	Milliequivalents/100 grams of soil									Pct	Pct	Pct	
Sacul fine sandy loam:[18] (S86LA-085-13)	A	0-3	2.00	6.8	27	7.7	1.3	0.2	0.0	---	---	4.8	14.0	---	65.7	0.0	---	5.9
	E	3-5	0.59	5.3	<5	3.0	3.1	0.2	0.0	1.3	0.1	6.6	12.9	7.7	48.8	0.0	16.9	1.0
	Bt1	5-12	0.24	4.4	<5	2.6	8.3	0.5	0.1	7.8	0.4	16.2	27.7	19.7	41.5	0.4	39.6	0.3
	Bt2	12-28	0.28	4.6	<5	3.5	8.3	0.4	0.1	9.8	0.6	21.3	33.6	22.7	36.6	0.3	43.2	0.4
	BC	28-41	0.15	4.8	<5	2.3	8.3	0.5	0.3	9.7	0.6	20.4	31.8	21.7	35.8	0.9	44.7	0.3
	Cr	41-60	0.19	5.0	<5	1.9	8.3	0.4	0.3	8.5	0.0	18.4	29.2	19.4	37.3	1.0	43.8	0.2
Sacul fine sandy loam:[19] (S87LA-085-13)	A	0-5	1.31	4.4	15	4.0	0.6	0.2	0.0	9.0	0.6	14.4	19.2	14.4	25.0	0.0	62.5	6.7
	Bt1	5-13	0.31	4.4	15	1.8	3.1	1.0	0.0	11.0	0.4	18.6	24.5	17.3	24.1	0.0	63.6	0.6
	Bt2	13-18	0.17	4.4	17	1.0	3.0	1.0	0.1	3.2	0.4	22.2	27.3	8.7	18.7	0.4	36.8	0.3
	BC	18-29	0.12	4.1	15	0.4	1.8	1.0	0.1	0.9	0.3	22.8	26.1	4.5	12.6	0.4	20.0	0.2
	Cr1	29-49	0.05	4.3	15	0.2	1.0	0.4	0.1	13.3	0.1	19.2	20.9	15.1	8.1	0.5	88.1	0.2
	Cr2	49-60	0.01	4.2	11	0.2	1.0	0.3	0.1	16.2	0.2	18.0	19.6	18.0	8.2	0.5	90.0	0.2
Sardis loam:[20] (S85LA-085-10)	A	0-4	2.93	4.6	<5	5.9	2.4	0.1	0.1	0.0	0.0	8.0	16.5	8.5	51.4	0.6	0.0	2.5
	Bw1	4-14	1.16	4.8	<5	7.5	3.2	0.1	0.2	0.0	0.0	7.3	18.3	11.0	60.0	1.0	0.0	2.4
	Bw2	14-24	0.90	4.5	<5	6.3	3.6	0.2	0.3	1.4	0.2	10.5	20.9	12.0	49.7	1.3	11.7	1.7
	Bw3	24-36	0.46	4.3	<5	4.2	3.5	0.2	0.4	2.2	0.0	9.0	17.2	10.4	47.7	2.2	21.1	1.2
	Bw4	36-42	0.41	4.4	<5	4.5	4.7	0.2	0.7	2.4	0.2	9.0	19.1	12.7	52.9	3.5	18.9	1.0
	Bw5	42-50	0.50	4.4	<5	6.5	7.2	0.3	1.3	2.9	0.0	12.5	27.8	18.2	55.0	4.6	15.9	0.9
	Bw6	50-60	0.41	4.5	<5	5.7	6.0	0.2	1.4	1.6	0.4	9.0	22.3	15.3	59.6	6.2	10.5	0.9
Saucier very fine sandy loam:[3] (S85LA-085-09)	A	0-5	1.12	4.6	<5	1.4	0.3	0.1	0.1	0.4	0.2	3.8	5.7	2.5	33.3	1.8	16.0	4.7
	E	5-8	0.37	4.6	<5	1.3	0.3	0.0	0.1	0.4	0.2	2.7	4.4	2.3	38.6	2.3	17.4	4.3
	E/B	8-15	0.10	4.6	<5	2.3	1.1	0.1	0.1	1.9	0.1	5.9	9.5	5.6	37.9	1.1	33.9	2.1
	Bt	15-27	0.06	4.5	<5	2.1	1.3	0.1	0.2	3.2	0.2	7.4	11.1	7.1	33.3	1.8	45.1	1.6
	Btv	27-58	0.01	4.5	<5	0.9	0.9	0.1	0.1	4.3	0.4	8.7	10.7	6.7	18.7	0.9	64.2	1.0
	2Btg	58-70	0.06	4.4	<5	0.7	0.7	0.0	0.1	3.1	0.3	6.7	8.2	4.9	18.3	1.2	63.3	1.0
Saucier very fine sandy loam:[21] (S85LA-085-17)	A	0-5	0.90	4.7	54	1.5	0.3	0.1	0.0	0.2	0.2	4.0	5.9	2.3	32.2	0.0	8.7	5.0
	E	5-13	0.19	5.0	30	2.1	0.3	0.0	0.0	0.2	0.2	2.5	4.9	2.8	49.0	0.0	7.1	7.0
	Bt1	13-23	0.10	4.7	<5	4.7	1.0	0.3	0.1	1.1	0.1	6.7	12.8	7.3	47.7	0.8	15.1	4.7
	Btv1	23-33	0.00	4.4	<5	2.8	1.2	0.3	0.1	4.1	0.3	10.3	14.7	8.8	29.9	0.7	46.6	2.3
	Btv2	33-41	0.01	4.3	<5	1.5	1.3	0.2	0.1	5.6	0.1	10.6	13.7	8.8	22.6	0.7	63.6	1.2
	Bt2	41-63	0.01	4.4	<5	1.2	1.2	0.2	0.1	5.4	0.3	10.6	13.3	8.4	20.3	0.8	64.3	1.0
	Bt3	63-75	0.00	4.5	<5	0.7	0.8	0.1	0.2	4.4	0.3	8.7	10.5	6.5	17.1	1.9	67.7	0.9

See footnotes at end of table.

TABLE 18.--FERTILITY TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Organic matter content	pH 1:1 H_2O	Extractable phosphorus	Exchangeable cations: Ca	Mg	K	Na	Al	H	Total acidity	Cation-exchange capacity (sum)	Cation-exchange capacity (effective)	Base saturation (sum)	Saturation: Sum of cation-exchange capacity Na	Saturation: Effective cation-exchange capacity Al	Ca/Mg
		In	Pct		Ppm	Milliequivalents/100 grams of soil									Pct	Pct	Pct	
Trep loamy fine sand:[3] (S86LA-085-01)	A	0-4	2.05	5.8	94	5.8	0.6	0.2	0.0	0.0	0.2	3.6	10.2	6.8	64.7	0.0	0.0	9.7
	E	4-22	0.19	6.3	12	1.8	0.2	0.1	0.0	---	---	1.2	3.3	---	63.7	0.0	---	9.0
	Bt1	22-30	0.19	6.6	<5	5.9	2.3	0.5	0.0	---	---	4.2	12.9	---	67.4	0.0	---	2.6
	Bt2	30-39	0.15	5.3	<5	3.0	3.5	0.4	0.0	1.5	0.0	7.8	14.7	8.4	46.9	0.0	17.9	0.9
	Bt3	39-55	0.01	4.3	<5	1.0	1.9	0.2	0.0	6.3	0.1	13.2	16.3	9.5	19.0	0.0	66.3	0.5
	BC	55-60	0.01	4.7	<5	0.5	1.0	0.1	0.0	6.0	0.2	11.1	12.7	7.8	12.6	0.0	76.9	0.5

[1] This pedon classifies as fine-loamy, siliceous, thermic Typic Paleudults. It is included as a similar soil in an area of Attoyac fine sandy loam, 1 to 5 percent slopes (AtC). This pedon is in North Toledo Bend State Park, about 4.25 miles southwest on Sabine Parish Highway 3229 from its junction with Louisiana State Highway 482, about 300 feet southeast of end of an improved road, 20 feet east of a woodland road; NE1/4NW1/4 sec. 31, T. 7 N., R. 13 W.

[2] This Attoyac pedon is in North Toledo Bend State Park, about 4.25 miles southwest on Sabine Parish Highway 3229 from its junction with Louisiana State Highway 482, about 310 feet southeast of the end of an improved road, 30 feet east of a woodland road; NE1/4NW1/4 sec. 31, T. 7 N., R. 13 W.

[3] This is the typical pedon for the series in Sabine Parish.

[4] This Bellwood pedon is in Hodges Gardens, about 0.75 mile northwest of Hodges Garden Lake, 300 feet north of a woodland road, 54 feet east of center of an electric power line; SE1/4SW1/4 sec. 20, T. 5 N., R. 10 W.

[5] This Betis pedon is about 0.5 mile west of Union Springs, 486 feet west of a gravel road, 93 feet south of an old fence line; Spanish Land Grant sec. 38, T. 10 N., R. 14 W.

[6] This Bowie pedon is about 0.25 mile north of Mitchell, 310 feet east of Louisiana State Highway 483; Spanish Land Grant sec. 38, T. 9 N., R. 12 W., map sheet 8.

[7] This Bowie pedon is in Converse, about 2 miles west of the intersection of Louisiana State Highways 171 and 174, about 0.25 mile south of Louisiana State Highway 174, about 200 feet north of a gravel road; Spanish Land Grant sec. 38, T. 9 N., R. 13 W.

[8] This pedon classifies as loamy, siliceous, thermic Arenic Paleudalfs. It is included as a similar soil in and area of Briley loamy fine sand, 5 to 12 percent slopes (BYE). The pedon is about 6.5 miles west of Zwolle, 0.25 mile north of Sabine Parish Highway 3229, about 205 feet west of a woodland road, 150 feet south of road to a sand pit; SE1/4SW1/4 sec. 7, T. 7 N., R. 13 W.

[9] This Eastwood pedon is about 1.25 miles southeast of Fort Jessup, 705 feet east of a pipeline, 105 feet south of a gravel road; SW1/4SE1/4 sec. 10, T. 7 N., R. 10 W., map sheet 32.

[10] This pedon classifies as clayey, montmorillonitic, thermic Vertic Hapludults. It is included as a similar soil in an area of Eastwood fine sandy loam, 5 to 12 percent slopes (EDE). The pedon is about 1.5 miles east of Florien, 800 feet east of a power line right-of-way, 15 feet south of a gravel road; NE1/4NW1/4 sec. 6, T. 5 N., R. 10 W.

[11] This Guyton pedon is about 4.2 miles east on Louisiana State Highway 120, about 25 feet east of a woodland road, 220 feet north of a small creek; NW1/4 sec. 15, T. 8 N., R. 12 W., map sheet 17.

[12] This Guyton pedon is about 0.25 mile west of the Natchitoches Parish line, 0.5 mile north of Louisiana State Highway 6, about 321 feet northwest of a pecan orchard in an area of pasture; SE1/4NE1/4 sec. 24, T. 8 N., R. 10 W.

[13] This Kenefick pedon is about 2.5 miles north of Oak Grove along Spring Creek, 65 feet east of a gravel parish road, 56 feet north of a woodland road; Spanish Land Grant sec. 38, T. 10 N., R. 12 W., map sheet 3.

[14] This Kirvin pedon is within the city limits of Noble, 0.5 mile west on Sabine Parish Highway 1218 from its junction with U.S. Highway 171, about 0.25 mile north of Sabine Parish Highway 1218, about 140 feet west of an improved parish road, 125 feet south of a woodland road; Las Ormigas Land Grant sec. 38, T. 8 N., R. 13 W., map sheet 16.

[15] This Kirvin pedon is within the city limits of Many, about 0.5 mile east of Sabine Parish Highway 1217, about 195 feet north of Louisiana State Highway 6, about 50 feet west of electric poles; Spanish Land Grant sec. 39, T. 7 N., R. 11 W.

[16] This Latonia pedon is about 1.0 mile south and 1.25 miles east of Mitchell, in north end of a pasture, 50 feet east of an unimproved road, 77 feet south of the property line; NE1/4NW1/4 sec. 16, T. 9 N., R. 12 W., map sheet 9.

TABLE 18.--FERTILITY TEST DATA FOR SELECTED SOILS--Continued

[17] This pedon classifies as fine, mixed, thermic Aquic Hapludalfs. It is included as a similar soil in an area of Sacul fine sandy loam, 5 to 12 percent slopes (SCE). The pedon is abut 3.25 miles north of Mitchell, 0.75 mile east of Louisiana State Highway 483, about 500 feet east of a gravel road, 60 feet north of a pipeline; Spanish Land Grant sec. 38, T. 10 N., R. 12 W.

[18] This Sacul pedon is about 3 miles east of Pleasant Hill, 1.25 miles east of Louisiana State Highway 174, about 150 feet west of a woodland road; NW1/4SW1/4 sec. 25, T. 10 N., R. 11 W.

[19] This Sacul pedon is about 3 miles northeast of Fischer, 1,500 feet southwest of Fischer Fire Tower, 190 feet north of a gravel road, 40 feet east of a woodland fire lane; SE1/4NE1/4, sec. 6, T. 6 N., R. 10 W.

[20] This Sardis pedon is about 8 miles northeast of Many, 0.25 mile north of Louisiana State Highway 6, about 410 feet northwest of an escarpment; NW1/4NE1/4 sec. 24, T. 8 N., R. 10 W., map sheet 26.

[21] This Saucier pedon is about 1.25 miles east of Converse, 0.5 mile south of Louisiana State Highway 174, about 306 feet west of a blacktop road, 132 feet south of a woodland road; Spanish Land Grant sec. 38, T. 9 N., R. 13 W.

TABLE 19.--PHYSICAL TEST DATA FOR SELECTED SOILS

(Dashes indicate that analyses were not made)

Soil name and sample number	Horizon	Depth	Particle-size distribution: Sand: Very coarse (2-1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2.0-0.5 mm)	Silt (0.25-0.002 mm)	Clay (0.002 mm)	Water content: 1/3 bar	15 bar	Water retention	Bulk density: 1/3 bar	Air-dry	Oven-dry	Field moisture	COLE
		In	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct (wt)	Pct (wt)	Pct (wt)	g/cm^3	g/cm^3	g/cm^3	g/cm^3	
Attoyac fine sandy loam:[1, 2]	A	0-9	0.2	1.1	12.0	36.6	21.9	71.8	27.1	1.1	10.5	2.6	0.12	1.49	---	1.49	---	---
(S87LA-085-007)	E	9-14	---	0.9	10.9	31.7	27.0	70.5	28.1	1.4	11.3	1.4	0.16	1.63	---	1.65	---	0.004
	B/E	14-21	---	0.6	8.8	33.1	21.0	63.5	28.7	7.8	10.1	3.5	0.11	1.70	---	1.74	---	0.008
	Bt1	21-35	---	0.4	7.7	26.7	16.5	51.3	25.4	23.3	13.6	8.8	0.08	1.71	---	1.78	---	0.013
	Bt2	35-45	---	0.5	7.6	26.3	16.5	50.9	24.0	25.1	14.6	9.8	0.08	1.74	---	1.79	---	0.009
	Bt3	45-56	---	0.4	7.5	21.9	21.0	50.8	24.6	24.6	14.8	9.6	0.09	1.75	---	1.82	---	0.013
	Bt4	56-66	---	0.4	7.4	27.0	16.4	51.2	25.3	23.5	14.1	9.3	0.08	1.71	---	1.77	---	0.012
Bowie fine sandy loam:[1, 2]	Ap	0-5	0.6	0.3	1.8	49.3	21.3	73.3	22.3	4.4	17.6	5.6	0.15	1.27	---	1.32	---	0.013
(S87LA-085-001)	E	5-15	0.4	0.2	0.6	47.3	20.9	69.4	25.1	5.5	9.5	2.1	0.12	1.63	---	1.63	---	---
	Bt1	15-23	0.1	0.1	0.5	34.0	13.6	48.3	19.4	32.3	18.9	12.5	0.10	1.53	---	1.61	---	0.017
	Btv1	23-31	0.2	---	0.5	33.6	12.5	46.8	15.6	37.6	20.4	14.2	0.10	1.56	---	1.64	---	0.017
	Btv2	31-45	---	---	0.5	40.5	7.3	48.3	11.2	40.5	20.6	15.3	0.08	1.55	---	1.62	---	0.015
	Bt2	45-62	0.2	0.2	0.4	43.6	9.2	53.6	12.6	33.8	17.4	13.2	0.07	1.61	---	1.65	---	0.008
Corrigan fine sandy loam:[2, 3]	A	0-7	1.4	1.8	7.7	31.8	27.7	70.4	25.1	4.5	9.7	2.8	6.9	---	1.69	1.89	1.69	---
(S87LA-085-23)	E	7-12	0.4	1.1	7.5	29.8	25.2	64.0	27.0	9.0	12.4	3.6	8.8	---	1.69	1.76	1.68	---
	Btg1	12-23	0.2	0.6	4.9	18.8	16.3	40.8	18.9	40.3	32.2	17.0	15.2	---	1.73	2.04	1.62	---
	Btg2	23-29	0.2	0.4	3.7	15.5	14.8	34.6	15.0	50.4	34.5	19.9	14.6	---	1.85	1.86	1.59	---
	Btssg	29-36	0.0	0.2	2.2	11.8	15.7	29.9	22.3	47.8	38.5	20.8	17.7	---	1.91	1.93	1.63	---
Eastwood fine sandy loam:[1, 2]	A	0-3	1.4	1.6	1.8	12.2	36.5	53.5	40.8	5.7	8.5	6.7	0.02	1.17	---	1.19	---	0.006
(S86LA-085-016)	E	3-7	2.4	1.9	1.0	10.0	38.4	53.7	39.4	6.9	11.0	4.2	0.10	1.45	---	1.47	---	0.004
	Bt1	7-22	0.3	0.2	0.1	1.6	16.8	19.0	24.4	56.6	33.5	22.8	0.14	1.27	---	1.66	---	0.093
	Bt2	22-36	---	---	---	3.0	17.6	20.6	21.6	57.8	38.0	25.3	0.15	1.21	---	1.66	---	0.111
	Bt3	36-48	---	---	---	6.6	17.5	24.1	28.8	47.1	33.1	24.0	0.12	1.30	---	1.78	---	0.110
	B/Cr	48-56	---	---	0.4	17.5	16.9	34.8	34.6	30.6	25.8	16.3	0.13	1.40	---	1.65	---	0.056
	Cr	56-70	0.7	0.4	0.7	52.5	16.9	71.2	14.2	14.6	14.3	9.3	0.08	1.50	---	1.60	---	0.022
Guyton silt loam:[1, 2]	A	0-6	0.2	0.6	0.6	1.4	3.7	6.5	71.8	21.7	27.1	10.3	0.24	1.41	---	1.48	---	0.016
(S87LA-085-004)	Eg	6-27	0.3	1.2	1.3	1.4	2.5	6.7	66.4	26.9	25.2	11.8	0.20	1.48	---	1.56	---	0.018
	B/E	27-45	0.3	0.8	0.8	1.7	4.2	7.8	57.0	35.2	24.1	14.6	0.14	1.51	---	1.68	---	0.036
	B/E	45-60	1.3	1.3	0.9	1.5	3.6	8.6	56.2	35.2	21.4	15.1	0.10	1.55	---	1.68	---	0.027
	Btg	60-81	1.3	1.4	0.9	1.7	3.1	8.4	56.2	35.4	23.2	18.6	0.07	1.53	---	1.69	---	0.034

See footnotes at end of table

TABLE 19.--PHYSICAL TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Particle-size distribution: Sand: Very coarse (2-1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2.0-0.5 mm)	Silt (0.25-0.002 mm)	Clay (0.002 mm)	Water content: 1/3 bar	15 bar	Water retention	Bulk density: 1/3 bar	Air-dry	Oven-dry	Field moisture	COLE
		In	Pct								Pct (wt)			g/cm^3	g/cm^3	g/cm^3	g/cm^3	
Herty very fine sandy loam:[2, 3] (S87LA-085-20)	A	0-6	0.3	1.0	15.0	61.5	8.3	86.1	8.1	5.8	8.8	3.6	5.2	---	1.64	1.70	1.48	---
	E	6-10	1.0	1.0	12.4	60.7	8.0	83.1	11.0	5.9	8.6	3.0	5.6	---	1.55	1.71	1.61	---
	Btg1	10-20	0.2	0.6	6.0	25.0	4.6	36.4	18.9	44.7	41.0	24.4	16.6	---	1.74	1.80	1.40	---
	Btg2	20-28	1.0	1.5	7.9	27.4	4.5	42.3	11.3	46.4	31.7	19.0	12.7	---	1.80	1.82	1.57	---
	Btg3	28-42	0.9	2.5	10.8	31.3	6.9	52.4	11.5	36.1	30.6	15.9	14.7	---	1.84	1.85	1.67	---
	Btg4	42-52	1.9	3.5	10.7	32.5	9.6	58.2	12.7	29.1	29.3	14.1	15.2	---	1.86	1.86	1.74	---
	Btgy	52-68	0.9	1.3	7.5	39.7	7.2	56.6	13.7	29.7	31.8	15.8	16.0	---	1.69	1.70	1.62	---
Keiffer clay loam:[2, 3] (S87LA-085-22)	A	0-5	3.7	2.3	2.5	5.6	7.2	21.1	51.3	27.6	34.5	18.8	15.7	---	1.54	1.66	1.36	---
	AB	5-11	0.2	0.8	1.9	5.5	6.2	14.6	55.0	30.4	33.3	10.9	22.4	---	1.49	1.56	1.46	---
	Bk1	11-18	1.5	1.8	2.8	6.9	7.4	20.4	43.7	35.9	37.8	14.2	23.6	---	1.70	1.83	1.66	---
	Bk2	18-24	0.4	0.3	0.6	3.0	5.8	10.1	52.9	37.0	42.6	20.4	22.2	---	1.49	1.60	1.46	---
	Bk3	24-32	1.2	0.4	0.2	1.5	3.4	6.7	45.9	47.3	51.5	28.3	23.2	---	1.59	1.79	1.35	---
	Bkss1	32-43	1.0	0.3	0.2	1.0	2.3	4.9	37.1	58.0	54.9	29.0	25.9	---	1.65	1.92	1.27	---
	Bkss2	43-51	0.0	0.1	0.2	0.5	1.0	1.8	50.1	48.1	70.3	33.1	37.2	---	1.75	2.05	1.28	---
	BCk	51-96	0.6	1.0	4.4	9.6	5.8	21.4	32.8	45.9	51.1	25.9	25.2	---	1.60	1.84	1.31	---
Kenefick loamy fine sand:[1, 2] (S86LA-085-018)	A	0-3	0.2	2.5	2.9	25.4	40.7	71.7	26.9	1.4	---	8.5	---	---	---	---	---	---
	EB	3-10	0.8	0.4	0.6	22.6	46.8	71.2	26.8	2.0	---	1.5	---	---	---	---	---	---
	Bt1	10-24	0.5	0.1	0.4	15.2	32.9	49.1	31.4	19.5	---	8.2	---	---	---	---	---	---
	Bt2	24-35	0.4	0.3	0.4	12.1	34.7	47.9	30.9	21.2	---	8.9	---	---	---	---	---	---
	B/E	35-45	0.2	---	0.3	16.3	36.0	52.8	28.4	18.8	---	8.1	---	---	---	---	---	---
	B/C	45-56	---	0.1	0.3	19.7	37.3	57.4	22.9	19.7	---	8.1	---	---	---	---	---	---
	C	56-76	---	---	0.5	25.4	40.1	66.0	21.4	12.6	---	5.9	---	---	---	---	---	---
Kirvin fine sandy loam:[1, 2] (S87LA-085-003)	A	0-6	2.6	0.7	2.7	29.6	29.0	64.6	28.6	6.8	19.7	6.1	0.16	1.26	---	1.32	---	0.014
	E	6-10	8.0	2.8	3.1	26.6	26.8	67.3	26.6	5.6	15.6	3.3	0.15	1.52	---	1.53	---	0.002
	Bt1	10-20	1.7	0.5	0.8	6.6	12.5	22.1	20.8	57.1	31.4	21.5	0.13	1.34	---	1.58	---	0.056
	Bt2	20-29	0.4	0.2	0.4	12.6	9.4	23.0	21.9	55.1	28.4	21.6	0.10	1.40	---	1.59	---	0.043
	Bt3	29-40	---	0.1	0.4	4.8	8.1	13.4	35.4	51.2	31.0	20.9	0.14	1.36	---	1.58	---	0.051
	BC	40-60	0.1	0.2	0.2	1.8	6.4	8.7	43.2	48.1	30.3	19.6	0.15	1.37	---	1.67	---	0.068
	C	60-75	0.2	0.6	0.7	1.8	6.0	9.3	46.2	44.5	29.6	18.4	0.15	1.38	---	1.69	---	0.070

See footnotes at end of table

TABLE 19.--PHYSICAL TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Particle-size distribution: Sand: Very coarse (2-1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2.0-0.5 mm)	Silt (0.25-0.002 mm)	Clay (0.002 mm)	Water content: 1/3 bar	15 bar	Water retention	Bulk density: 1/3 bar	Air-dry	Oven-dry	Field moisture	COLE
		In	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct (wt)	Pct (wt)	Pct (wt)	g/cm^3	g/cm^3	g/cm^3	g/cm^3	
Latonia fine sandy loam:[1, 2] (S87LA-085-002)	A	0-5	0.4	0.2	0.9	29.1	28.1	58.7	36.0	5.3	18.7	3.5	0.22	1.48	---	1.51	---	0.007
	E	5-12	---	0.2	0.6	25.8	29.5	56.1	36.5	7.4	12.8	3.2	0.15	1.56	---	1.58	---	0.004
	B/E	12-19	0.1	0.1	0.5	25.7	23.4	49.8	35.3	14.9	13.1	6.2	0.11	1.55	---	1.58	---	0.006
	Bt1	19-29	0.5	0.5	0.7	23.9	21.4	47.0	34.7	18.3	16.8	7.7	0.14	1.57	---	1.62	---	0.010
	Bt2	29-39	0.5	0.3	0.5	23.4	22.4	47.1	36.4	16.5	15.4	7.2	0.13	1.61	---	1.66	---	0.010
	C	39-53	---	---	0.6	32.6	26.8	60.0	27.1	12.9	14.3	5.7	0.14	1.63	---	1.68	---	0.010
	C	53-67	0.1	---	0.5	39.7	23.3	63.6	23.9	12.5	14.5	5.2	0.15	1.64	---	1.69	---	0.010
Mayhew loam:[2, 3] (S87LA-085-22)	A1	0-5	0.2	1.3	4.0	16.0	12.0	33.5	44.3	22.2	35.0	14.1	20.9	---	1.50	1.52	1.42	---
	A2	5-11	1.0	1.3	2.8	14.4	12.3	31.8	43.9	24.3	31.0	12.3	18.7	---	1.67	1.59	1.47	---
	Btg	11-18	0.3	0.7	2.0	8.6	6.7	18.3	24.1	57.6	56.8	29.3	27.5	---	1.81	1.91	1.31	---
	Btssg1	18-28	0.0	0.2	0.9	5.7	4.3	11.1	21.9	67.0	64.8	34.0	30.8	---	1.79	1.90	1.17	---
	Btssg2	28-43	0.0	0.2	1.0	6.4	5.5	13.1	20.1	66.8	64.4	33.3	31.1	---	1.80	1.89	1.30	---
	Bssg1	43-53	0.0	0.4	1.0	3.1	2.8	7.3	19.7	73.0	66.1	35.0	31.1	---	1.73	1.81	1.39	---
	Bssg2	53-65	0.2	0.2	0.5	1.8	1.4	4.1	26.0	69.9	62.3	31.8	30.5	---	1.69	1.81	1.38	---
Nacogdoches gravelly sandy loam:[2, 3] (S88LA-085-21)	Ap	0-4	14.1	9.4	9.6	20.8	13.9	67.8	22.4	9.7	16.2	7.5	8.7	---	1.62	1.63	1.58	---
	Bt1	4-17	3.1	2.8	5.0	15.0	11.8	37.7	22.7	39.6	26.4	13.8	12.6	---	1.65	1.66	1.59	---
	Bt2	17-24	6.1	3.2	3.8	11.9	9.3	34.2	18.3	47.4	32.0	17.1	14.9	---	1.72	1.74	1.69	---
	Btc1	24-32	4.0	2.1	3.6	11.1	9.3	30.2	24.9	45.0	28.8	17.5	11.3	---	1.77	1.80	1.71	---
	Btc2	32-42	3.1	1.6	3.3	11.2	8.3	27.6	18.1	54.3	28.3	19.8	8.5	---	1.72	1.73	1.63	---
	Bt3	42-54	7.2	5.5	5.4	8.9	6.0	33.1	17.7	49.2	35.2	24.4	10.8	---	1.61	1.63	1.56	---
	Btom	54-60	16.1	11.6	7.8	9.2	5.0	49.2	12.2	38.6	31.2	20.6	10.6	---	2.05	2.07	1.99	---
	B't	60-74	1.6	1.7	4.0	10.4	7.4	25.0	35.7	39.6	38.7	26.0	12.7	---	1.66	1.69	1.58	---
Oktibbeha loam:[2, 3] (S88LA-085-20)	A	0-3	5.4	3.2	3.6	8.5	20.5	41.2	40.2	18.7	26.1	12.1	14.0	---	---	---	---	---
	E	3-5	4.5	3.5	3.1	7.3	21.7	40.1	40.0	19.9	22.5	8.3	14.2	---	1.63	1.65	1.60	---
	Bt	5-12	2.1	1.6	1.5	3.9	9.7	18.8	19.2	61.9	45.2	24.4	20.8	---	1.79	1.84	1.44	---
	Bss1	12-23	0.8	0.9	1.4	3.0	8.0	14.0	22.0	63.9	44.3	25.4	18.9	---	1.82	1.87	1.45	---
	Bss2	23-33	0.0	0.9	0.8	2.1	4.4	8.1	14.8	77.1	55.2	31.8	23.4	---	1.81	1.90	1.33	---
	Bkss	33-42	1.6	0.9	0.7	1.6	2.3	7.0	48.0	45.0	42.7	22.7	20.0	---	1.73	1.83	1.41	---
	Bk	42-48	1.8	2.2	1.6	2.4	2.5	10.5	51.3	38.2	35.9	15.6	20.3	---	1.75	1.78	1.45	---
	BcK	48-70	1.6	3.0	6.0	9.7	3.7	24.0	48.2	27.8	39.5	18.6	20.9	---	1.63	1.63	1.41	---

See footnotes at end of table

TABLE 19.--PHYSICAL TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Particle-size distribution: Sand: Very coarse (2-1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2.0-0.5 mm)	Silt (0.25-0.002 mm)	Clay (0.002 mm)	Water content: 1/3 bar	15 bar	Water retention	Bulk density: 1/3 bar	Air-dry	Oven-dry	Field moisture	COLE
		In	Pct								Pct (wt)			g/cm^3	g/cm^3	g/cm^3	g/cm^3	
Rayburn fine sandy loam:[2, 3] (S87LA-085-21)	A	0-5	1.3	1.5	1.7	22.1	42.1	68.7	19.3	12.0	15.4	7.3	8.1	---	1.51	1.53	1.48	---
	Bt1	5-14	0.1	0.2	0.2	6.1	23.3	29.9	9.7	60.4	44.8	27.1	17.7	---	1.71	1.74	1.39	---
	Bt2	14-20	0.1	0.1	0.2	7.6	19.9	27.9	11.3	60.8	37.9	22.6	15.3	---	1.75	1.78	1.46	---
	Bt3	20-31	0.0	0.0	0.1	2.3	11.7	14.1	21.0	64.9	51.6	32.5	19.1	---	1.73	1.75	1.38	---
	BCg	31-45	0.0	0.2	0.7	3.9	16.0	20.8	18.0	61.2	51.0	29.9	21.1	---	1.72	1.79	1.37	---
	Cr	45-82	0.1	0.1	0.3	2.1	17.5	20.1	23.5	56.4	53.1	30.8	22.3	---	1.60	1.62	1.49	---
Sacul fine sandy loam:[1, 4] (S86LA-085-017)	A	0-5	3.4	1.3	1.3	26.3	32.0	64.3	28.7	7.0	10.5	5.4	0.07	1.49	---	1.50	---	0.002
	E	5-13	5.4	1.4	1.0	26.5	29.3	63.6	29.6	6.8	10.3	3.8	0.10	1.56	---	1.57	---	0.002
	Bt	13-28	1.8	1.7	0.8	4.6	14.3	23.2	35.8	41.0	26.7	18.2	0.12	1.38	---	1.61	---	0.053
	BC	28-41	2.7	1.9	1.0	34.0	17.5	57.1	21.4	21.5	22.4	13.3	0.13	1.47	---	1.61	---	0.031
	Cr1	41-51	3.0	1.9	1.0	26.5	23.0	55.4	23.3	21.3	23.1	12.3	0.16	1.52	---	1.62	---	0.021
	Cr2	51-60	4.3	3.6	1.5	7.3	33.5	50.2	29.7	20.1	20.4	11.9	0.12	1.44	---	1.53	---	0.020
	2C1	60-85	---	0.1	0.3	51.0	28.5	79.9	12.0	8.1	15.0	6.9	0.11	1.40	---	1.47	---	0.016
	2C2	85-110	3.3	2.3	1.5	13.5	48.7	69.3	20.1	10.6	---	8.1	---	---	---	---	---	---
	2C3	110-150	0.8	1.0	0.7	4.9	44.4	51.8	34.2	14.0	---	10.9	---	---	---	---	---	---
Sardis loam:[2, 3] (S88LA-085-19)	A	0-4	2.1	0.5	0.3	13.5	30.7	47.1	37.5	15.4	20.1	7.4	12.7	---	1.43	1.44	1.37	---
	Bw1	4-14	0.3	0.4	0.7	19.7	28.3	49.4	34.2	16.4	20.4	7.3	13.1	---	1.53	1.54	1.50	---
	Bw2	14-23	0.1	0.6	0.9	2.7	15.9	20.3	58.9	20.9	39.6	16.4	23.2	---	1.48	1.49	1.36	---
	Bw3	23-35	0.1	0.4	0.6	2.2	7.6	11.0	60.7	28.3	38.3	14.1	24.2	---	1.46	1.47	1.35	---
	Bw4	35-42	0.0	0.1	0.2	1.1	7.6	9.0	63.4	27.6	37.4	13.6	23.8	---	1.60	1.62	1.47	---
	Bw5	42-51	0.2	0.4	0.5	0.9	3.5	5.5	60.4	34.1	37.7	17.0	20.7	---	1.66	1.67	1.51	---
	Bw6	51-62	0.1	0.1	0.3	0.5	1.7	2.7	59.3	38.0	41.0	19.4	21.6	---	1.68	1.71	1.52	---

[1] Analyses by the National Soil Survey Laboratory, Natural Resources Conservation Service.

[2] This is the typical pedon for the series in Sabine Parish. For the description and location of the soil, see the section "Soil Series and Their Morphology."

[3] Analyses by the Soil Characterization Laboratory, Louisiana Agricultural Experiment Station.

[4] This Sacul pedon is about 3.25 miles east of Fort Jesup, 200 feet south of a gravel road, 15 feet west of a woodland road; NE1/4SE1/4SW1/4 sec.1, T. 7 N., R. 10 W.

TABLE 20.--CHEMICAL TEST DATA FOR SELECTED SOILS

(The symbol TR means trace. Dashes indicate that analyses were not made. The symbol < means less than)

Soil name and sample number	Horizon	Depth	Extractable bases: Ca	Extractable bases: Mg	Extractable bases: K	Extractable bases: Na	Extractable acidity	Cation-exchange capacity NH_4OAc	Base saturation	Organic carbon	pH 1:1 H_2O	pH 1:1 KCl	pH 1:2 $CaCl_2$	Extractable iron	Extractable aluminum	Extractable hydrogen	Extractable phosphorus (Bray 2)
		In	Meq/100g				Pct	Pct		Pct				Pct	Meq/100g		Ppm
Attoyac fine sandy loam:[1, 2] (S87LA-085-007)	A	0-9	2.1	0.5	---	0.2	4.5	4.3	65	1.20	5.3	---	4.6	0.2	0.1	---	---
	E	9-14	0.9	0.2	---	0.1	1.5	2.3	52	0.43	5.4	---	4.7	0.2	0.1	---	---
	B/E	14-21	1.1	0.5	---	0.1	1.8	2.7	63	0.17	5.5	---	4.6	0.5	0.1	---	---
	Bt1	21-35	2.6	1.5	0.1	0.1	2.4	5.7	75	0.11	5.5	---	4.8	1.3	0.1	---	---
	Bt2	35-45	2.4	1.6	0.1	0.2	4.2	6.4	67	0.06	5.3	---	4.5	1.5	0.1	---	---
	Bt3	45-56	2.1	1.7	0.1	0.1	3.5	5.8	69	0.08	5.2	---	4.5	1.5	0.1	---	---
	Bt4	56-66	2.0	1.7	TR	0.2	3.9	5.5	71	0.04	5.3	---	4.5	1.4	0.1	---	---
Bowie fine sandy loam:[1, 2] (S87LA-085-001)	Ap	0-5	5.4	0.8	TR	0.1	3.5	6.7	94	1.93	5.3	---	5.0	0.4	0.1	---	---
	E	5-15	1.3	0.1	---	---	1.3	1.6	87	0.23	5.9	---	5.4	0.4	0.1	---	---
	Bt1	15-23	7.4	0.8	TR	0.1	3.6	8.0	100	0.23	6.6	---	6.0	2.5	0.4	---	---
	Btv1	23-31	3.4	1.1	---	---	7.1	6.9	65	0.16	4.9	---	4.4	3.1	0.4	---	---
	Btv2	31-45	1.8	1.6	TR	---	10.2	8.6	40	0.11	4.8	---	4.0	3.2	0.3	---	---
	Bt2	45-62	1.4	0.8	TR	0.1	8.3	7.3	32	0.04	4.5	---	3.9	2.5	0.2	---	---
Corrigan fine sandy loam:[2, 3] (S87LA-085-23)	A	0-7	0.4	1.3	0.0	0.4	6.0	5.6	25.9	0.60	4.6	3.8	3.8	0.2	1.4	1.1	<5
	E	7-12	0.6	2.6	0.0	0.7	5.8	15.5	40.2	0.07	4.7	3.7	3.9	0.2	2.4	1.7	<5
	Btg1	12-23	1.0	3.3	0.0	0.8	16.4	20.0	23.7	0.04	4.6	3.4	3.9	0.5	10.1	1.1	<5
	Btg2	23-29	1.3	4.0	0.1	0.9	18.2	23.4	25.7	0.00	4.4	3.3	3.9	0.5	11.8	1.3	<5
	Btssg	29-36	1.6	4.7	0.1	0.9	18.8	24.3	28.0	0.00	4.3	3.1	4.0	0.3	13.3	3.1	<5
Eastwood fine sandy loam:[1, 2] (S86LA-085-016)	A	0-3	4.7	2.0	0.1	0.1	8.1	13.5	51	3.12	5.3	---	4.8	1.1	0.1	---	---
	E	3-7	1.7	1.4	---	TR	4.0	5.7	54	0.68	4.8	---	4.4	1.8	0.1	---	---
	Bt1	7-22	4.6	8.3	0.1	0.5	19.3	27.3	49	0.48	4.9	---	4.1	3.8	0.4	---	---
	Bt2	22-36	0.9	11.1	0.2	1.1	21.5	30.2	44	0.22	4.8	---	3.9	3.3	0.3	---	---
	Bt3	36-48	0.6	13.2	0.2	1.4	17.3	29.0	53	0.16	5.0	---	3.9	2.4	0.2	---	---
	B/Cr	48-56	0.9	12.6	0.2	1.5	12.0	25.6	59	0.11	4.8	---	3.8	2.1	0.2	---	---
	Cr	56-70	1.4	8.5	---	1.4	4.1	14.5	78	0.08	4.9	---	4.2	1.6	0.1	---	---

See footnotes at end of table.

TABLE 20.--CHEMICAL TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Extractable bases Ca	Mg	K	Na	Extractable acidity	Cation-exchange capacity NH4OAc	Base saturation NH4OAc	Organic carbon	pH 1:1 H_2O	pH 1:1 KCl	pH 1:2 $CaCl_2$	Extractable iron	Extractable aluminum	Extractable hydrogen	Extractable phosphorus (Bray 2)
		In	Meq/100g				Pct	Pct		Pct				Pct	Meq/100g		Ppm
Guyton silt loam:[1, 2]	A	0-6	3.2	1.8	---	0.1	8.0	10.7	48	0.77	5.1	---	4.4	1.3	0.1	---	---
(S87LA-085-004)	Eg	6-27	2.3	1.6	---	---	10.1	11.4	34	0.43	4.7	---	4.0	1.3	0.1	---	---
	B/E	27-45	1.8	2.7	---	0.4	11.5	14.6	34	0.19	4.7	---	3.9	1.4	0.1	---	---
	B/E	45-60	2.1	3.0	---	0.7	11.0	14.8	39	0.18	4.7	---	3.9	1.7	0.1	---	---
	Btg	60-80	3.2	3.3	---	0.9	9.7	14.7	50	0.14	4.8	---	3.9	1.8	0.1	---	---
Herty very fine sandy loam:[2, 3]	A	0-6	0.7	0.7	0.0	0.4	6.0	6.7	26.9	0.50	4.6	3.8	3.8	0.8	1.6	0.8	<5
(S87LA-085-20)	E	6-10	0.7	0.8	0.0	0.4	4.2	4.5	42.2	0.21	5.2	4.0	4.0	0.7	1.3	0.6	<5
	Btg1	10-20	2.0	6.2	0.2	0.7	18.0	23.4	38.9	0.29	4.5	3.5	3.9	0.9	12.9	1.3	<5
	Btg2	20-28	1.4	5.3	0.1	0.7	16.8	18.5	40.5	0.15	4.5	3.6	4.7	1.0	11.3	1.0	<5
	Btg3	28-42	1.5	6.3	0.1	0.9	15.0	22.9	38.4	0.09	4.5	3.4	3.7	1.2	10.0	1.0	<5
	Btg4	42-52	1.4	5.1	0.1	0.9	12.6	18.4	40.8	0.07	4.6	3.4	3.6	1.3	7.8	1.0	<5
	Btgy	52-68	2.1	6.2	0.1	1.2	18.6	20.2	47.5	0.05	4.3	3.2	3.4	1.2	9.1	0.9	<5
Keiffer clay loam:[2, 3, 4]	A	0-5	31.2	1.0	0.6	1.0	1.2	45.9	73.6	1.35	7.8	6.9	6.7	0.47	0.0	1.0	10
(S88LA-085-22)	AB	5-11	23.7	0.3	0.2	1.2	3.0	23.4	108.5	0.67	8.1	7.3	7.0	0.53	0.0	1.0	<5
	Bk1	11-18	25.2	0.4	0.3	1.6	1.2	20.3	135.5	0.59	8.3	7.3	7.0	0.47	0.4	1.6	10
	Bk2	18-24	29.7	0.4	0.3	1.4	3.0	25.2	126.2	0.33	8.2	7.1	6.8	0.48	0.0	1.0	<5
	Bk3	24-32	44.5	0.4	0.5	2.2	1.8	30.6	155.5	0.24	8.2	7.1	6.9	0.41	0.0	1.4	<5
	Bkss1	32-43	44.8	0.5	0.6	2.2	1.8	37.8	127.2	0.07	8.1	7.0	6.9	0.47	0.0	0.8	<5
	Bkss2	43-51	47.5	0.6	0.8	1.9	2.1	40.3	126.0	0.06	8.0	6.7	6.4	0.50	0.0	1.2	<5
	BCk	51-96	49.6	0.7	0.8	1.9	3.0	43.2	121.3	0.04	8.2	6.8	6.4	0.49	0.0	1.0	10
Kenefick loamy fine sand:[1, 2]	A	0-3	1.9	0.5	TR	---	15.2	11.2	21	0.60	4.8	---	4.0	0.5	0.1	---	---
(S86LA-085-018)	EB	3-10	---	TR	---	---	2.4	1.5	1	0.27	4.5	---	4.2	0.6	0.1	---	---
	Bt1	10-24	3.2	1.3	---	---	6.8	6.4	70	0.14	5.3	---	4.7	1.3	0.1	---	---
	Bt2	24-35	2.8	1.3	---	---	4.1	6.9	59	0.05	5.0	---	4.4	1.6	0.2	---	---
	B/E	35-45	2.4	1.1	---	TR	3.9	6.6	53	0.03	5.1	---	4.3	1.3	0.2	---	---
	B/C	45-56	2.8	1.4	TR	---	3.9	7.9	53	0.08	5.2	---	4.3	1.2	0.1	---	---
	C	56-76	2.5	1.1	---	---	4.6	5.6	64	0.04	5.1	---	4.5	0.8	0.1	---	---

See footnotes at end of table.

TABLE 20.--CHEMICAL TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Extractable bases: Ca	Extractable bases: Mg	Extractable bases: K	Extractable bases: Na	Extractable acidity	Cation-exchange capacity (NH$_4$OAc)	Base saturation (NH$_4$OAc)	Organic carbon	pH 1:1 H$_2$O	pH 1:1 KCl	pH 1:2 CaCl$_2$	Extractable iron	Extractable aluminum	Extractable hydrogen	Extractable phosphorus (Bray 2)
		In	Meq/100g	Meq/100g	Meq/100g	Meq/100g	Pct	Pct	Pct	Pct				Pct	Meq/100g	Meq/100g	Ppm
Kirvin fine sandy loam:[1, 2] (S87LA-085-003)	A	0-6	7.0	1.2	0.1	---	7.9	11.1	75	2.65	5.1	---	4.8	1.4	0.1	---	---
	E	6-10	0.6	0.5	---	---	3.5	3.7	30	0.39	5.2	---	4.5	4.1	0.3	---	---
	Bt1	10-20	2.9	4.1	0.3	---	17.6	18.6	39	0.42	4.7	---	4.0	5.6	0.6	---	---
	Bt2	20-29	0.4	2.9	0.2	---	19.7	19.5	18	0.28	4.6	---	3.9	5.1	0.5	---	---
	Bt3	29-40	---	4.4	0.2	TR	22.8	25.4	18	0.19	4.6	---	3.8	4.2	0.4	---	---
	BC	40-60	---	5.1	0.2	0.1	24.5	27.8	19	0.10	4.7	---	3.7	2.4	0.3	---	---
	C	60-75	---	5.7	0.2	0.3	20.8	26.7	23	0.14	4.5	---	3.6	1.5	0.2	---	---
Latonia fine sandy loam:[1, 2] (S87LA-085-002)	A	0-5	2.3	0.4	TR	---	4.4	4.5	60	1.25	4.9	---	4.6	0.4	0.1	---	---
	E	5-12	1.7	0.3	---	---	1.5	2.6	77	0.22	6.0	---	5.4	0.5	0.1	---	---
	B/E	12-19	2.6	0.6	---	---	2.3	4.5	71	0.16	5.5	---	4.8	0.9	0.2	---	---
	Bt1	19-29	2.0	1.1	---	0.1	5.4	5.9	54	0.11	5.0	---	4.3	1.3	0.2	---	---
	Bt2	29-39	1.0	1.3	---	0.1	4.4	5.4	44	0.08	4.9	---	4.2	1.2	0.2	---	---
	C	39-53	0.5	1.0	---	TR	4.3	4.5	33	0.03	4.8	---	4.1	0.8	0.1	---	---
	C	53-67	0.2	0.9	---	TR	3.9	4.3	26	0.02	4.6	---	4.0	0.6	0.1	---	---
Mayhew loam:[2, 3] (S87LA-085-22)	A1	0-5	6.6	4.1	0.1	0.5	12.6	27.9	40.5	1.87	4.6	3.6	4.0	0.2	2.2	0.7	7
	A2	5-11	4.8	3.3	0.0	0.5	13.2	21.8	39.4	0.42	4.4	3.5	3.9	0.3	6.3	0.8	6
	Btg	11-18	12.8	6.6	0.3	0.9	20.4	41.4	49.8	0.40	4.1	3.3	3.8	0.3	13.8	0.8	<5
	Btssg1	18-28	14.4	8.2	0.4	0.9	22.8	50.4	47.4	0.13	4.0	3.2	3.7	0.3	14.2	0.6	<5
	Btssg2	28-43	13.4	7.4	0.4	0.9	18.0	48.6	45.5	0.12	4.1	3.2	3.7	0.4	13.8	1.5	<5
	Bssg1	43-53	14.8	8.3	0.6	1.2	17.4	49.5	50.3	0.09	3.7	2.9	3.7	0.3	13.9	2.7	<5
	Bssg2	53-65	13.1	7.6	0.6	1.2	22.2	47.7	47.2	0.04	3.7	2.9	3.6	0.2	12.4	0.5	<5
Nacogdoches gravelly sandy loam:[2, 3] (S88LA-085-21)	Ap	0-4	8.0	1.0	0.2	0.1	11.6	11.1	83.8	1.19	6.4	5.8	5.3	0.82	0.0	1.0	---
	Bt1	4-17	7.7	2.0	0.2	0.1	12.0	12.0	83.3	0.53	5.5	4.9	4.3	1.52	0.6	0.8	---
	Bt2	17-24	2.5	2.0	0.2	0.1	12.6	13.5	35.5	0.25	5.3	4.5	3.9	2.01	2.0	1.0	---
	Btc1	24-32	2.2	2.0	0.3	0.1	11.2	12.1	38.0	0.25	5.4	4.7	4.2	1.87	1.0	0.6	---
	Btc2	32-42	3.4	2.8	0.3	0.2	11.4	13.7	48.9	0.24	5.4	4.7	4.2	1.67	0.6	0.4	---
	Bt3	42-54	3.7	3.0	0.4	0.2	15.0	15.7	46.5	0.28	5.5	5.0	4.4	2.32	0.0	0.8	---
	Btom	54-60	2.6	3.1	0.2	0.2	11.8	18.2	33.5	0.15	5.5	4.9	4.5	2.40	0.0	0.8	---
	B't	60-74	2.5	3.1	0.3	0.3	11.4	18.4	33.7	0.13	5.0	4.4	3.9	2.72	1.2	1.0	---

See footnotes at end of table.

TABLE 20.--CHEMICAL TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Extractable bases: Ca	Mg	K	Na	Extractable acidity	Cation-exchange capacity (NH4OAc)	Base saturation (NH4OAc)	Organic carbon	pH 1:1 H_2O	pH 1:1 KCl	pH 1:2 $CaCl_2$	Extractable iron	Extractable aluminum	Extractable hydrogen	Extractable phosphorus (Bray 2)
		In	Meq/100g				Pct	Pct		Pct				Pct	Meq/100g		Ppm
Oktibbeha loam:[2, 3] (S88LA-085-20)	A	0-3	13.4	2.5	0.4	0.2	15.6	18.4	89.7	1.35	5.9	5.7	5.4	0.29	0.0	1.2	14
	E	3-5	12.2	2.0	0.2	0.1	11.4	16.6	87.3	1.07	5.8	5.5	5.2	0.40	0.0	1.0	<5
	Bt	5-12	22.0	2.5	0.2	0.1	17.4	34.0	72.9	0.45	5.4	5.3	4.8	0.80	0.0	0.6	7
	Bss1	12-23	29.7	2.4	0.2	0.1	19.2	34.2	94.7	0.15	5.1	4.8	4.3	0.80	1.0	0.2	<5
	Bss2	23-33	40.7	2.4	0.4	0.1	15.6	47.3	91.5	0.13	6.2	6.0	5.7	1.03	0.0	0.4	<5
	Bkss	33-42	38.6	2.0	0.3	0.2	14.4	32.4	100.0	0.10	7.1	7.0	6.5	0.67	0.0	0.8	<5
	Bk	42-48	29.7	1.7	0.3	0.2	12.4	21.6	100.0	0.10	7.4	7.2	6.6	0.69	0.0	1.2	<5
	BCk	48-70	29.7	1.7	0.5	0.9	10.2	23.4	100.0	0.07	7.5	7.3	6.7	1.20	0.0	1.4	<5
Rayburn fine sandy loam:[2, 3] (S87LA-085-21)	A	0-5	1.8	2.2	0.0	0.5	10.2	9.2	48.9	0.96	4.9	3.8	3.9	0.5	2.1	1.0	<5
	Bt1	5-14	2.1	7.2	0.3	0.6	19.2	28.1	36.3	0.44	4.6	3.5	3.7	1.0	12.6	1.4	<5
	Bt2	14-20	1.5	5.8	0.3	0.6	22.2	33.3	24.6	0.21	4.5	3.4	3.9	1.3	15.2	1.0	<5
	Bt3	20-31	1.2	7.9	0.7	0.6	27.0	33.5	31.0	0.21	4.0	3.2	3.4	1.5	23.9	1.3	<5
	BCg	31-45	1.0	6.6	0.5	0.7	24.6	34.0	25.9	0.12	3.8	3.0	3.4	1.9	21.7	1.5	6
	Cr	45-82	1.0	6.7	0.6	0.8	16.2	36.9	24.7	0.10	3.8	3.1	3.4	2.0	15.0	1.0	7
Sacul fine sandy loam:[1, 5] (S86LA-085-017)	A	0-5	2.7	0.9	TR	---	8.0	8.9	40	2.14	4.8	---	4.3	1.6	0.1	---	---
	E	5-13	0.8	0.7	TR	---	4.5	4.8	31	0.56	4.9	---	4.2	1.8	0.1	---	---
	Bt	13-28	0.7	6.3	0.6	TR	16.9	20.9	36	0.29	4.7	---	3.9	2.6	0.2	---	---
	BC	28-41	0.1	4.4	0.4	0.1	12.3	15.4	32	0.16	4.8	---	3.9	2.1	0.2	---	---
	Cr1	41-51	---	4.2	0.3	0.3	12.6	16.2	30	0.14	4.5	---	3.8	1.7	0.2	---	---
	Cr2	51-60	---	3.9	0.3	0.1	13.7	16.0	27	0.14	4.7	---	3.7	2.7	0.2	---	---
	2C1	60-85	TR	2.1	0.1	0.1	8.9	10.5	22	0.06	4.8	---	3.9	0.6	0.1	---	---
	2C2	85-110	0.1	0.8	---	0.4	13.1	13.6	10	0.03	4.7	---	3.6	3.1	0.2	---	---
	2C3	110-150	0.5	0.7	0.1	0.5	13.8	14.5	12	0.03	4.8	---	3.6	0.5	0.1	---	---

See footnotes at end of table.

TABLE 20.--CHEMICAL TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	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 (Bray 2)
		In	Meq/100g				Pct	Pct		Pct				Pct	Meq/100g		Ppm
Sardis loam:[2, 3]	A	0-4	4.3	2.4	0.2	0.0	11.4	10.8	63.9	1.03	6.3	5.3	4.8	0.20	0.0	0.6	77
(S88LA-085-19)	Bw1	4-14	4.2	3.0	0.5	0.3	10.2	10.4	76.9	0.55	6.1	5.1	4.8	0.25	0.0	1.0	<5
	Bw2	14-23	5.0	5.3	0.5	0.5	14.4	21.2	53.3	0.53	5.5	4.6	4.0	0.43	1.6	0.4	24
	Bw3	23-35	4.5	4.4	0.2	0.6	15.0	16.9	57.4	0.25	5.0	4.1	3.7	0.43	4.2	0.8	29
	Bw4	35-42	4.2	5.4	0.4	1.0	16.2	20.0	55.0	0.13	4.8	4.0	3.6	0.44	5.0	1.2	19
	Bw5	42-51	4.0	8.9	0.4	1.1	17.4	22.0	65.5	0.13	4.8	4.1	3.6	0.51	4.2	0.8	10
	Bw6	51-62	4.6	9.2	0.6	1.4	18.0	21.8	72.5	0.10	4.9	4.2	3.7	0.47	3.0	0.8	17

[1] Analyses by the National Soil Survey Laboratory, Natural Resources Conservation Service.

[2] This is the typical pedon for the series in Sabine Parish. For the description and location of the soil, see the section "Soil Series and Their Morphology."

[3] Analyses by the Soil Characterization Laboratory, Louisiana Agricultural Experiment Station.

[4] In this Keiffer pedon, the calcium carbonate equivalent, expressed as a percentage, is as follows: A--53.5, AB--84.0, Bk1--87.5, Bk2--63.5, Bk3--47.5, Bkss1--44.0, Bkss2--65.0, BCk--53.5.

[5] This Sacul pedon is about 3.25 miles east of Fort Jesup, 200 feet south of a gravel road, 15 feet west of a woodland road; NE1/4SE1/4SW1/4 sec. 1, T. 7 N., R. 10 W.

TABLE 21.--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
Attoyac	Fine-loamy, siliceous, thermic Typic Paleudalfs
Bellwood	Very fine, montmorillonitic, thermic Aquentic Chromuderts
Betis	Sandy, siliceous, thermic Psammentic Paleudults
Bowie	Fine-loamy, siliceous, thermic Plinthic Paleudults
Briley	Loamy, siliceous, thermic Arenic Paleudults
*Corrigan	Fine, montmorillonitic, thermic Albaquic Hapludalfs
Eastwood	Fine, montmorillonitic, thermic Vertic Hapludalfs
Gessner	Coarse-loamy, siliceous, thermic Typic Glossaqualfs
Guyton	Fine-silty, siliceous, thermic Typic Glossaqualfs
Herty	Fine, montmorillonitic, thermic Vertic Albaqualfs
Iuka	Coarse-loamy, siliceous, acid, thermic Aquic Udifluvents
Keiffer	Fine-silty, carbonatic, thermic Rendollic Eutrochrepts
Keithville	Fine-silty, siliceous, thermic Glossaquic Paleudalfs
Kenefick	Fine-loamy, siliceous, thermic Ultic Hapludalfs
Kirvin	Clayey, mixed, thermic Typic Hapludults
Kisatchie	Fine, montmorillonitic, thermic Typic Hapludalfs
Latonia	Coarse-loamy, siliceous, thermic Typic Hapludults
Letney	Loamy, siliceous, thermic Arenic Paleudults
*Mayhew	Fine, montmorillonitic, thermic Vertic Ochraqualfs
Nacogdoches	Fine, kaolinitic, thermic Rhodic Paleudalfs
Niwana	Coarse-loamy, siliceous, thermic Typic Paleudults
Oktibbeha	Very fine, montmorillonitic, thermic Vertic Hapludalfs
*Rayburn	Fine, montmorillonitic, thermic Vertic Hapludalfs
Sacul	Clayey, mixed, thermic Aquic Hapludults
Sardis	Fine-silty, siliceous, thermic Fluvaquentic Dystrochrepts
Saucier	Fine-loamy, siliceous, thermic Plinthaquic Paleudults
Trep	Loamy, siliceous, thermic Arenic Paleudults

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