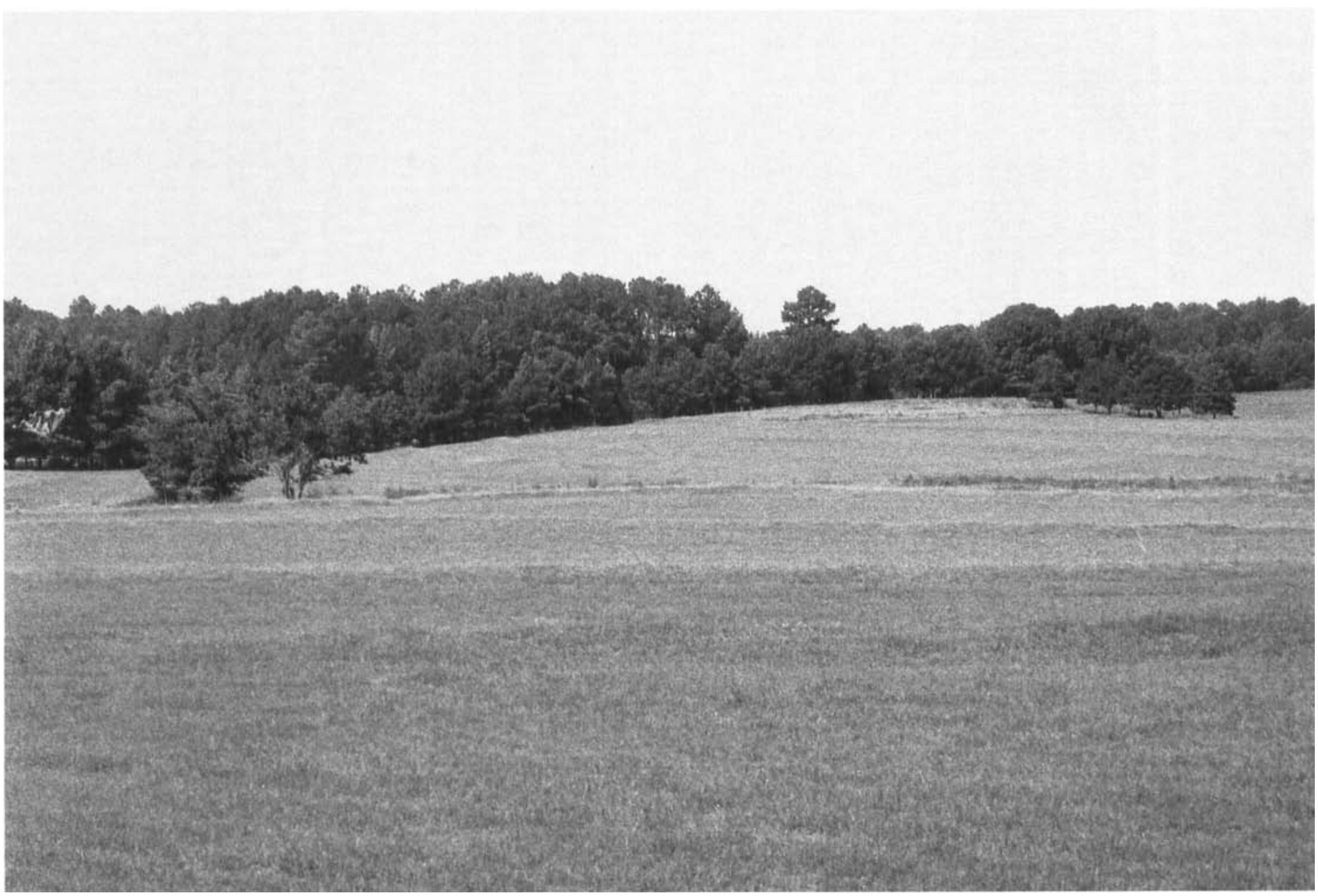
United States Department of Agriculture

Natural Resources Conservation Service

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

Soil Survey of Jackson Parish, Louisiana



How To Use This Soil Survey

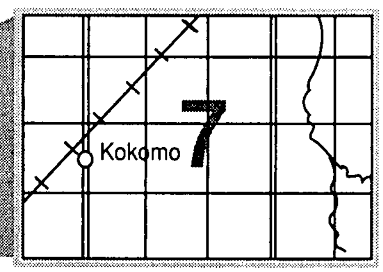
General Soil Map

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.

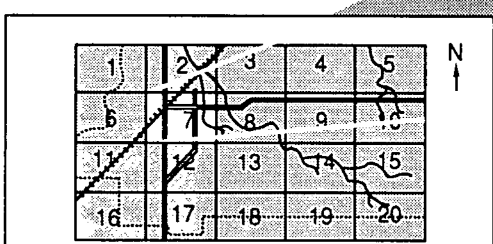
Detailed Soil Maps

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

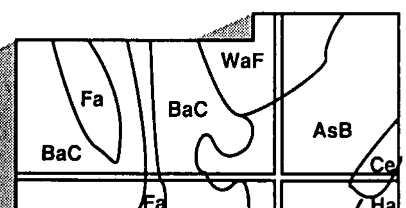
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



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 1990. Soil names and descriptions were approved in 1991. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1991. This soil survey was made cooperatively by the Natural Resources Conservation Service, the Louisiana Agricultural Experiment Station, and the Louisiana State Soil and Water Conservation Committee. It is part of the technical assistance furnished to the Dugdemona 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: A pasture and trees in an area of Bowie fine sandy loam, 1 to 5 percent slopes. Pastureland and woodland are major land uses in the survey area.

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Foreword

This soil survey contains information that can be used in land-planning programs in Jackson 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 too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to underground installations.

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

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Soil Survey of
Jackson Parish, Louisiana

By Wilton W. Stephens, Natural Resources Conservation Service

Fieldwork by Wilton W. Stephens, Daniel C. Johnson, and Edward D. Scott, Natural Resources Conservation Service

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

JACKSON PARISH is in north-central Louisiana, about 30 miles southwest of Monroe (fig. 1). The total area is 370,800 acres, of which 365,300 acres is land and 5,500 acres is water in the form of lakes, small ponds, and streams. Jackson Parish is bordered on the north by Lincoln Parish, on the east by Ouachita and Caldwell Parishes, on the south by Winn Parish, and on the west by Bienville Parish. In 1990, the population was 15,551, according to the Bureau of the Census. Jonesboro, with a population of 4,264, is the largest city and the parish seat. It is in the western part of the parish and is about 75 miles north of Alexandria. Other cities and communities are Chatham, Clay, Eros, Hodge, Quitman, Vernon, and Weston.

The parish consists of three major physiographic areas—the level to gently undulating flood plains, the level to gently sloping stream terraces, and the nearly level to strongly sloping uplands. The elevation ranges from about 340 feet above sea level on the uplands in the north-central part of the parish to about 120 feet above sea level on the flood plains throughout the parish.

The flood plains of streams that drain the uplands are throughout the parish. They make up about 20 percent of the land area. The soils on flood plains are loamy and range from poorly drained to well drained. Most of the acreage is woodland. Several small areas are used as pastureland or cropland. The poorly drained soils are in the lower areas and are limited by wetness and flooding. The well drained soils are at slightly higher elevations on low ridges. They are also limited by flooding mainly during winter and spring.

The soils of the stream terraces make up about 9 percent of the parish. Elevation ranges from 140 to 200 feet above sea level. These level to gently sloping soils are well drained, somewhat poorly drained, and poorly drained. They are loamy throughout. Most have a high silt content and are low in natural fertility. Most of the acreage is woodland.

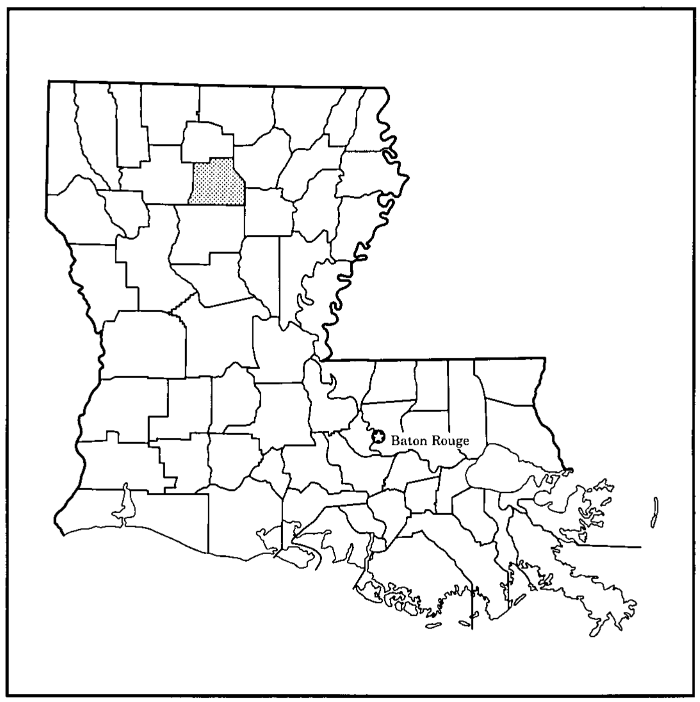

Figure 1.—Location of Jackson Parish in Louisiana.

The uplands, which are throughout the parish, make up about 71 percent of the land area. The soils on uplands are loamy or sandy and range from somewhat poorly drained to somewhat excessively drained. They are on nearly level to gently sloping ridgetops and moderately sloping and strongly sloping side slopes. Elevation ranges from about 120 to 340 feet above sea level. Most of the acreage is woodland, which is owned by large timber companies. A small acreage is used as homesites, pastureland, or cropland. The hazard of erosion is generally the main concern in soil management. Steepness of slope and low fertility are additional soil limitations for crops and pasture.

General Nature of the Parish

This section gives general information about Jackson Parish. It describes the history and development, agriculture, transportation, and climate.

History and Development

Jackson Parish was created in 1845 from an area that was part of Ouachita, Claiborne, and Union Parishes. The first seat of government for the parish was established at Vernon. In 1879, the courthouse was destroyed by fire, and all public records were lost. In 1911, the parish seat was relocated to its present site in Jonesboro, which was near the railroad and was the center of an expanding lumber industry.

Throughout its history, Jackson Parish has depended largely on its forests for economic development. By 1945, there were 16 sawmills and one paper mill operating in Jackson Parish. For years, timber cutting exceeded the rate that forests could be replenished. In 1957, little marketable timber remained in the parish. The pulpwood industry survived by consuming smaller trees. However, most of the sawmills were eventually closed. Only one sawmill remains in operation today.

According to the U.S. Census, Jackson Parish has supported a slow but steady increase in population throughout its history. The population has grown from 5,566 in 1845 to 15,551 in 1990.

Agriculture

Wood products, livestock, and hay production are the main agricultural enterprises in Jackson Parish. Crop production, mainly corn and cotton, was once the primary land use; but woodland, pastureland, and hayland have since replaced most of the cropland in the parish.

Jackson Parish has large commercial tracts of timber. Landowners produce both pine and hardwood, but pine plantations are dominant. These forest products are sold for pulpwood, posts, cross ties, and other wood products. Some mature stands are also sold for saw timber. Forest products form the base for most of the economic activity in Jackson Parish.

Livestock operations consist mainly of small herds of beef cattle and privately-owned chicken houses used to raise meat birds.

Crop production is mainly hay, which is fed on location. Some hay is sold commercially. Small acreages are used to grow vegetables.

The present land use trend in Jackson Parish appears to be fairly stable. Except for a small increase in the number of poultry producers, agricultural officials do not foresee any major land use changes in the near future.

Transportation

Jackson Parish is served by one railroad, which is headquartered in Hodge and has trackage from Winnfield through Hodge. It connects with another railroad line at Gibsland. Two major bus lines and several taxi companies serve the parish. Jackson Parish has a municipal airport and a privately-owned airport. Highway 167 provides highway transportation in the parish and connects with Interstate 20 north of the parish. Numerous other paved state and parish roads are available throughout the parish.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Bienville, Louisiana, in the period 1972 to 1986. 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 46 degrees F and the average daily minimum temperature is 35 degrees. The lowest temperature on record, which occurred at Bienville on February 25, 1983, is 4 degrees. In summer, the average temperature is 81 degrees and the average daily maximum temperature is 93 degrees. The highest recorded temperature, which occurred at Bienville on July 13, 1980, is 106 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 61 inches. Of this, 27 inches, or 44 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 11 inches. The heaviest 1-day rainfall during the period of record was 10.25 inches at

Bienville on May 7, 1978. Thunderstorms occur on about 55 days each year, and most occur in summer.

The average seasonal snowfall is 1 inch. The greatest snow depth at any one time during the period of record was 5 inches. There is seldom a day that has as much as 1 inch of snow on the ground, but the number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 70 percent of the time possible in summer and 55 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 10 miles per hour, in spring.

How This Survey Was Made

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

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 *intensive recreation areas.* Cultivated crops are those grown extensively in the survey area. Pasture refers to native and improved grasses for livestock. 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 Jackson Parish were matched, where possible, with those of the previously published surveys of Claiborne, Ouachita, and Caldwell Parishes. In a few places, however, the names of the map units differ. These differences resulted mainly because of changes in soil series concepts, differences in map unit design, and changes in soil patterns near the survey area boundaries.

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

Soils on Uplands

The map units in this group consist of somewhat excessively drained to somewhat poorly drained, nearly level to strongly sloping soils on ridgetops and side slopes of uplands. These map units make up about 71 percent of Jackson Parish. Most of the area is woodland. Areas used as pastureland or cropland are small and scattered. Steepness of slope is the main limitation for most uses.

1. Sacul

Gently sloping to strongly sloping, moderately well drained soils that have a loamy surface layer and a clayey subsoil

This map unit consists of gently sloping soils on convex ridgetops and strongly sloping soils on side slopes. The landscape is dissected by many small drainageways. Slopes range from 1 to 5 percent on the ridgetops and from 5 to 20 percent on the side slopes.

This map unit makes up about 46 percent of the parish. It is about 90 percent Sacul soils and 10 percent soils of minor extent.

The Sacul soils have a dark grayish brown fine sandy loam surface layer. The subsurface layer is brown fine sandy loam. The layers of the subsoil, from top to bottom, are red clay, yellowish red clay, light brownish gray clay, and light brownish gray and yellowish red clay loam. The subsoil is mottled throughout.

The minor soils in this map unit are the Bowie, Briley, Guyton, McLaurin, and Ruston soils. Bowie soils are on broad ridgetops and are moderately well drained. Briley, McLaurin, and Ruston soils are on narrow and convex ridgetops and are well drained. Briley and McLaurin soils are also on some of the side slopes. Guyton soils mainly are on the narrow flood plains of small streams and are poorly drained. Guyton soils are also on stream terraces.

The soils in this map unit are used mainly as woodland. Small acreages are used as pastureland; and in a few areas, the gently sloping soils are used as cropland.

These soils are moderately well suited to use as woodland. Erosion is a hazard on the steeper slopes. Rutting and soil compaction are problems if logging is done during wet periods. Plant competition and the hazard of windthrow are additional concerns.

These soils generally are not suited to cultivated crops because of the severe hazard of erosion. Soils on gently sloping ridgetops are poorly suited to crops. Special conservation practices are needed to control erosion.

These soils are moderately well suited to use as pastureland. The strongly sloping areas are poorly suited to this use. The main limitation is low fertility, and erosion is a hazard.

The soils in this map unit generally are poorly suited to urban development and moderately well suited to most intensive recreational uses. Slow permeability, wetness, high shrink-swell potential, steepness of slope, and low strength for roads are the main limitations.

2. Briley-McLaurin

Very gently sloping to strongly sloping, well drained soils that have a sandy surface layer and a loamy subsoil

This map unit consists of soils on very gently sloping and gently sloping ridgetops and moderately sloping and strongly sloping side slopes. Slopes range from 1 to 5 percent on the ridgetops and from 3 to 12 percent on the side slopes.

This map unit makes up about 9 percent of the parish. It is about 54 percent Briley soils, 41 percent McLaurin soils, and 5 percent soils of minor extent.

The Briley soils are on gently sloping ridgetops and strongly sloping side slopes. These soils have a brown or dark brown loamy fine sand surface layer. The subsurface layer is brown and light yellowish brown loamy fine sand. The next layer is yellowish red fine sandy loam. The subsoil is red sandy clay loam and yellowish red fine sandy loam.

The McLaurin soils are on very gently sloping ridgetops and moderately sloping side slopes. These soils have a grayish brown loamy fine sand surface layer. The subsurface layer is brown loamy fine sand. The subsoil is yellowish red sandy loam in the upper part, yellowish red sandy loam and light brown sand in the middle part, and red loam in the lower part.

The minor soils in this map unit are the Betis and Sacul soils on ridgetops and side slopes and the Bowie and Ruston soils on ridgetops. Bowie and Sacul soils are moderately well drained, and Ruston soils are well drained.

The soils in this map unit are used mainly as woodland. In a few areas, they are used as cropland, pastureland, or homesites.

The Briley soils in this map unit are moderately well suited to use as woodland, and the McLaurin soils are well suited to this use. The growth of trees is limited somewhat by droughtiness. In addition, seedling mortality is moderate on the Briley soil.

These soils generally are moderately well suited to crops. The strongly sloping Briley soils are poorly suited to this use. The main limitations are low soil fertility, low or moderate available water capacity, and steepness of slope. Erosion is a severe hazard on the moderately sloping and strongly sloping soils.

These soils generally are moderately well suited to use as pastureland. The McLaurin soils on ridgetops are well suited to this use. Low soil fertility, steepness of slope, and soil droughtiness are the main limitations. Erosion is the main hazard.

The soils in this map unit generally are well suited to most urban and intensive recreational uses. Steepness of slope is the main limitation for building sites, and seepage is a problem where the soils are used for sanitary facilities.

3. Metcalf-Keithville

Nearly level and gently sloping, somewhat poorly drained and moderately well drained soils that have a loamy surface layer and a loamy and clayey subsoil

This map unit consists of soils on broad ridgetops. Slopes range from 0 to 5 percent.

This map unit makes up about 5 percent of the parish. It is about 47 percent Metcalf soils, 35 percent Keithville soils, and 18 percent soils of minor extent.

The Keithville soils are gently sloping and moderately well drained. These soils have a dark grayish brown very fine sandy loam surface layer. The subsurface layer is light yellowish brown very fine sandy loam. The subsoil is yellowish red and yellowish red, mottled silty clay loam in the upper part; mottled light brownish gray, reddish yellowish, and red clay loam in the middle part; and light brownish gray, mottled clay in the lower part.

The Metcalf soils are nearly level and somewhat poorly drained. These soils have a brown very fine sandy loam surface layer. The subsurface layer is light yellowish brown very fine sandy loam. The subsoil is yellowish brown, mottled loam and silty clay loam in the upper part; light brownish gray, mottled silt loam and light gray silt in the middle part; and light brownish gray, mottled clay and silty clay in the lower part.

The minor soils in this map unit are the Bellwood, Bowie, and Sacul soils on ridgetops and side slopes. Bellwood soils are somewhat poorly drained, and Bowie and Sacul soils are moderately well drained.

The soils in this map unit are used mainly as woodland. In a few areas, they are used as cropland, pastureland, or homesites.

These soils are moderately well suited to use as woodland. A restricted use of equipment and the risk of soil compaction because of the clayey subsoil and wetness are the main concerns in producing and harvesting timber. Plant competition and the hazard of windthrow are additional concerns.

These soils are moderately well suited to crops. The main limitations are low soil fertility, wetness, and potentially toxic levels of exchangeable aluminum within the rooting zone. Erosion is a hazard on the gently sloping Keithville soils.

These soils are well suited to use as pastureland. Wetness and low fertility are the main limitations. Erosion is a hazard in gently sloping areas. Additions of fertilizer and lime improve the soils for grasses and legumes.

The Metcalf soils in this map unit generally are poorly suited to most urban and intensive recreational uses. Wetness, very slow permeability, and low strength for roads are the main limitations. The Keithville soils are moderately well suited to urban development.

4. Bellwood-Vaiden

Nearly level to strongly sloping, somewhat poorly drained soils that have a loamy surface layer and a clayey subsoil

This map unit consists of soils on broad ridgetops and on side slopes. Slopes range from 0 to 5 percent on the ridgetops and 5 to 15 percent on the side slopes.

This map unit makes up about 4 percent of the parish. It is about 70 percent Bellwood soils, 10 percent Vaiden soils, and 20 percent soils of minor extent.

The Bellwood soils are gently sloping to strongly sloping. They are on broad ridgetops and on side slopes. These soils have a dark grayish brown silt loam surface layer. The subsoil is yellowish red clay in the upper part, light brownish gray clay in the middle part, and grayish brown and gray clay in the lower part. The subsoil is mottled throughout.

The Vaiden soils are nearly level. They are on broad ridgetops. These soils have a dark grayish brown silty clay loam surface layer. The subsoil is yellowish brown clay in the upper part; yellowish brown, mottled clay in the middle part; and light olive, mottled brown clay in the lower part. The substratum is light olive brown, mottled clay in the upper and middle parts and olive brown, mottled clay in the lower part.

The minor soils in this map unit are the Guyton, Frizzell, Keithville, Mahan, Metcalf, Oktibbeha, and Sacul soils. Guyton soils mainly are on flood plains of drainageways and are poorly drained. Guyton soils are also on stream terraces. Frizzell soils are on stream terraces. Keithville and Metcalf soils are on broad ridgetops. Keithville soils are moderately well drained. Mahan, Oktibbeha, and Sacul soils are on ridgetops and side slopes. Mahan soils are well drained, and Oktibbeha and Sacul soils are moderately well drained.

The soils in this map unit are used mainly as woodland. Small acreages are used as pastureland or homesites.

The soils in this map unit are moderately well suited to use as woodland. If logging is done during wet periods, rutting and soil compaction can be a problem. Seedling mortality, the hazard of windthrow, and plant competition are additional concerns. Erosion is a hazard on the gently sloping and strongly sloping soils.

These soils generally are poorly suited to cultivated crops because of wetness, poor tilth, low fertility, potentially toxic levels of aluminum within the root zone, and the severe hazard of erosion. Strongly sloping soils are generally not suited to crops, and nearly level soils are moderately well suited to crops.

These soils are moderately well suited to use as pastureland. The main limitations are wetness, low fertility, steepness of slope, and the hazard of erosion.

The soils in this map unit are poorly suited to most urban and intensive recreational uses. Very slow permeability, wetness, a high or very high shrink-swell potential, steepness of slope, and low strength for roads are the main limitations.

5. Mahan-Bowie

Gently sloping to strongly sloping, well drained and moderately well drained soils that have a loamy surface layer and a clayey and loamy or a loamy subsoil

This map unit consists of soils on gently sloping ridgetops and strongly sloping side slopes. Slopes range from 1 to 5 percent on the ridgetops and 5 to 15 percent on the side slopes.

This map unit makes up about 5 percent of the parish. It is about 43 percent Mahan soils, 42 percent Bowie soils, and 15 percent soils of minor extent.

The Mahan soils are well drained. They are on narrow, gently sloping ridgetops and on strongly sloping side slopes. These soils have a brown or dark grayish brown fine sandy loam surface layer. The subsurface layer is brown fine sandy loam. The subsoil is red clay in the upper part, yellowish red clay in the middle part, and yellowish red sandy clay loam in the lower part.

The Bowie soils are moderately well drained. They are on broad, gently sloping ridgetops. These soils have a dark grayish brown fine sandy loam surface layer. The subsurface layer is pale brown fine sandy loam. The subsoil is strong brown sandy clay loam in the upper part; yellowish brown, mottled sandy clay loam in the middle part; and strong brown, mottled sandy clay loam in the lower part.

The minor soils in this map unit are the Frizzell, Guyton, Metcalf, Ruston, and Sacul soils. Frizzell and Guyton soils are on stream terraces. Guyton soils are also in drainageways. Frizzell soils are somewhat poorly drained, and Guyton soils are poorly drained. Metcalf soils are on broad ridgetops and are somewhat poorly drained. Ruston soils are on narrow ridgetops and are well drained. Sacul soils are on ridgetops and side slopes and are moderately well drained.

The soils in this map unit are used mainly as woodland. Small acreages are used as cropland, pastureland, or homesites.

These soils are well suited to use as woodland. They have few limitations to this use.

These soils generally are moderately well suited to crops. Steepness of slope and the hazard of erosion are the main limitations. The soils on strongly sloping side slopes generally are not suited to crops. Low or medium soil fertility and potentially toxic levels of aluminum in the root zone are additional limitations to growing crops.

These soils are well suited to use as pastureland. Low or medium fertility is a limitation, and erosion is a hazard. The soils on strongly sloping side slopes are moderately well suited to use as pastureland mainly because of the hazard of erosion.

The soils in this map unit dominantly are moderately well suited to urban development and well suited to intensive recreational uses. Steepness of slope, moderate or moderately slow permeability, wetness, low strength for roads, and the hazard of erosion are the main limitations. The strongly sloping soils are moderately well suited to most recreational uses.

6. Betis-McLaurin

Very gently sloping to strongly sloping, somewhat excessively drained and well drained soils that have a sandy surface layer and a sandy and loamy subsoil.

This map unit consists of soils on very gently sloping and gently sloping ridgetops and on moderately sloping and strongly sloping side slopes. Slopes range from 1 to 5 percent on the ridgetops and 5 to 12 percent on the side slopes.

This map unit makes up about 2 percent of the parish. It is about 45 percent Betis soils, 43 percent McLaurin soils, and 12 percent soils of minor extent.

The Betis soils are somewhat excessively drained. They are on gently sloping ridgetops and strongly sloping side slopes. These soils have a grayish brown or dark grayish brown loamy fine sand surface layer. The subsurface layer is yellowish brown loamy fine sand. The subsoil is strong brown loamy fine sand in the upper part and very pale brown loamy fine sand and strong brown fine sandy loam in the lower part.

The McLaurin soils are well drained. They are on very gently sloping ridgetops and on moderately sloping side slopes. These soils have a grayish brown loamy fine sand surface layer. The subsurface layer is brown loamy fine sand. The subsoil is yellowish red sandy loam in the upper part, yellowish red sandy loam and light brown sand in the middle part, and red loam in the lower part.

The minor soils in this map unit are the Bowie, Briley, Ruston, and Sacul soils on ridgetops and side slopes. Bowie and Ruston soils are only on ridgetops. Bowie soils are moderately well drained, and Ruston soils are well drained. Briley soils are well drained, and Sacul soils are moderately well drained.

The soils in this map unit are used mainly as woodland. In a few areas, they are used as cropland, pastureland, or homesites.

The Betis soils in this map unit are moderately well suited to use as woodland. Because of the sandy textures, traction is poor during dry periods, and seedling mortality is moderate because of soil droughtiness. The McLaurin soils are well suited to use as woodland. Soil droughtiness in both soils somewhat limits tree growth.

These soils dominantly are moderately well suited to crops. The main limitations are low soil fertility, low or moderate available water capacity, and steepness of slope. Strongly sloping areas generally are not suited to crops because of the severe hazard of erosion.

These soils dominantly are moderately well suited to use as pastureland. The very gently sloping McLaurin soils are well suited to this use, and the strongly sloping Betis soils are poorly suited to this use. Low soil fertility, steepness of slope, and soil droughtiness are the main limitations. Special conservation practices are needed to control erosion while the pasture grasses are being established.

The Betis soils in this map unit are moderately well suited to most urban and intensive recreational uses. The very gently sloping McLaurin soils mainly are well suited to these uses. Steepness of slope is the main limitation for building sites, and seepage is a problem where the soils are used for sanitary facilities. The sandy surface layer is a limitation to most recreational uses. Moderately sloping areas of McLaurin soils are moderately well suited to most recreational uses.

Soils on Stream Terraces

This map unit consists of somewhat poorly drained, well drained, and poorly drained, loamy soils on low terraces along major streams. Some of the soils are subject to rare flooding. This map unit makes up about 9 percent of Jackson Parish. Most of the area is woodland. Seasonal wetness is the main limitation for most uses.

7. Frizzell-Cahaba-Guyton

Level to very gently sloping, somewhat poorly drained, well drained, and poorly drained soils that are loamy throughout

This map unit consists of soils on broad flats, in depressional areas, and on low ridges and mounds. These soils are on stream terraces that flank the flood plains of major streams. Slopes range from 0 to 1 percent on broad flats and in depressional areas and 1 to 3 percent on low ridges and mounds. Some areas of the Guyton soils are subject to rare flooding.

This map unit makes up about 9 percent of the parish. It is about 30 percent Frizzell soils, 27 percent Cahaba soils, 17 percent Guyton soils, and 26 percent soils of minor extent.

The Frizzell soils are nearly level and somewhat poorly drained. They are on low ridges and mounds. These soils have a dark grayish brown silt loam surface layer. The next layer is yellowish brown and light brownish gray silt loam. The subsoil is yellowish brown and gray silt loam in the upper part and yellowish brown silty clay loam in the lower part. The subsoil is mottled throughout.

The Cahaba soils are well drained. They are on very gently sloping stream terraces. These soils have a grayish brown fine sandy loam surface layer. The subsurface layer is brown fine sandy loam. The next layer is light yellowish brown fine sandy loam. The subsoil is red loam in the upper part, yellowish red loam in the middle part, and strong brown sandy loam in the lower part.

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

The minor soils in this map unit are the Ochlockonee and Ouachita soils on flood plains. These soils are frequently flooded and well drained and are on low ridges.

The soils in this map unit are used mainly as woodland. In a few areas, they are used as cropland, pastureland, or homesites.

These soils dominantly are moderately well suited to use as woodland. The Cahaba soils are well suited to this use. A restricted use of equipment and seedling mortality caused by wetness, soil compaction, plant competition, and the hazard of windthrow are the main concerns for planting and harvesting trees.

The soils in this map unit dominantly are moderately well suited to cultivated crops. The Cahaba soils are well suited to this use. The main limitations are wetness, low fertility, and potentially toxic levels of aluminum in the root zone. Erosion is a hazard on very gently sloping areas.

The soils in this map unit dominantly are well suited to use as pastureland. The Guyton soils are only moderately well suited to this use because of wetness. Low soil fertility is also a limitation.

The soils in this map unit dominantly are poorly suited to urban and intensive recreational uses. Wetness and slow permeability are the main limitations. Flooding is a hazard in some areas of the Guyton soils. The Cahaba soils are well suited to urban and intensive recreational uses.

Soils on Flood Plains

This map unit consists of poorly drained and well drained loamy soils on narrow flood plains. The soils are subject to frequent flooding. This map unit makes up 20 percent of Jackson Parish. Most of the area is woodland. Seasonal wetness and the hazard of flooding are the main limitations for most uses.

8. Guyton-Ouachita-Ochlockonee

Level and very gently sloping, poorly drained and well drained soils that are loamy throughout

This map unit consists of soils on the flood plains of major streams. Flooding is frequent and occurs mainly in winter and spring, but it can occur during any season. Slopes range from 0 to 3 percent.

This map unit makes up about 20 percent of the parish. It is about 30 percent Guyton soils, 27 percent Ouachita soils, 18 percent Ochlockonee soils, and 25 percent soils of minor extent.

The Guyton soils are level and poorly drained. They are in low positions on the flood plains. These soils have a dark grayish brown silt loam surface layer. The subsurface layer is grayish brown, mottled silt loam in the upper part and light brownish gray, mottled silt loam in the lower part. The next layer is gray, mottled silty clay loam and light brownish gray silt loam. The subsoil is grayish brown, mottled silty clay loam in the upper part and gray, mottled silty clay loam in the lower part.

The Ouachita soils are very gently sloping and well drained. They are on low ridges on the flood plains. These soils have a dark yellowish brown silt loam surface layer. The subsoil is yellowish brown in the upper part; mottled light brownish gray, yellowish brown, and dark yellowish brown silt loam in the middle part; and light brownish gray, mottled silt loam in the lower part.

The Ochlockonee soils are very gently sloping and well drained. They are on low ridges on the flood plains. These soils have a dark brown sandy loam surface layer. The underlying material is yellowish brown, mottled fine sandy loam in the upper part; strong brown, mottled fine sandy loam in the middle part; and yellowish brown, mottled loamy fine sand in the lower part.

The minor soils in this map unit are the Cahaba soils on nearby stream terraces. Cahaba soils are well drained and very gently sloping.

The soils in this map unit are used mainly as woodland. Small acreages are used as pastureland.

These soils are moderately well suited to use as woodland. The use of equipment can be somewhat difficult, and seedling mortality is moderate because of flooding and seasonal wetness. Plant competition and the hazard of windthrow are additional concerns.

These soils generally are not suited to crops and are poorly suited to use as pastureland because of flooding and seasonal wetness.

The soils in this map unit are poorly suited to urban and intensive recreational uses because of frequent flooding and seasonal wetness. These soils are not suitable for building sites.

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 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, 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. Frizzell-Guyton silt loams, 0 to 2 percent slopes, is 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-Ouachita-Ochlockonee 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 suitabilities for many uses. The Glossary defines many of the terms used in describing the soils.

BdC—Bellwood silt loam, 1 to 5 percent slopes

This soil is gently sloping and somewhat poorly drained. It is on broad ridgetops on uplands. The areas of this soil are irregular in shape and range from 20 to 300 acres. Slopes are generally long and smooth.

Typically, the surface layer is dark grayish brown silt loam about 3 inches thick. The subsoil extends to a depth of about 60 inches. From top to bottom, the layers of the subsoil are yellowish red, mottled clay; light brownish gray, mottled clay; grayish brown, mottled clay; and gray, mottled clay.

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to 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 2 to 4 feet below the surface during December through April. The available water capacity is moderate to high. The shrink-swell potential is high in the subsoil.

Included with this soil in mapping are a few small areas of Guyton, Keithville, Mahan, Sacul, and Vaiden soils. Guyton soils are in drainageways, are poorly drained, and are loamy throughout the profile. Keithville soils are in slightly higher positions than the Bellwood soil and have a subsoil that is loamy in the upper part. Mahan and Sacul soils are at a higher elevation than the Bellwood soil and have a subsoil that contains less than 60 percent clay. Vaiden soils are in positions similar to those of the Bellwood soil and have an underlying material that is alkaline in the lower part. The included soils make up about 15 percent of the map unit.

This Bellwood soil is used mainly as woodland. A small acreage is used as pastureland or homesites.

This soil is moderately well suited to the production of loblolly pine and shortleaf pine. The understory vegetation is mainly American beautyberry, sumac, greenbriar, and waxmyrtle. On the basis of a 50-year site curve, the mean site index for loblolly pine is 78. The main limitation for producing and harvesting timber on this soil is a restricted use of equipment. The moderate hazard of windthrow, seedling mortality, and plant competition are additional limitations. Conventional methods of harvesting timber generally can be used except sometimes during rainy periods, generally from December to April. Logging roads require surfaces that are suitable for year-round use. Unsurfaced roads and skid trails are sticky or slippery when wet and can be impassable during rainy periods. Soil compaction can be reduced by using suitable logging systems, laying out skid trails in advance, and harvesting timber when the soil is least susceptible to compaction. Competing vegetation can be controlled and seedling survival improved by proper site preparation. Spraying, cutting, girdling, or prescribed burning eliminates unwanted weeds, brush, or trees.

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

This soil is moderately well suited to pasture. The main limitations are low fertility and the severe hazard of erosion. The main suitable pasture plants are common bermudagrass, bahiagrass, and crimson clover. Grazing when the soil is wet causes puddling, compaction of the surface layer, and reduced forage production. Seedbed preparation should be on the contour or across the slope where practical. Lime and fertilizer help to overcome low fertility and promote good growth of forage plants. Proper stocking, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition.

This soil is poorly suited to cultivated crops. It is limited mainly by low fertility, the severe hazard of erosion, and potentially toxic levels of aluminum in the root zone. The main suitable crops are soybeans, grain sorghum, and small grains. This soil is difficult to keep in good tilth and can be worked only within a narrow range of moisture content. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Conservation tillage, terraces, diversions, and grassed waterways help to reduce erosion. All tillage should be on the contour or across the slope. Most crops respond well to fertilizer and lime, which improve soil fertility and reduce the levels of exchangeable aluminum.

This soil is poorly suited to urban development. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are very slow permeability, wetness, low strength for roads and streets, and high shrink-swell potential. If buildings are constructed on this soil, properly designing foundations and footings and diverting runoff away from buildings help to prevent the structural damage caused by shrinking and swelling. The effects of shrinking and swelling can also be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. Septic tank absorption fields do not function properly during rainy periods because of wetness and very slow permeability. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Roads and streets can be designed to compensate for the limited capacity of the subsoil to support a load. Establishing and maintaining the plant cover can be achieved through proper fertilizing, seeding, mulching, and shaping of the slopes.

This soil is poorly suited to recreational uses. The main limitations are very slow permeability and the severe hazard of erosion. Good drainage improves 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 cover can be maintained by adding fertilizer and by controlling traffic.

This Bellwood soil is in capability subclass IVe. The woodland ordination symbol is 8C.

BDE—Bellwood silt loam, 5 to 15 percent slopes

This soil is strongly sloping and somewhat poorly drained. It is on side slopes on uplands. The areas of this soil are irregular in shape and range from 20 to 300 acres. Fewer observations were made than in most other map units. The detail in mapping, however, is adequate for the expected use of the soil.

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

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to 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 ranges from about 2 to 4 feet below the surface during December through April. The shrink-swell potential is high in the subsoil.

Included with this soil in mapping are a few small areas of Guyton, Keithville, Mahan, Sacul, and Vaiden soils. Guyton soils are in drainageways, are poorly drained, and are loamy throughout the profile. Keithville soils are on broad ridgetops and have a subsoil that is loamy in the upper part. Mahan and Sacul soils are at a higher elevation than the Bellwood soil and have a subsoil that contains less than 60 percent clay. Vaiden soils are on broad ridgetops and have an underlying material that is alkaline in the lower part. The included soils make up about 15 percent of the map unit.

This soil is used mainly as woodland. A small acreage is used as pastureland or homesites.

This soil is moderately well suited to the production of loblolly pine and shortleaf pine. The understory vegetation is mainly American beautyberry, sumac, greenbriar, and waxmyrtle. On the basis of a 50-year site curve, the mean site index for loblolly pine is 78. The main limitation for producing and harvesting timber on this soil is a restricted use of equipment. The moderate hazard of windthrow, seedling mortality, and plant competition are additional limitations. Conventional methods of harvesting timber generally can be used except sometimes during rainy periods, generally from December to April. Logging roads require surfaces that are suitable for year-round use. Unsurfaced roads and skid trails are sticky or slippery when wet and can be impassable during rainy periods. Soil compaction can be reduced by using suitable logging systems, laying out skid trails in advance, and harvesting timber when the soil is least susceptible to compaction. Competing vegetation can be controlled and seedling survival improved by proper site preparation. Spraying, cutting, girdling, or prescribed burning eliminates unwanted weeds, brush, or trees.

This soil is well suited to use as habitat for woodland wildlife. Habitat for wildlife can be improved by planting appropriate vegetation, by maintaining existing plant cover, or by promoting the natural establishment of desirable plants. Prescribed burning every three years and rotated among several small tracts of land can increase the amount of palatable browse for deer and seed-producing plants for quail and turkey. Planting small areas of grass and other seed crops around pastureland and cropland and leaving these areas undisturbed provides food and nesting areas for quail, rabbits, and song birds.

This soil is moderately well suited to pasture. The main limitations are low fertility and the severe hazard of erosion. The main suitable pasture plants are common bermudagrass, bahiagrass, and crimson clover. Grazing when the soil is wet causes puddling, compaction of the surface layer, and reduced forage production. Where practical, seedbed preparation should be on the contour or across the slope to reduce erosion. Lime and fertilizer help to overcome low fertility and promote good growth of forage plants. Proper stocking, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition.

This soil generally is not suited to cultivated crops. The hazard of erosion is too severe for this use.

This soil is poorly suited to urban development. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are very slow permeability, steepness of slope, wetness, low strength for roads and streets, and high shrink-well potential. If buildings are constructed on this soil, properly designing foundations and footings and diverting runoff away from buildings help to prevent the structural damage caused by shrinking and swelling. The effects of shrinking and swelling can also be minimized by using proper engineering designs and by backfilling with material that has low shrink-well potential. Septic tank absorption fields do not function properly during rainy periods because of wetness and very slow permeability. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Roads and streets can be designed to compensate for the limited capacity of the subsoil to support a load. Establishing and maintaining the plant cover can be achieved through proper fertilizing, seeding, mulching, and shaping of the slopes.

This soil is poorly suited to recreational uses. The main limitations are very slow permeability and the severe hazard of erosion. Drainage improves 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 cover can be maintained by adding fertilizer and by controlling traffic.

This Bellwood soil is in capability subclass VIe. The woodland ordination symbol is 8C.

BeC—Betis loamy fine sand, 1 to 5 percent slopes

This soil is gently sloping and somewhat excessively drained. It is on narrow ridgetops on uplands. The areas of this soil are long and narrow in shape and range from 10 to 150 acres. Slopes are short and convex.

Typically, the surface layer is dark grayish brown loamy fine sand about 4 inches thick. The subsurface layer is yellowish brown loamy fine sand about 20 inches thick. The subsoil to a depth of about 76 inches is strong brown loamy fine sand in the upper part and very pale brown loamy fine sand and strong brown fine sandy loam in the lower part.

This soil has low fertility. Water and air move through this soil at a rapid rate. Water runs off the surface at a very slow rate. A seasonal high water table is more than 6 feet below the surface. The surface layer of this soil dries quickly after rains. The available water capacity is low. Plants generally suffer from a shortage of water during dry periods in summer and fall of most years. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Briley, McLaurin, and Ruston soils. Briley and McLaurin soils are in positions similar to those of the Betis soil and have a loamy subsoil. Ruston soils are in slightly lower positions than the Betis soil and are loamy throughout the profile. The included soils make up about 10 percent of the map unit.

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

This soil is moderately well suited to the production of loblolly pine and shortleaf pine. On the basis of a 50-year site curve, the mean site index for loblolly pine is 63. The main concerns in producing and harvesting timber are the sandy soil texture and soil droughtiness. Trafficability is poor when this sandy soil is dry. The seedling mortality rate may be high in summer because of a shortage of moisture in the soil. To reduce the seedling mortality rate, seedlings can be planted in early spring to obtain additional moisture from spring rain. Natural regeneration may be preferable on the driest sites. Organic matter is conserved on this soil by restricting burning and leaving slash well distributed.

This soil is moderately well suited to use as habitat for woodland wildlife. Habitat for wildlife can be improved by planting appropriate vegetation, by maintaining existing plant cover, or by promoting the natural establishment of desirable plants. Small clear-cuts in irregular shapes provide maximum edge for use by deer.

This soil is moderately well suited to pasture. The main limitations are soil droughtiness and low fertility. Low available water capacity of the soil limits the production of plants suitable for pasture. Suitable pasture plants are improved bermudagrass, bahiagrass, and weeping lovegrass. Lime and fertilizer help to overcome the low fertility and promote good growth of forage plants. Proper stocking 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 low fertility, droughtiness, and poor trafficability. Suitable crops are watermelons, peanuts, and other vegetable crops. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. Conservation tillage and returning all crop residue to the soil or regularly adding other organic matter improves fertility and helps to maintain soil tilth and content of organic matter. To reduce erosion, all tillage should be on the contour or across the slope. Most crops respond well to fertilizer and lime.

This soil is moderately well suited to urban development. The main limitations are the sandy texture and rapid permeability. It has slight limitations for dwellings and local roads and streets and severe limitations for most sanitary facilities. If the density of housing is moderate to high, community sewage systems are best suited to prevent contamination of water supplies as a result of seepage. Selection of adapted vegetation is critical for the establishment of lawns, shrubs, trees, and vegetable gardens. Plants that tolerate droughtiness can be selected if irrigation is not provided. Special retainer walls can prevent caving of shallow excavations.

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

This Betis soil is in capability subclass IIIs. The woodland ordination symbol is 7S.

BEE—Betis loamy fine sand, 5 to 12 percent slopes

This soil is strongly sloping and somewhat excessively drained. It is on side slopes on uplands. The areas of this soil are long and narrow in shape and range from 10 to 100 acres. Slopes are short and convex.

Typically, the surface layer is grayish brown loamy fine sand about 12 inches thick. The subsurface layer is yellowish brown loamy fine sand about 12 inches thick. The subsoil to a depth of about 76 inches is strong brown loamy fine sand in the upper part and pale brown and strong brown loamy fine sand in the lower part.

This soil has low fertility. Water and air move through this soil at a rapid rate. Water runs off the surface at a very slow rate. A seasonal high water table is more than 6 feet below the surface throughout the year. The surface layer of this soil dries quickly after rains. The available water capacity is low. Plants generally suffer from a lack of water during dry periods in summer and fall of most year. The shrink-swell potential is low.

Included with this soil in mapping are Briley and McLaurin soils. These soils are in positions similar to those of the Betis soil and have a loamy subsoil. The included soils make up about 10 percent of the map unit.

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

This soil is moderately well suited to the production of loblolly pine and shortleaf pine. On the basis of a 50-year site curve, the mean site index for loblolly pine is 63. The main concerns in producing and harvesting timber are the sandy surface layer and soil droughtiness. Trafficability is poor when this sandy soil is dry. The seedling mortality rate may be high in summer because of a shortage of adequate moisture in the soil. To reduce the seedling mortality rate, seedlings can be planted in early spring to obtain additional moisture from spring rain. Natural regeneration may be preferable on the driest sites. Organic matter is conserved on this soil by restricting burning and leaving slash well distributed.

This soil is moderately well suited to use as habitat for woodland wildlife. Habitat for wildlife can be improved by planting appropriate vegetation, by maintaining existing plant cover, or by promoting the natural establishment of desirable plants. Small clear-cuts in irregular shapes provide maximum edge for use by deer.

This soil is poorly suited to pasture. The main limitations are steepness of slope, low fertility, limited choice of plants, and droughtiness. Low available water capacity of the soil limits the production of plants suitable for pasture. Suitable pasture plants are improved bermudagrass, bahiagrass, and weeping lovegrass. Lime and fertilizer help to overcome the low fertility and promote good growth of forage plants. Seedbed preparation should be on the contour or across the slope where practical. Proper stocking and pasture rotation help to keep the pasture in good condition.

This soil generally is not suited to cultivated crops. It is limited mainly by steepness of slope, low fertility, and soil droughtiness. Erosion is the main hazard.

This soil is moderately well suited to urban development. The main limitations are the sandy texture, steepness of slope, and rapid permeability. If the density of housing is moderate to high, community sewage systems are best suited to prevent contamination of water and supplies as a result of seepage. Selection of adapted vegetation is critical for the establishment of lawns, shrubs, trees, and vegetable gardens. Plants that tolerate droughtiness can be selected if irrigation is not provided. Cutbanks are not stable and are subject to slumping.

This soil is moderately well suited to intensive recreational uses. The main limitations are steepness of slope and the sandy surface layer, which is loose when dry and provides poor traction. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The cover can be maintained by adding fertilizer and by controlling traffic.

This Betis soil is in capability subclass VIe. The woodland ordination symbol is 7S.

BoC—Bowie fine sandy loam, 1 to 5 percent slopes

This soil is gently sloping and moderately well drained. It is on broad ridgetops on uplands. The areas of this soil are irregular in shape and range from 5 to 125 acres. Slopes are generally long and smooth.

Typically, the surface layer is dark grayish brown fine sandy loam about 8 inches thick. The subsurface layer is pale brown fine sandy loam about 10 inches thick. The subsoil to a depth of about 65 inches is strong brown sandy clay loam in the upper part; yellowish brown, mottled sandy clay loam in the middle part; and strong brown, mottled sandy clay loam in the lower part. Nodules of plinthite are in the middle and lower parts of the subsoil. In some places, the lower part of the subsoil is silty clay or clay. In other places, the subsoil does not contain plinthite.

This Bowie soil has low fertility and moderately high levels of exchangeable aluminum that are potentially toxic to 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 ranges from about 3.5 to 5 feet below the surface during January through April. The available water capacity is moderate to high. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Frizzell, Mahan, Metcalf, Ruston, and Sacul soils. Frizzell soils are on stream terraces and contain less clay and sand in the subsoil than the Bowie soil. McLaurin soils are in positions similar to those of the Bowie soil and contain less clay in the subsoil. Mahan, Metcalf, and Sacul soils have a loamy and clayey subsoil. Mahan soils are in higher positions, Metcalf soils are in lower positions, and Sacul soils are in slightly lower positions than the Bowie soil. Ruston soils are in slightly higher positions than the Bowie soil and have a redder subsoil. The included soils make up about 15 percent of the map unit.

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

This soil is well suited to the production of loblolly pine and shortleaf pine. It has few limitations for use and management. The site index for loblolly pine is 86.

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

This soil is well suited to pasture; however, low fertility and the moderate hazard of erosion are limitations. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, crimson clover, ball clover, and ryegrass. Where practical, seedbed preparation should be on the contour or across the slope to reduce erosion. Lime and fertilizer help to overcome the low fertility and promote good growth of forage plants. Proper stocking, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition.

This soil is moderately well suited to most cultivated crops. It is limited mainly by steepness of slope, low fertility, toxic levels of exchangeable aluminum in the root zone, and the hazard of erosion. Suitable crops are soybeans, corn, cotton, and grain sorghum. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. Conservation tillage and returning all crop residue to the soil or regularly adding other organic matter improves fertility and helps to maintain soil tilth and content of organic matter. Conservation tillage, terraces, diversions, and grassed waterways help to control erosion. All tillage should be on the contour or across the slope. Most crops respond well to fertilizer and lime, which improve soil fertility and reduce the levels of exchangeable aluminum.

This soil is moderately well suited to urban development. The main limitations are wetness, low strength for roads and streets, and moderately slow permeability. It has slight to moderate limitations for building sites and local roads and streets and moderate to severe limitations for most sanitary facilities. Deep drainage reduces the problem of wetness. Preserving the existing plant cover during construction helps to control erosion. Septic tank absorption fields do not function properly during rainy periods because of wetness and moderately slow permeability. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Roads should be designed to offset the limited ability of the soil to support a load.

This soil is well suited to intensive recreational uses. It has few limitations for use and management; however, the slope is a moderate limitation for playgrounds. Erosion can be reduced and the beauty of the area enhanced by maintaining an adequate plant cover. The cover can be maintained by adding fertilizer and by controlling traffic.

This Bowie soil is in capability subclass IIIe. The woodland ordination symbol is 9A.

BrC—Briley loamy fine sand, 1 to 5 percent slopes

This soil is gently sloping and well drained. It is on convex ridgetops on uplands. The mapped areas of this soil range from about 10 to 80 acres.

Typically, the surface layer is brown loamy fine sand about 6 inches thick. The subsurface layer is pale brown and light yellowish brown loamy fine sand about 18 inches thick. The next layer to a depth of about 29 inches is brown fine sandy loam and light yellowish brown loamy fine sand. The subsoil between depths of about 29 and 65 inches is yellowish red loam in the upper part and red loam in the lower part.

This soil has low fertility. Water and air move through the sandy upper part of this soil at a rapid rate and through the loamy lower part at a moderate rate. Water runs off the surface at a slow rate. A seasonal high water table is more than 6 feet below the surface. The available water capacity is moderate. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Betis, Bowie, McLaurin, and Ruston soils. Betis and McLaurin soils are in positions similar to those of the Briley soil. Betis soils mostly are sandy throughout the profile. McLaurin soils have sandy surface and subsurface layers that together are less than 20 inches thick. Bowie and Ruston soils are in slightly lower positions than the Briley soil and are loamy throughout the profile. The included soils make up about 15 percent of the map unit.

This Briley soil is used mainly as woodland. A small acreage is used as pastureland or cropland.

This soil is moderately well suited to the production of loblolly pine and shortleaf pine. Tree growth is limited somewhat and seedling mortality generally is moderate because of soil droughtiness. The site index for loblolly pine is 80. The seedling mortality rate can be reduced by planting seedlings in early spring to obtain additional moisture from spring rain. Organic matter is conserved on this soil by restricting burning and leaving slash well distributed.

This soil is well suited to use as habitat for woodland wildlife. Habitat for wildlife can be improved by planting appropriate vegetation, by maintaining existing plant cover, or by promoting the natural establishment of desirable plants. Habitat for deer and squirrels can be improved by selective harvesting of timber to leave large den and mast-producing trees. Small clear-cuts in irregular shapes provide maximum edge for use by deer.

This soil is moderately well suited to pasture. Droughtiness, low fertility, and the hazard of erosion are the main limitations. Pasture plants are difficult to establish because of droughtiness. Suitable pasture plants are improved bermudagrass, weeping lovegrass, bahiagrass, and crimson clover. Fertilizer and lime improve the soil for grasses and legumes.

This soil is moderately well suited to cultivated crops. Droughtiness, low fertility, and the hazard of erosion are the main limitations. Crop residue left on the surface helps to conserve moisture and control erosion. Most crops respond well to fertilizer and lime.

This soil is moderately well suited to urban development. It has slight limitations for dwellings and local roads and streets and slight to severe limitations for sanitary facilities. Seepage is a problem where this soil is used for sewage lagoons or sanitary landfills. Cutbanks cave easily where shallow excavations are constructed. Plants for lawns and landscaping that tolerate droughtiness can be selected if irrigation is not provided.

This soil is moderately well suited to intensive recreational uses. It is limited mainly by the sandy surface layer, which is loose when dry and provides poor traction. Steepness of slope is a limitation for playgrounds. Supplemental irrigation helps to maintain a good plant cover.

This Briley soil is in capability subclass IIIe. The woodland ordination symbol is 8S.

BRE—Briley loamy fine sand, 5 to 12 percent slopes

This soil is strongly sloping and well drained. It is on side slopes on uplands. The areas of this soil range from about 10 to 200 acres. Fewer observations were made than in most other map units. The detail in mapping, however, is adequate for the expected use of the soil.

Typically, the surface layer is dark brown loamy fine sand about 5 inches thick. The subsurface layer is about 19 inches thick. It is brown loamy fine sand in the upper part and light yellowish brown loamy fine sand in the lower part. The next layer to a depth of about 28 inches is yellowish red fine sandy loam. The subsoil between depths of about 28 and 65 inches is red sandy clay loam in the upper part, yellowish red fine sandy loam in the middle part, and red sandy clay loam in the lower part.

This soil has 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. A seasonal high water table is more than 6 feet below the surface. The available water capacity is moderate. Plants generally suffer from a shortage of water during dry periods in summer and fall of most years. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Betis, McLaurin, and Sacul soils. Betis and McLaurin soils are in positions similar to those of the Briley soil. Betis soils mostly are sandy throughout the profile. McLaurin soils have sandy surface and subsurface layers that together are less than 20 inches thick. Sacul soils are on some of the lower side slopes and have a loamy and clayey subsoil. The included soils make up about 15 percent of the map unit.

This Briley soil is used mainly as woodland. A small acreage is used as pastureland or homesites.

This soil is moderately well suited to the production of loblolly pine and shortleaf pine. Tree growth and seedling survival are limited somewhat by soil droughtiness. The site index for loblolly pine is 80. The seedling mortality rate can be improved by planting seedlings in early spring to obtain additional moisture from spring rain. Organic matter is conserved on this soil by restricting burning and leaving slash well distributed.

This soil is well suited to use as habitat for woodland wildlife. Habitat for wildlife can be improved by planting appropriate vegetation, by maintaining existing plant cover, or by promoting the natural establishment of desirable plants. Habitat for deer and squirrels can be improved by selective harvesting of timber to leave large den and mast-producing trees. Small clear-cuts in irregular shapes provide maximum edge for use by deer.

This soil is moderately well suited to pasture. Droughtiness, steepness of slope, low fertility, and the hazard of erosion are the main limitations. Pasture plants are difficult to establish because of droughtiness. Suitable pasture plants are improved bermudagrass, weeping lovegrass, bahiagrass, and crimson clover. Fertilizer and lime improve the soil for grasses and legumes.

This soil is poorly suited to cultivated crops. Droughtiness, low fertility, and the hazard of erosion are the main limitations. Crop residue left on the surface helps to conserve moisture and control erosion. Most crops respond well to fertilizer and lime.

This soil is moderately well suited to urban development. Steepness of slope and the hazard of erosion are the main limitations. Cutbanks cave easily where shallow excavations are constructed. Preserving the existing plant cover during construction helps to control erosion. The cover can be established and maintained by properly fertilizing, seeding, mulching, and shaping the slopes. Plants that tolerate droughtiness can be selected if irrigation is not provided. Seepage can be a problem in sanitary landfills and sewage lagoons.

This soil is moderately well suited to recreational uses. Steepness of slope and the sandy surface layer are the main limitations. Cuts and fills should be seeded or mulched to control erosion. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover.

This Briley soil is in capability subclass IVe. The woodland ordination symbol is 8S.

ChB—Cahaba fine sandy loam, 1 to 3 percent slopes

This soil is very gently sloping and well drained. It is on stream terraces. The areas of this soil range from about 20 to 200 acres.

Typically, the surface layer is grayish brown fine sandy loam about 6 inches thick. The subsurface layer is brown fine sandy loam about 6 inches thick. The next layer to a depth of about 15 inches is light yellowish brown fine sandy loam. The subsoil between depths of about 15 and 65 inches is red loam in the upper part, yellowish red loam in the middle part, and strong brown sandy loam in the lower part.

This soil has low fertility and moderately high levels of exchangeable aluminum that are potentially toxic to crops. Water and air move through the subsoil at a moderate rate. Water runs off the surface at a medium rate. A seasonal high water table is more than 6 feet below the surface. The available water capacity is moderate to high. Plants are stressed by a shortage of water during dry periods in summer and fall of some years. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Guyton, Frizzell, Ochlockonee, and Ouachita soils. Guyton soils are in low positions on flood plains and in depressional areas on terraces. They are poorly drained and are gray throughout the profile. Frizzell soils are on low mounds and ridges. They contain less clay and sand in the subsoil than the Cahaba soil and are somewhat poorly drained. Ochlockonee and Ouachita soils are on flood plains and do not have a distinct subsoil. The included soils make up about 10 percent of the map unit.

This Cahaba soil is used mainly as woodland. A small acreage is used for cultivated crops or as pastureland .

This soil is well suited to the production of loblolly pine, shortleaf pine, sweetgum, and water oak. It has few limitations for producing and harvesting timber. The site index for loblolly pine is 87.

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

This soil is well suited to pasture; however, low fertility is a limitation, and erosion is a hazard during plant establishment. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, ryegrass, weeping lovegrass, and crimson clover. Proper grazing, weed control, and fertilizer and lime are needed for maximum quality of forage.

This soil is well suited to cultivated crops; however, low fertility, the hazard of erosion, and potentially toxic levels of exchangeable aluminum in the root zone are limitations. The main crops are soybeans, corn, and truck crops. Conservation tillage, farming on the contour, terraces, diversions, and grassed waterways help to control erosion. The organic matter content can be maintained by returning all crop residue to the soil, plowing under cover crops, and using a suitable cropping system. Most crops and pasture plants respond well to lime and fertilizer, which help to overcome the low fertility and reduce the levels of exchangeable aluminum.

This soil is well suited to urban development. It has few limitations for building sites, local roads and streets, and septic tank absorption fields. Seepage is a concern where this soil is used for sewage lagoons or sanitary landfills. Revegetating disturbed areas around construction sites as soon as possible helps to reduce erosion. Cutbanks cave easily where shallow excavations are constructed.

This soil is well suited to recreational uses. It has few limitations for this use; however, erosion can be a hazard for playgrounds. Erosion can be controlled by maintaining a good plant cover.

This Cahaba soil is in capability subclass IIe. The woodland ordination symbol is 9A.

FzB—Frizzell-Guyton silt loams, 0 to 2 percent slopes

These soils are nearly level and are on stream terraces. The Frizzell soil is somewhat poorly drained and is on low ridges and mounds. The mounds and ridges are 20 to 40 feet wide and 1 to 3 feet high. The Guyton soil is poorly drained and is on broad flats and in depressional areas. It is subject to rare flooding. A few well-defined drainageways cross most areas. The Frizzell soil has slopes of 2 percent or less. The Guyton soil has slopes that are less than 1 percent. The areas of these soils are irregular in shape and range from 50 to several hundred acres. The areas of these soils generally parallel major streams and are about 55 percent Frizzell soil and 30 percent Guyton soil. The soils in this map unit are too intricately intermingled to be mapped separately at the selected scale.

Typically, this Frizzell soil has a surface layer of dark grayish brown silt loam about 3 inches thick. The next layer to a depth of about 31 inches is yellowish brown and light brownish gray silt loam. The subsoil between a depth of about 31 to 60 inches is yellowish brown and gray silt loam in the upper part and yellowish brown silty clay loam in the lower part. The subsoil is mottled throughout.

This Frizzell soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to 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 about 1.5 to 4 feet below the surface during December through April. In places, this soil is subject to rare flooding. The available water capacity is high. The shrink-swell potential is low.

Typically, this Guyton soil has a surface layer of dark grayish brown silt loam about 3 inches thick. The subsurface layer is light brownish gray, mottled silt loam about 21 inches thick. The next layer between depths of about 24 and 33 inches is grayish brown, mottled silty clay loam and light brownish gray silt loam. The subsoil to a depth of about 60 inches is light brownish gray, mottled silty clay loam in the upper part and light gray, mottled silty clay loam in the lower part.

This Guyton soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to 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 ranges from the soil surface to a depth of about 1.5 feet during December through May. This soil is subject to shallow flooding during unusually wet periods. The available water capacity is high to very high. The shrink-swell potential is low.

Included with these soils in mapping are a few small areas of Cahaba soils. Cahaba soils are in slightly higher positions than the Frizzell soil and have a reddish subsoil. The included soils make up about 15 percent of the map unit.

The soils in this map unit are used mainly as woodland. They are also used as pastureland or homesites.

These soils are moderately well suited to the production of loblolly pine, water oak, cherrybark oak, and Shumard oak. Swamp chestnut oak is also suitable to plant on the Guyton soil. The site index for loblolly pine is 90 on the Frizzell soil and 85 on the Guyton soil. The main concerns in producing and harvesting timber are a moderate to severe equipment use limitation, a moderate to severe windthrow hazard, and severe plant competition because of wetness. Seedling mortality is moderate in areas of the Guyton soil because of wetness. If site preparation is not adequate, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Conventional methods of harvesting timber generally can be used except sometimes during rainy periods, generally from December to April. Equipment use should be limited to dry periods to prevent rutting and compaction of the surface layers. Where adequate outlets are available, drainage can improve these soils for use as woodland.

The Frizzell soil in this map unit is well suited to use as habitat for woodland wildlife, and the Guyton soil in this map unit is moderately well suited to this use. Habitat for wildlife can be improved by planting appropriate vegetation, by maintaining existing plant cover, or by promoting the natural establishment of desirable plants. Prescribed burning every three years and rotated among several small tracts of land can increase the amount of palatable browse for deer and seed-producing plants for quail and turkey. Preserving as many of the large den and mast-producing trees as possible improves the habitat for deer, squirrels, and turkeys.

These soils are well suited to pasture; however, wetness and low fertility are limitations. The main suitable pasture plants are common bermudagrass, bahiagrass, white clover, and winter peas. Improved bermudagrass can also be grown on the Frizzell soil. Fertilizer improves the soils for grasses and legumes. Proper stocking and restricted grazing during wet periods help to keep the pasture and soil in good condition.

The soils in this map unit are moderately well suited to cultivated crops. The main limitations are wetness, low fertility, and high levels of exchangeable aluminum that are potentially toxic to crops. Drainage can improve these soils for use as cropland. Crusting of the surface layer and soil compaction can be reduced by returning crop residue to the soil. Conservation tillage or regularly adding other organic matter improves fertility and helps to maintain the content of organic matter. Most crops respond well to lime and fertilizer, which improve soil fertility and reduce the high levels of exchangeable aluminum.

These soils are poorly suited to urban development. The main limitations are wetness, low strength for roads and streets, and slow permeability. Flooding is a hazard in areas of the Guyton soil. Excess water can be removed by using shallow ditches and providing the proper grade. A seasonal high water table and slow permeability increase the possibility for septic tank absorption fields to fail during rainy periods. Lagoons or self-contained disposal units can be used to dispose of sewage properly. In areas of the Guyton soil, dwellings can be placed on mounds to raise them above the expected flood elevation. Roads should be designed to offset the limited ability of the Guyton soil to support a load.

The Frizzell soil in this map unit is moderately well suited to intensive recreational uses, and the Guyton soil in this map unit is poorly suited to intensive recreational uses. The main limitations are wetness and slow permeability. Flooding is a hazard in areas of the Guyton soil. Protection from flooding and drainage improve these soils for intensively used areas, such as playgrounds and camp areas.

The Frizzell soil is in capability subclass IIw, and the Guyton soil is in capability subclass IIIw. The woodland ordination symbol is 9W for the Frizzell soil and 8W for the Guyton soil.

GuA—Guyton silt loam

This soil is level and poorly drained. It is on broad flats and in depressional areas on stream terraces. The areas of this soil range from 25 to 500 acres. Slopes are less than 1 percent.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsurface layer is light brownish gray and grayish brown, mottled silt loam about 16 inches thick. The next layer between depths of 22 and 33 inches is light brownish gray, mottled silty clay loam and grayish brown silt loam. The subsoil to a depth of about 65 inches is grayish brown, mottled silty clay loam in the upper part and light brownish gray, mottled silty clay loam in the lower part.

This soil has low fertility and high levels of exchangeable aluminum in the root zone that are potentially toxic to crops. Water and air move through this soil at a slow rate. Water runs off the surface at a slow rate. This soil is subject to rare flooding during unusually wet conditions. A seasonal high water table ranges from the soil surface to a depth of about 1.5 feet during December through May. The available water capacity is high to very high. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Cahaba and Frizzell soils. These soils are in higher positions than the Guyton soil. Cahaba soils are well drained and have a reddish, loamy subsoil. Frizzell soils are somewhat poorly drained and have a brownish and grayish subsoil. The included soils make up about 15 percent of the map unit.

This Guyton soil is used mainly as woodland. A small acreage is used as pastureland, cropland, or homesites.

This soil is moderately well suited to the production of loblolly pine, water oak, Shumard oak, swamp chestnut oak, and cherrybark oak. The site index for loblolly pine is 85. The main concerns in producing and harvesting timber are a restricted use of equipment and seedling mortality caused by wetness. In addition, the windthrow hazard and plant competition are severe. Conventional methods of harvesting timber generally can be used except sometimes during rainy periods, generally from December to May. Logging roads require surfaces that are suitable for year-round use. Water-tolerant trees should be selected, and they can be planted or harvested during dry periods. Trees are subject to windthrow because of the high water table. After harvesting, reforestation can be carefully managed to reduce competition from undesirable understory plants.

This soil is moderately well suited to use as habitat for woodland and wetland wildlife. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open water areas for waterfowl and furbearers, such as muskrat, nutria, and otter. Habitat for all wildlife can be improved by planting appropriate vegetation, by maintaining existing plant cover, or by promoting the natural establishment of desirable plants.

This soil is moderately well suited to pasture; however, wetness and low fertility are limitations. The main suitable pasture plants are common bermudagrass, bahiagrass, white clover, vetch, and winter peas. Grazing when the soil is wet causes the surface layer to puddle. Excess water on the surface can be removed by using shallow ditches. Lime and fertilizer help to overcome the low fertility and promote good growth of forage plants. Proper stocking, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition.

This soil is moderately well suited to most cultivated crops. The main limitations are wetness, low fertility, and potentially toxic levels of exchangeable aluminum in the root zone. Suitable crops are soybeans, rice, corn, and grain sorghum. A drainage system is needed for most cultivated crops and pasture plants. A tillage pan forms easily if this soil is tilled when wet. This pan can be broken by chiseling or subsoiling. Returning crop residue to the soil or regularly adding other organic matter improves fertility, reduces crusting, and increases the water intake rate. Most crops respond well to fertilizer and lime, which improve soil fertility and reduce the high levels of exchangeable aluminum.

This soil is poorly suited to urban development. The main limitations are wetness, low strength for roads and streets, and slow permeability. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. Drainage can improve this soil for use as roads and buildings. Buildings can be placed on pilings or mounds to elevate them above the expected flood level. A seasonal high water table and slow permeability increase the possibility for septic tank absorption fields to fail. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Roads should be designed to offset the limited ability of the soil to support a load.

This soil is poorly suited to intensive recreational uses. Wetness is the main limitation. Flooding is a hazard to camp areas. Excess water on the surface can be removed by using shallow ditches.

This Guyton soil is in capability subclass IIIw. The woodland ordination symbol is 8W.

GYA—Guyton-Ouachita-Ochlockonee association, frequently flooded

These soils are gently undulating and are on the flood plains of major streams. The Guyton soil is poorly drained and is in low positions. The Ouachita and Ochlockonee soils are well drained and are on low ridges. These soils are subject to frequent flooding during any time of the year. The Guyton soil has slopes of less than 1 percent. The Ouachita and Ochlockonee soils have slopes that range from 1 to 3 percent. The areas of these soils are long and narrow in shape and range from 1 to several thousand acres in size. They are about 35 percent Guyton soil, 30 percent Ouachita soil, and 20 percent Ochlockonee soil. Fewer observations were made than in most other map units, because frequent flooding limits the use and management of these soils. The detail in mapping, however, is adequate for the expected use of the soils.

Typically, this Guyton soil has a surface layer of dark grayish brown, mottled silt loam about 6 inches thick. The subsurface layer is about 21 inches thick. It is grayish brown, mottled silt loam in the upper part and light brownish gray, mottled silt loam in the lower part. The next layer between depths of 27 and 35 inches is gray, mottled silty clay loam and light brownish gray silt loam. The subsoil to a depth of about 65 inches is grayish brown, mottled silty clay loam in the upper part and gray, mottled silty clay loam in the lower part. In places, the soil has a loam surface layer and a loam or clay loam subsoil.

This Guyton soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to 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 ranges from the soil surface to a depth of about 1.5 feet below the surface during December through May. This soil is subject to brief to long periods of flooding. Flooding can occur any time of the year, but it occurs more commonly in winter and spring. The available water capacity is high to very high. This soil dries out more slowly than most adjacent soils at higher elevations. The shrink-swell potential is low.

Typically, this Ouachita soil has a surface layer of dark yellowish brown silt loam about 6 inches thick. The subsoil to a depth of about 65 inches is yellowish brown silt loam in the upper part; mottled light brownish gray, yellowish brown, and dark yellowish brown silt loam in the middle part; and light brownish gray, mottled silt loam in the lower part.

This Ouachita soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to crops. Water and air move through this soil at a moderately slow rate. Water runs off the surface at a slow rate. A seasonal high water table is a depth of greater than 6 feet. This soil is subject to brief to long periods of flooding any time of the year, but flooding occurs more commonly in winter and spring. The available water capacity is high to very high. The shrink-swell potential is low.

Typically, the Ochlockonee soil has a surface layer of dark brown sandy loam about 10 inches thick. The underlying material to a depth of about 65 inches is yellowish brown, mottled fine sandy loam in the upper part; strong brown, mottled fine sandy loam in the middle part; and yellowish brown, mottled loamy fine sand in the lower part.

This Ochlockonee soil has low fertility. 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 3 to 5 feet below the surface from December to April. This soil is subject to brief to long periods of flooding any time of the year, but flooding occurs more commonly in winter and spring. The available water capacity ranges from low to high. Plants are stressed by a shortage of water during dry periods in summer and fall of some years. The shrink-swell potential is low.

Included with these soils in mapping are a few small areas of Cahaba soils. Cahaba soils are on adjacent stream terraces and have a well developed, reddish subsoil. The included soils make up about 15 percent of the map unit.

These soils are used mainly as woodland. A small acreage is used as pastureland.

These soils are moderately well suited to the production of green ash, Nuttall oak, eastern cottonwood, and American sycamore. The main concerns in producing and harvesting timber are a restricted use of equipment, soil compaction, plant competition, and seedling mortality caused by wetness and flooding. In addition, the hazard of windthrow is severe in areas of the Guyton soil. Trees that can tolerate seasonal wetness should be planted. After harvesting, reforestation can be carefully managed to reduce competition from undesirable understory plants. Conventional methods of harvesting timber generally can be used except sometimes during rainy periods and periods of flooding, generally from December to May. Logging can be done during the drier periods to reduce soil compaction and rutting.

These soils are well suited to moderately well suited to use as habitat for deer, squirrels, rabbits, ducks, turkeys, and numerous other small furbearers. Habitat for wildlife can be improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants. The habitat for waterfowl can be improved by constructing shallow ponds.

These soils are poorly suited to pasture because of the hazard of flooding and low fertility. Wetness is a limitation in the Guyton soil. The main suitable pasture plants are common bermudagrass and bahiagrass. Improved bermudagrass can be grown on the Ouachita and Ochlockonee soils. Singletary peas, white clover, tall fescue, and vetch have a moderate tolerance to flooding and can be grown in some places. Proper stocking, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition. Generally, it is not feasible to add fertilizer and lime because of the frequency of flooding. During flood periods, cattle can be moved to adjacent protected areas or to pastures at higher elevations.

These soils generally are not suited to cultivated crops because of the hazard of flooding and seasonal wetness.

These soils are poorly suited to urban development and intensive recreational uses. The hazard of flooding and seasonal wetness are the main limitations for these uses.

These soils are in capability subclass Vw. The woodland ordination symbol is 11W for the Ouachita and Ochlockonee soils and 6W for the Guyton soil.

KeC—Keithville very fine sandy loam, 1 to 5 percent slopes

This soil is gently sloping and moderately well drained. It is on broad ridgetops on uplands. The areas of this soil range from 5 to 125 acres. Slopes are generally long and smooth. In places, this soil has slopes of more than 5 percent.

Typically, the surface layer is dark grayish brown very fine sandy loam about 3 inches thick. The subsurface layer is light yellowish brown very fine sandy loam about 5 inches thick. The subsoil to a depth of about 34 inches is yellowish red silty clay loam, mottled in the middle and lower parts. To a depth of about 37 inches, the subsoil is mottled light brownish gray, reddish yellow, and red clay loam. The lower part of the subsoil to a depth of about 70 inches is light brownish gray, mottled clay.

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to 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 during December through April of most years. The available water capacity is high. The shrink-swell potential is high in the lower part of the subsoil.

Included with this soil in mapping are a few small areas of Bellwood, Bowie, Metcalf, and Sacul soils. All of these soils are at a higher elevation than the Keithville soil. Bellwood soils are somewhat poorly drained and have a subsoil that is clayey throughout. Bowie soils are loamy throughout the profile. Metcalf soils are somewhat poorly drained and have a subsurface layer that extends into the subsoil as tongues. Sacul soils are moderately well drained and have a subsoil that is clayey in the upper part. The included soils make up about 10 percent of the map unit.

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

This soil is moderately well suited to the production of loblolly pine and shortleaf pine. On the basis of a 50-year site curve, the mean site index for loblolly pine is 90. The main concerns in producing and harvesting timber are soil compaction and moderate competition from unwanted plants. After harvesting, reforestation can be carefully managed to reduce competition from undesirable understory plants. Site preparation, such as chopping, burning, herbicide application, and bedding, can reduce debris, reduce immediate plant competition, and facilitate mechanical planting.

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

This soil is well suited to pasture; however, low fertility is a limitation, and erosion is a hazard during establishment of pasture grasses. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, and crimson clover. Annual cool-season grasses, such as ryegrass, wheat, and oat, are suitable for winter forage. Where practical, seedbed preparation should be on the contour or across the slope to reduce erosion. Lime and fertilizer help to overcome the low fertility and promote good growth of forage plants. Proper stocking, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition.

This soil is moderately well suited to most cultivated crops. It is limited mainly by steepness of slope, low fertility, high levels of exchangeable aluminum in the root zone, and the hazard of erosion. The main suitable crops are soybeans, cotton, corn, grain sorghum, and wheat. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. Excessive cultivation can result in the formation of a tillage pan. This pan can be broken by subsoiling when the soil is dry. Conservation tillage and returning all crop residue to the soil or regularly adding other organic matter improves fertility and helps to maintain soil tilth and content of organic matter. Erosion can be reduced if fall grain or winter pasture grasses are seeded early, stubble-mulch tillage is used, and tillage and seeding are on the contour or across the slope. Also, waterways can be shaped and seeded to perennial grass. Most crops respond well to fertilizer and lime, which improve soil fertility and reduce the high levels of exchangeable aluminum.

This soil is moderately well suited to urban development. It has moderate limitations for building sites and local roads and streets and moderate to severe limitations for most sanitary facilities. The main limitations are wetness, very slow permeability, and low strength for roads. A seasonal high water table and very slow permeability increase the possibility for septic tank absorption fields to fail. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Roads should be designed to offset the limited ability of the soil to support a load.

This soil is poorly suited to intensive recreational uses, mainly because of very slow permeability. Slope is an additional limitation for playgrounds. Erosion can be reduced by maintaining a good plant cover.

This Keithville soil is in capability subclass IIIe. The woodland ordination symbol is 9A.

MaC—Mahan fine sandy loam, 1 to 5 percent slopes

This soil is gently sloping and well drained. It is on narrow ridgetops on uplands. The areas of this soil are irregular in shape and range from 20 to 250 acres.

Typically, the surface layer is dark grayish brown fine sandy loam about 3 inches thick. The subsurface layer is brown fine sandy loam about 4 inches thick. The subsoil to a depth of about 60 inches is red clay in the upper part, yellowish red clay in the middle part, and yellowish red sandy clay loam in the lower part.

This soil has medium fertility and moderately high to high levels of exchangeable aluminum that are potentially toxic to crops. Permeability is moderate. Water runs off the surface at a medium rate. A seasonal high water table is more than 6 feet below the surface. The available water capacity is moderate to high. Plants suffer from a shortage of water during dry periods in summer and fall of some years. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Bowie, Metcalf, and Sacul soils. Bowie soils are in lower positions than the Mahan soil. They are moderately well drained and are loamy throughout the profile. Metcalf and Sacul soils are at a lower elevation than the Mahan soil. Metcalf soils have a subsoil that is loamy in the upper part. Sacul soils have gray mottles in the upper part of the subsoil. The included soils make up about 15 percent of the map unit.

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

This soil is well suited to the production of shortleaf pine and loblolly pine. It has few limitations for producing and harvesting timber. The site index for loblolly pine is 90.

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

This soil is well suited to pasture; however, medium fertility is a minor limitation, and erosion can be a hazard when the soil is tilled and until pasture plants are established. The main suitable pasture plants are common bermudagrass, bahiagrass, crimson clover, and ryegrass. Where practical, tillage should be on the contour or across the slope to reduce erosion. Grasses and legumes grow well if adequate fertilizer is provided. Rotation grazing helps to maintain the quality of forage.

This soil is moderately well suited to cultivated crops. The main limitations are a hazard of erosion, medium soil fertility, and potentially toxic levels of exchangeable aluminum in the root zone. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. Crop residue left on or near the surface reduces runoff and helps to maintain soil tilth and organic matter content. Crops respond well to lime and fertilizer, which improve soil fertility and reduce the levels of exchangeable aluminum. Conservation tillage, terraces, diversions, and grassed waterways help to control erosion.

This soil is moderately well suited to urban development. It has slight limitations for dwellings and slight to moderate limitations for sanitary facilities. Steepness of slope, moderate permeability, the clayey subsoil, and low strength for roads are the main limitations. Seepage is a hazard in sewage lagoons. The hazard of erosion is increased if the soil is left exposed during site development. Roads should be designed to offset the limited ability of the soil to support a load.

This soil is well suited to intensive recreational uses; however, steepness of slope and small stones on the soil surface are limitations for playgrounds. Erosion can be controlled in intensively used areas by maintaining a good plant cover. The cover can be maintained by adding fertilizer and by controlling traffic.

This Mahan soil is in capability subclass IIIe. The woodland ordination symbol is 9A.

MAE—Mahan fine sandy loam, 5 to 15 percent slopes

This soil is strongly sloping and well drained. It is on side slopes on uplands. The areas of this soil are irregular in shape and range from 40 to 300 acres. Fewer observations were made than in most other map units. The detail in mapping, however, is adequate for the expected use of the soil.

Typically, the surface layer is brown fine sandy loam about 4 inches thick. The subsurface layer is brown fine sandy loam about 10 inches thick. The subsoil to a depth of about 55 inches is red clay in the upper part and yellowish red clay loam in the lower part. The substratum to a depth of about 65 inches is yellowish red sandy loam.

This soil has medium fertility and moderately high to high levels of exchangeable aluminum that are potentially toxic to crops. Permeability is moderate. Water runs off the surface at a rapid rate. A seasonal high water table is more than 6 feet below the surface. The available water capacity is moderate or high. Plants suffer from a lack of water during dry periods of some years. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Bowie and Sacul soils. Bowie soils are on ridgetops and are loamy throughout the profile. Sacul soils are at a lower elevation than the Mahan soil and have gray mottles in the upper part of the subsoil. The included soils make up about 15 percent of the map unit.

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

This soil is well suited to the production of shortleaf pine and loblolly pine. It has few limitations for planting and harvesting trees. The site index for loblolly pine is 90.

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

This soil is moderately well suited to pasture. The main limitations are steepness of slope and medium fertility. The main suitable pasture plants are common bermudagrass, bahiagrass, crimson clover, and ryegrass. Where practical, seedbed preparation should be on the contour or across the slope to reduce erosion. In places, the use of equipment is limited by short and irregular slopes. Proper grazing, weed control, and fertilizer help to ensure maximum quality of forage.

This soil generally is not suited to cultivated crops mainly because of the severe hazard of erosion. Other soil limitations are medium fertility and potentially toxic levels of exchangeable aluminum in the root zone. If the soil is adequately protected from erosion, less sloping areas can be cropped to small grains. The hazard of erosion generally is too severe to grow row crops, such as soybeans. Erosion can be reduced if fall grain or winter pasture grasses are seeded early, conservation tillage is used, and tillage and seeding are on the contour or across the slope. Also, waterways can be shaped and seeded to perennial grass.

This soil is moderately well suited to urban development. The main limitations are the clayey subsoil, steepness of slope, moderate permeability, and low strength for roads. Excavation for roads and buildings increases the hazard of erosion. Preserving the existing plant cover during construction and revegetating disturbed areas around construction sites as soon as possible help to control erosion. Roads can be designed to overcome the limited capacity of the soil to support a load. Moderate permeability increases the possibility for septic tank absorption fields to fail. The limitation of moderate permeability can be overcome by increasing the size of the absorption field.

This soil is moderately well suited to intensive recreational uses. It is limited mainly by steepness of slope. Cuts and fills should be seeded or mulched to reduce erosion. The plant cover can be maintained by adding fertilizer and by controlling traffic.

This Mahan soil is in capability subclass VIe. The woodland ordination symbol is 9A.

McB—McLaurin loamy fine sand, 1 to 3 percent slopes

This soil is very gently sloping and well drained. It is on narrow, convex ridgetops on uplands. The areas of this soil are irregular in shape and range from 20 to 350 acres.

Typically, the surface layer is grayish brown loamy fine sand about 6 inches thick. The subsurface layer is brown loamy fine sand about 8 inches thick. The subsoil to a depth of about 28 inches is yellowish red sandy loam. The next layer between depths of 28 and 48 inches is yellowish red sandy loam and light brown sand. The lower part of the subsoil to a depth of about 65 inches is red loam.

This soil has low fertility. In places, high levels of exchangeable aluminum are in the root zone. Permeability is moderate. Water runs off the surface at a slow rate. The surface layer of this soil dries quickly after rains. A seasonal high water table is 6 feet or more below the surface. The available water capacity is low to moderate. Plants generally suffer from a shortage of water during dry periods in summer and fall of most years. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Briley soils. Briley soils are in positions similar to those of the McLaurin soil. They are sandy from the soil surface to a depth of 20 inches or more. The included soils make up about 15 percent of the map unit.

This McLaurin soil is used mainly as woodland. A small acreage is used as cropland or pastureland.

This soil is well suited to the production of shortleaf pine and loblolly pine. It has few limitations for producing and harvesting timber; however, tree growth is limited somewhat because of soil droughtiness. The site index for loblolly pine is 83. Organic matter is conserved on this soil by restricting burning and leaving slash well distributed.

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

This soil is well suited to pasture; however, low fertility and soil droughtiness are limitations, and erosion can be a hazard when the soil is tilled and until pasture grasses become established. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, crimson clover, and wheat. Proper grazing, weed control, and fertilizer help to ensure maximum quality of forage.

This soil is moderately well suited to cultivated crops. The main limitations are low fertility, low to moderate available water capacity, and the hazard of erosion. Suitable crops are corn, cotton, watermelons, sweet potatoes, wheat, and vegetables. This soil is very friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. In areas where water of suitable quality is available, supplemental irrigation can prevent damage to crops during dry periods of most years. Excessive cultivation can result in the formation of a tillage pan. This pan can be broken by subsoiling when the soil is dry. The organic matter content can be maintained by using all crop residue, plowing under cover crops, and using a suitable cropping system. The risk of sheet and rill erosion can be reduced by the use of gradient terraces and contour farming. Crops respond well to lime and fertilizer, which improve soil fertility and reduce the high levels of exchangeable aluminum in the root zone.

This soil is well suited to urban development. It has slight limitations for dwellings and local roads and streets and slight or severe limitations for sanitary facilities. Revegetating disturbed areas around construction sites as soon as possible helps to control soil erosion. Cutbanks are not stable and are subject to slumping. The floor of sewage lagoons should be sealed with impervious material to prevent seepage of effluent and contamination of nearby ground-water supplies.

This soil is well suited to intensive recreational uses. It has few limitations for this use; however, maintaining a good vegetative cover in intensively used areas, such as playgrounds, helps to control erosion. The cover can be maintained by adding fertilizer, irrigation, and by controlling traffic.

This McLaurin soil is in capability subclass IIe. The woodland ordination symbol is 8A.

MCD—McLaurin loamy fine sand, 3 to 8 percent slopes

This soil is moderately sloping and well drained. It is on side slopes on uplands. The areas of this soil are irregular in shape and range from 20 to 250 acres. Fewer observations were made than in most other map units. The detail in mapping, however, is adequate for the expected use of the soil.

Typically, the surface layer is grayish brown loamy fine sand about 4 inches thick. The subsurface layer is dark brown loamy fine sand about 13 inches thick. The subsoil to a depth of about 44 inches is red and yellowish red sandy loam. The next layer between depths of 44 and 50 inches is yellowish red sandy loam and light brown loamy fine sand. The lower part of the subsoil to a depth of about 60 inches is yellowish red sandy clay loam.

This McLaurin soil has low fertility. In places, high levels of exchangeable aluminum are in the root zone. Permeability is moderate. Water runs off the surface at a medium rate. This soil dries quickly after rains. A seasonal high water table is 6 feet or more below the soil surface. The available water capacity is low to moderate. Plants generally suffer from a shortage of water during dry periods in summer and fall of most years. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Briley soils. Briley soils are in positions similar to those of the McLaurin soil. They are sandy from the soil surface to a depth of 20 inches or more below the surface. The included soils make up about 15 percent of the map unit.

This McLaurin soil is used mainly as woodland. A small acreage is used as cropland or pastureland.

This soil is well suited to the production of loblolly pine and shortleaf pine. It has few limitations for producing and harvesting timber; however, tree growth is limited somewhat because of soil droughtiness. The site index for loblolly pine is 83. Organic matter is conserved on this soil by restricting burning and leaving slash well distributed.

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

This soil is moderately well suited to pasture. The main limitations are low fertility, soil droughtiness, and the hazard of erosion. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, and crimson clover. Proper grazing, weed control, and lime and fertilizer help to ensure maximum quality of forage.

This soil is moderately well suited to crops. The main limitations are low fertility, low to moderate available water capacity, and the hazard of erosion. This soil is very friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. Erosion can be reduced if fall grain or winter pasture grasses are seeded early, conservation tillage is used, and tillage and seeding are on the contour or across the slope. Also, waterways can be shaped and seeded to perennial grass. Crops respond well to lime and fertilizer, which improve soil fertility and reduce the high levels of exchangeable aluminum.

This soil is well suited to urban development; however, steepness of slope and seepage are limitations. Revegetating disturbed areas around construction sites as soon as possible helps to control soil erosion. Cutbanks are not stable and are subject to slumping. The bottom of sewage lagoons should be coated with impervious material to reduce seepage and prevent the contamination of nearby ground water.

This soil is moderately well suited to intensive recreational uses. The main limitation is steepness of slope. Maintaining a good vegetative cover in intensively used areas, such as playgrounds, helps to control erosion. The cover can be maintained by adding fertilizer, irrigation, and by controlling traffic.

This McLaurin soil is in capability subclass IIIe. The woodland ordination symbol is 8A.

MeB—Metcalf very fine sandy loam, 0 to 2 percent slopes

This soil is nearly level and somewhat poorly drained. It is on broad ridgetops on uplands. The areas of this soil range from 20 to 400 acres.

Typically, the surface layer is brown very fine sandy loam about 3 inches thick. The subsurface layer is light yellowish brown very fine sandy loam about 5 inches thick. The subsoil to a depth of about 29 inches is yellowish brown, mottled loam and silty clay loam. The next layer between depths of 29 and 36 inches is light brownish gray, mottled silt loam and light gray silt. The subsoil between depths of 36 and 65 inches is light brownish gray, mottled clay and silty clay.

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to 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 about 1.5 to 2.5 feet below the surface during December through April. The available water capacity is high. The shrink-swell potential is high in the lower part of the subsoil.

Included with this soil in mapping are a few small areas of Guyton, Keithville, and Sacul soils. Guyton soils are on stream terraces and on flood plains. They are poorly drained and gray throughout the profile. Keithville and Sacul soils are at a higher elevation than the Metcalf soil. Keithville soils do not have tongues on the subsurface layer that extend into the subsoil. Sacul soils have a subsoil that is clayey in the upper part. The included soils make up about 10 percent of the map unit.

This Metcalf soil is used mainly as woodland. A small acreage is used as pastureland or cropland.

This soil is moderately well suited to the production of loblolly pine, shortleaf pine, Shumard oak, and cherrybark oak. The site index for loblolly pine is 92. Wetness limits the use of equipment. Also, competition from understory plants is severe, and the hazard of windthrow is moderate. Conventional methods of harvesting timber generally are suitable, but the soil can be compacted if it is wet and heavy equipment is used. Planting and harvesting should be scheduled during dry periods to reduce rutting and soil compaction. If site preparation is not adequate, competition from undesirable plants can prevent or prolong reestablishment of trees.

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

This soil is well suited to pasture; however, wetness and low fertility are the limitations. Suitable pasture plants are bahiagrass, common bermudagrass, improved bermudagrass, white clover, southern winter peas, vetch, and tall fescue. Proper stocking, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition. Fertilizer and lime improve the soil for grasses and legumes.

This soil is moderately well suited to cultivated crops. Low fertility, wetness, and potentially toxic levels of exchangeable aluminum in the root zone are the main limitations. The main suitable crops are soybeans, corn, and small grains. Shallow ditches and adequate outlets help to remove excess surface water. Conservation tillage and returning all crop residue to the soil or regularly adding other organic matter improves fertility and helps to maintain tilth and content of organic matter. Crops respond well to lime and fertilizer, which help to overcome the low fertility and reduce the high levels of exchangeable aluminum.

This soil is poorly suited to urban development. Wetness, very slow permeability, and low strength for local roads and streets are the main limitations. Excess water can be removed by constructing shallow ditches and by providing the proper grade. A seasonal high water table and very slow permeability increase the possibility for septic tank absorption fields to fail. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Roads should be designed to overcome the limited ability of the soil to support a load.

This soil is poorly suited to intensive recreational uses. Wetness and very slow permeability are the main limitations. Excess water can be removed by using shallow ditches and providing the proper grade.

This Metcalf soil is in capability subclass IIw. The woodland ordination symbol is 10W.

OkC—Oktibbeha silty clay loam, 1 to 5 percent slopes

This soil is moderately well drained and gently sloping. It is on ridgetops on uplands. The areas of this soil range from 29 to 150 acres.

Typically, the surface layer is dark brown silty clay loam about 3 inches thick. The subsoil to a depth of about 32 inches is yellowish red clay in the upper part; red and yellowish brown clay in the middle part; and olive yellow, olive, and yellowish red clay in the lower part. The subsoil is mottled throughout. The substratum to a depth of about 60 inches is light olive brown and olive brown clay.

This soil has low fertility. 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 more than 6 feet below the surface throughout the year. The available water capacity is moderate. Plants suffer from a shortage of water during dry periods in summer and fall of some years. The shrink-swell potential is high.

Included with this soil in mapping are a few small areas of Bellwood, Keithville, Mahan, Sacul, and Vaiden soils. All of these soils, except Vaiden soils, are acid throughout. Vaiden soils are brownish throughout the profile. Bellwood and Keithville soils are at a lower elevation than the Oktibbeha soil. Mahan and Sacul soils are at a higher elevation than the Oktibbeha soil. Vaiden soils are in positions similar to those of the Oktibbeha soil. The included soils make up about 15 percent of the map unit.

This Oktibbeha soil is used mainly as woodland. A small acreage is used as pastureland or homesites.

This soil is moderately well suited to the production of loblolly pine and shortleaf pine. The understory vegetation is mainly American beautyberry, sumac, greenbriar, and waxmyrtle. On the basis of a 50-year site curve, the mean site index for loblolly pine is 76. The main limitations for managing timber are a moderate equipment use limitation, moderate seedling mortality, and moderate plant competition. Conventional methods of harvesting timber generally can be used except sometimes during rainy periods, generally from December to April. Logging roads require surfaces that are suitable for year-round use. Soil compaction can be reduced by using suitable logging systems, laying out skid trails in advance, and harvesting timber when the soil is least susceptible to compaction. Competing vegetation can be controlled and seedling survival improved by proper site preparation. Spraying, cutting, or girdling eliminates unwanted weeds, brush, or trees.

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

This soil is moderately well suited to pasture. The main limitations are low fertility and the hazard of erosion. Soil droughtiness somewhat limits the growth of pasture plants. The main suitable pasture plants are common bermudagrass, bahiagrass, and crimson clover. Grazing when the soil is wet causes puddling, compaction of the surface layer, and reduced forage production. Where practical, seedbed preparation should be on the contour or across the slope to reduce erosion. Lime and fertilizer help to overcome the low fertility and promote good growth of forage plants. Proper stocking, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition.

This soil is moderately well suited to cultivated crops. The main limitations are low fertility, severe hazard of erosion, and moderate available water capacity. The main suitable crops are soybeans, grain sorghum, and small grains. This soil is difficult to keep in good tilth and can be worked only within a narrow range of moisture content. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Other practices that can be used to control erosion include early fall seedling, minimum tillage, terraces, diversions, and grassed waterways. All tillage should be on the contour or across the slope. Most crops respond well to fertilizer and lime, which improve fertility.

This soil is poorly suited to urban development. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are very slow permeability, high shrink-swell potential, and low strength for roads and streets. If buildings are constructed on this soil, properly designing foundations and footings and diverting runoff away from buildings help to prevent the structural damage caused by shrinking and swelling. The effects of shrinking and swelling can also be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. Septic tank absorption fields do not function properly during rainy periods because of very slow permeability. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Roads and streets can be designed to compensate for the limited capacity of the subsoil to support a load. Establishing and maintaining the plant cover can be achieved through proper fertilizing, seeding, mulching, and shaping of the slopes.

This soil is poorly suited to intensive recreational uses. The main limitation is very slow permeability of the subsoil. The slope is an additional limitation for playgrounds. Good drainage improves 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 cover can be maintained by adding fertilizer and by controlling traffic.

This Oktibbeha soil is in capability subclass IIIe. The woodland ordination symbol is 7C.

OKE—Oktibbeha silty clay loam, 5 to 15 percent slopes

This soil is strongly sloping and moderately well drained. It is on side slopes on uplands. The areas of this soil range from 49 to 300 acres. Fewer observations were made than in most other map units. The detail in mapping, however, is adequate for the expected use of the soil.

Typically, the surface layer is dark brown silty clay loam about 3 inches thick. The subsoil to a depth of about 32 inches is yellowish red clay in the upper part; red and yellowish brown clay in the middle part; and olive yellow, olive, and yellowish red clay in the lower part. The subsoil is mottled throughout. The substratum to a depth of about 60 inches is light olive brown clay in the upper part; light olive brown, mottled clay in the middle part; and olive, mottled clay in the lower part.

This soil has low fertility. 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 more than 6 feet below the surface throughout the year. The available water capacity is moderate. Plants suffer from a shortage of water during dry periods in summer and fall of some years. The shrink-well potential is high.

Included with this soil in mapping are a few small areas of Bellwood, Mahan, Sacul, and Vaiden soils. All of these soils, except Vaiden soils, are acid throughout. Vaiden soils are brownish throughout the profile. Bellwood and Keithville soils are at a lower elevation than the Oktibbeha soil. Mahan and Sacul soils are at a higher elevation than the Oktibbeha soil. Vaiden soils are on nearly level, broad ridgetops. The included soils make up about 15 percent of the map unit.

This Oktibbeha soil is used mainly as woodland. A small acreage is used as pastureland or homesites.

This soil is moderately well suited to the production of loblolly pine and shortleaf pine. The understory vegetation is mainly American beautyberry, sumac, greenbriar, and waxmyrtle. On the basis of a 50-year site curve, the mean site index for loblolly pine is 76. The main limitations for managing timber are a moderate equipment use limitation caused by the clayey subsoil, moderate seedling mortality, and moderate plant competition. Conventional methods of harvesting timber generally can be used except sometimes during rainy periods, generally from December to April. Logging roads require surfaces that are suitable for year-round use. Soil compaction can be reduced by using suitable logging systems, laying out skid trails in advance, and harvesting timber when the soil is least susceptible to compaction. Seedling survival is improved by controlling plant competition. Competing vegetation can be controlled by proper site preparation. Spraying, cutting, or girdling eliminates unwanted weeds, brush, or trees.

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

This soil is poorly suited to pasture. The main limitations are low fertility and the severe hazard of erosion. In addition, soil droughtiness somewhat limits plant growth. The main pasture plants are common bermudagrass, bahiagrass, and crimson clover. Grazing when the soil is wet causes puddling, compaction of the surface layer, and reduced forage production. Where practical, seedbed preparation should be on the contour or across the slope to reduce erosion. Lime and fertilizer help to overcome the low fertility and promote good growth of forage plants. Proper stocking, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition.

This soil generally is not suited to cultivated crops. The hazard of erosion is too severe for this use.

This soil is poorly suited to urban development. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are very slow permeability, steepness of slope, high shrink-well potential, and low strength for roads and streets. If buildings are constructed on this soil, properly designing foundations and footings and diverting runoff away from buildings help to prevent the structural damage caused by shrinking and swelling. The effects of shrinking and swelling also can be minimized by using proper engineering designs and by backfilling with material that has low shrink-well potential. Septic tank absorption fields do not function properly during rainy periods because of wetness and very slow permeability. Lagoons or self-contained disposal units may be used to dispose of sewage properly. Roads and streets can be designed to compensate for the limited capacity of the subsoil to support a load. Establishing and maintaining the plant cover can be achieved through proper fertilizing, seeding, mulching, and shaping of the slopes.

This soil is poorly suited to intensive recreational uses. The main limitations are very slow permeability and the severe hazard of erosion. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover. The cover can be maintained by adding fertilizer and by controlling traffic.

This Oktibbeha soil is in capability subclass VIe. The woodland ordination symbol is 7C.

RuC—Ruston fine sandy loam, 1 to 5 percent slopes

This soil is gently sloping and well drained. It is on narrow ridgetops on uplands. The areas of this soil range from about 50 to 250 acres.

Typically, the surface layer is dark grayish brown fine sandy loam about 6 inches thick. The subsurface layer is pale brown fine sandy loam about 8 inches thick. The subsoil to a depth of about 30 inches is yellowish red sandy clay loam in the upper part and red sandy clay loam in the lower part. The next layer to a depth of about 50 inches is yellowish red sandy loam and light yellowish brown fine sandy loam. The subsoil to a depth of about 80 inches is red fine sandy loam in the upper part and red sandy clay loam in the lower part.

This soil has low fertility and moderately high levels of exchangeable aluminum that are potentially toxic to crops. Water and air move through the subsoil at a moderate rate. Water runs off the surface at a medium rate. A seasonal high water table is at a depth greater than 6 feet from the surface. This soil dries quickly after rains. The available water capacity is moderate to high. Plants generally suffer from a shortage of water during dry periods in summer and fall of some years. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Bowie, Briley, and Sacul soils. The moderately well drained Bowie soils are in slightly lower positions than the Ruston soil and have more than 5 percent plinthite in the subsoil. Briley soils are in positions similar to those of the Ruston soil and are sandy from the surface to a depth of 20 to 40 inches below the surface. Sacul soils are in slightly lower positions than the Ruston soil and have a loamy and clayey subsoil. The included soils make up about 15 percent of the map unit.

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

This soil is well suited to the production of loblolly pine and shortleaf pine. It has few limitations for producing and harvesting timber. The site index for loblolly pine is 84.

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

This soil is well suited to pasture; however, low fertility is a limitation, and erosion is a hazard. Seedbed preparation should be on the contour or across the slope where practical. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, and crimson clover. Proper stocking and

Figure 2.—This area of Ruston fine sandy loam, 1 to 5 percent slopes, is being prepared for corn.

pasture rotation help to keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is moderately well suited to cultivated crops. The main limitations are low fertility, steepness of slope, and potentially toxic levels of exchangeable aluminum in the root zone. The hazard of erosion is moderate. The main suitable crops are corn, soybeans, and grain sorghum (fig. 2). Garden crops are successfully grown in places. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of 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 and control erosion. Minimum tillage also helps to maintain soil tilth and content of organic matter and control erosion. Crops respond well to fertilizer and lime, which improve soil fertility and reduce the levels of exchangeable aluminum.

This soil is well suited to urban development; however, steepness of slope, moderate permeability, and low strength for roads and streets are limitations. Also, this soil has slight limitations for dwellings, moderate limitations for local roads and streets, and slight to severe limitations for most sanitary facilities. Preserving the existing plant cover during construction helps to control erosion. Roads should be designed to offset the limited ability of the soil to support a load. Where septic tank absorption fields are installed, the limitation of moderate permeability can be overcome by increasing the size of the absorption field.

This soil is well suited to intensive recreational uses; however, the slope is a limitation for playgrounds. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining an adequate plant cover.

This Ruston soil is in capability subclass IIIe. The woodland ordination symbol is 8A.

ScC—Sacul fine sandy loam, 1 to 5 percent slopes

This soil is gently sloping and moderately well drained. It is on convex ridgetops on uplands. The areas of this soil are irregular in shape and range from 20 to 500 acres.

Typically, the surface layer is dark grayish brown fine sandy loam about 3 inches thick. The subsurface layer is brown fine sandy loam about 2 inches thick. The subsoil to a depth of about 60 inches is red clay in the upper part, light brownish gray silty clay in the middle part, and light brownish gray silty clay loam and silt loam in the lower part. The subsoil is mottled throughout.

This soil has low fertility and moderately high to high levels of exchangeable aluminum that are potentially toxic to 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 2 to 4 feet below the surface from December to April. The available water capacity is high. The shrink-swell potential is high.

Included with this soil in mapping are a few small areas of Bowie, Mahan, and Metcalf soils. Bowie and Mahan soils are at a higher elevation than the Sacul soil. Bowie soils are loamy throughout the profile. Mahan soils do not have gray mottles in the upper part of the subsoil. Metcalf soils are at a lower elevation than the Sacul soil and have a subsoil that is loamy in the upper part and clayey in the lower part. The included soils make up about 15 percent of the map unit.

This Sacul soil is used mainly as woodland. A small acreage is used as pastureland or cropland.

This soil is moderately well suited to the production of loblolly pine and shortleaf pine. The site index for loblolly pine is 84. The main concerns for producing and harvesting timber are the hazard of soil compaction, a moderate equipment use limitation, moderate hazard of windthrow, and moderate plant competition. Rutting and soil compaction can be minimized by logging during the drier seasons. Competing vegetation can be controlled by proper site preparation and by spraying, cutting, or girdling to eliminate unwanted weeds, brush, or trees.

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

This soil is moderately well suited to pasture; however, low fertility is a limitation. Erosion can be a hazard when the soil is tilled and until pasture plants are established. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, crimson clover, and ryegrass (fig. 3). Fertilizer and lime help to ensure optimum production of forage. All tillage should be on the contour to control erosion. Proper stocking and pasture rotation help to keep the pasture in good condition.

This soil is poorly suited to cultivated crops. The main limitations are low fertility and potentially toxic levels of exchangeable aluminum in the root zone. The main hazard is erosion. Suitable crops are cotton, soybeans, and corn. Erosion can be reduced by managing crop residue, stripcropping, contour farming, and terracing. Most crops respond well to lime and fertilizer, which help to overcome the low fertility and reduce the levels of exchangeable aluminum.

This soil is poorly suited to urban development. The main limitations are the clayey subsoil, wetness, slow permeability, high shrink-swell potential, and low strength for roads and streets. A seasonal high water table and

Figure 3.—Bahiagrass in an area of Sacul fine sandy loam, 1 to 5 percent slopes.

slow permeability are severe limitations if this soil is used as septic tank absorption fields. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Buildings and roads should be designed to withstand the effects of shrinking and swelling of the soil. Roads should be designed to offset the limited ability of the soil to support a load.

This soil is moderately well suited to intensive recreational uses. Wetness and slow permeability are the main limitations. The slope is also a limitation for playgrounds. Excess water on the surface can be removed by using shallow ditches or providing the proper grade. Erosion can be controlled by maintaining a good plant cover.

This Sacul soil is in capability subclass IVe. The woodland ordination symbol is 8C.

SCE—Sacul fine sandy loam, 5 to 20 percent slopes

This soil is strongly sloping and moderately well drained. It is on side slopes on uplands. The areas of this soil are irregular in shape and range from 40 to 350 acres. Fewer observations were made than in most other map units. 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 2 inches thick. The subsurface layer is brown fine sandy loam about 3 inches thick. The subsoil extends to a depth of about 52 inches. From top to bottom, the layers are red clay, yellowish red clay, light brownish gray clay, and light brownish gray and yellowish red sandy clay loam. The subsoil is mottled throughout.

The substratum to a depth of about 65 inches is stratified light brownish gray sandy clay loam and yellowish red sandy loam.

This soil has low fertility and moderately high to high levels of exchangeable aluminum that are potentially toxic to crops. Permeability is slow. Water runs off the surface at a rapid rate. A seasonal high water table is 2 to 4 feet below the surface from December to April. The available water capacity is high. The shrink-swell potential is high.

Included with this soil in mapping are a few small areas of Bowie and Mahan soils. Bowie and Mahan soils are at a higher elevation than the Sacul soil. Bowie soils are loamy throughout the profile. Mahan soils do not have gray mottles in the upper part of the subsoil. The included soils make up about 15 percent of the map unit.

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

This soil is moderately well suited to the production of shortleaf pine and loblolly pine. The main limitations to producing and harvesting timber are the risk of soil compaction, the hazard of windthrow, and plant competition. Conventional methods of harvesting trees generally can be used; however, logging should be done during the drier seasons to prevent rutting and soil compaction. Competing vegetation can be controlled by proper site preparation and by spraying, cutting, or girdling to eliminate unwanted weeds, brush, or trees.

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

This soil is poorly suited to pasture. The main limitations are the hazard of erosion and low natural fertility. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, crimson clover, and ryegrass. Native grasses are best suited to the more sloping areas where seedbed preparation is difficult. Proper grazing, weed control, and fertilizer are needed for maximum quality of forage.

This soil generally is not suited to cultivated crops. The hazard of erosion is too severe for this use.

This soil is poorly suited to urban development. The main limitations are slow permeability, steepness of slope, wetness, the clayey subsoil, high shrink-swell potential, and low strength for roads. Revegetating disturbed areas around construction sites as soon as possible helps to control soil erosion. Establishing and maintaining plant cover can be achieved through proper fertilizing, seeding, mulching, and shaping of the slopes. A seasonal high water table and slow permeability increase the possibility for septic tank absorption fields to fail. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Buildings and roads can be designed to offset the effects of shrinking and swelling and the limited ability of the soil to support a load.

This soil is moderately well suited to intensive recreational uses. It is limited mainly by slow permeability and steepness of slope. Cuts and fills should be seeded or mulched to reduce erosion. Plant cover can be maintained by adding fertilizer and by controlling traffic.

This Sacul soil is in capability subclass VIe. The woodland ordination symbol is 8C.

VaB—Vaiden silty clay loam, 0 to 2 percent slopes

This soil is nearly level and somewhat poorly drained. It is on broad ridgetops on uplands. The areas of this soil are irregular in shape and range from 5 to 350 acres. Slopes are generally long and smooth.

Typically, the surface layer is dark grayish brown silty clay loam about 2 inches thick. The subsoil to a depth of about 32 inches is yellowish brown clay in the upper part; yellowish brown, mottled clay in the middle part; and light olive brown, mottled clay in the lower part. The substratum to a depth of about 65 inches is light olive brown, mottled clay in the upper and middle parts and olive brown, mottled clay in the lower part.

This soil has low fertility and moderately high levels of exchangeable aluminum that are potentially toxic to crops. Water and air move through this soil at a very slow rate. Water runs off the surface at a slow rate. A seasonal high water table ranges from about 1 to 2 feet below the surface during December through April. The available water capacity is moderate. Plants suffer from a shortage of water during dry periods in summer and fall of some years. The surface layer of this soil remains wet for long periods after heavy rains. The shrink-swell potential is very high.

Included with this soil in mapping are a few small areas of Bellwood, Frizzell, Keithville, Mahan, Metcalf, and Sacul soils. All of these soils are acid throughout. Bellwood soils are in positions similar to those of the Vaiden soil. Frizzell soils are on stream terraces. Keithville, Mahan, and Metcalf soils are in higher positions than the Vaiden soil. Sacul soils are at a lower elevation than the Vaiden soil. The included soils make up about 15 percent of the map unit.

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

This soil is moderately well suited to the production of loblolly pine and eastern red cedar. The site index for loblolly pine is 79. The main limitations for the management of timber are a restricted use of equipment, soil compaction, seedling mortality, and plant competition caused by wetness. Because the clayey soil is sticky when wet, trafficability is poor when the soil is wet. Unsurfaced roads and skid trails are sticky and slippery when wet or moist and can be impassable during rainy periods. After harvesting, reforestation can be carefully managed to reduce competition from undesirable understory plants. Competing vegetation can be controlled by proper site preparation. Spraying, cutting, or girdling eliminates unwanted weeds, brush, or trees. Site preparation, such as chopping, burning, herbicide application, and bedding, reduces debris, controls immediate plant competition, and facilitates mechanical planting.

This soil is well suited to use as habitat for woodland wildlife. Habitat for wildlife can be improved by planting appropriate vegetation or by promoting the natural establishment of desirable plants. Prescribed burning every three years can increase the amount of palatable browse for deer and seed-producing plants for use by turkey and quail.

This soil is moderately well suited to pasture. The main limitations are low fertility and wetness. The main suitable pasture plants are improved bermudagrass, bahiagrass, crimson clover, and ryegrass. Lime and fertilizer help to overcome the low fertility and promote good growth of forage plants. Proper stocking, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good condition. Periodic mowing and clipping help to maintain uniform growth, discourage selective grazing, and reduce clumpy growth.

This Vaiden soil is moderately well suited to cultivated crops. Wetness, poor tilth, low fertility, and potentially toxic levels of exchangeable aluminum in the root zone are the main limitations. Field ditches and adequate outlets can remove excess surface water. Conservation tillage and returning all crop residue to the soil or regularly adding other organic matter improves fertility and helps to maintain soil tilth and content of organic matter. Most crops respond well to fertilizer and lime, which improve soil fertility and reduce the levels of exchangeable aluminum.

This soil is poorly suited to urban development. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. Wetness, very slow permeability, very high shrink-swell potential, and low strength for roads and streets are the main limitations. Drainage can improve this soil for roads and buildings. Roads should be designed to offset the limited ability of the soil to support a load. A high water table and very slow permeability increase the possibility for septic tank absorption fields to fail. Lagoons or self-contained disposal units can be used to dispose of sewage properly. 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 intensive recreational uses. It is limited mainly by the silty clay loam surface layer, wetness, and very slow permeability. Excess water on the surface can be removed by using shallow ditches and by providing the proper grade. The surface layer is slightly sticky when wet and compacts easily where traffic is heavy.

This Vaiden soil is in capability subclass IIIW. The woodland ordination symbol is 8C.

Prime Farmland

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

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

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

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

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

The following map units are considered prime farmland in Jackson Parish. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in 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.

Some soils that have a high water table and all soils that are frequently flooded during the growing season qualify as prime farmland only in areas where these limitations have been overcome by drainage measures or flood control. Only those soils are listed, however, that have few limitations and need no additional improvements to qualify as prime farmland.

The soils identified as prime farmland in Jackson Parish are:

BoC	Bowie fine sandy loam, 1 to 5 percent slopes
ChB	Cahaba fine sandy loam, 1 to 3 percent slopes
FzB	Frizzell-Guyton silt loams, 0 to 2 percent slopes
GuA	Guyton silt loam
KeC	Keithville very fine sandy loam, 1 to 5 percent slopes
MaC	Mahan fine sandy loam, 1 to 5 percent slopes
McB	McLaurin loamy fine sand, 1 to 3 percent slopes
MeB	Metcalf very fine sandy loam, 0 to 2 percent slopes
OkC	Oktibbeha silty clay loam, 1 to 5 percent slopes
RuC	Ruston fine sandy loam, 1 to 5 percent slopes
ScC	Sacul fine sandy loam, 1 to 5 percent slopes

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 suitabilities 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 suitabilities and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

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

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

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

Crops and Pasture

Charles M. Guillory, conservation agronomist, Natural Resources Conservation Service, helped to 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.

About 21,660 acres in Jackson Parish was in farms in 1987, according to the United States Census of Agriculture. About 1,970 acres was used for crops, mainly annual forage and hay crops and vegetables.

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 plant growth, drainage, and the hazard of flooding. Cropping systems and soil tillage are additional important parts of management. Each farm has a unique soil pattern; therefore, each has unique management problems. Some principles of farm management, however, apply to specific soils and certain crops. This section presents the general principles of management that can be widely applied to the soils of Jackson Parish.

Perennial grasses or legumes. Grasses, legumes, or mixtures of these are grown for pasture and hay. In 1987, about 1,000 acres in Jackson Parish was used for pasture. The mixtures generally consist of either a summer or a winter perennial grass and a suitable legume. In addition, many farmers seed small grains or ryegrass in the fall for winter and spring forage. Excess grass in summer is harvested as hay for the winter.

Common and improved bermudagrass and Pensacola bahiagrass are the summer perennials most commonly grown. Most of these grasses produce good quality forage when properly managed. Tall fescue, the main cool season perennial grass, grows well on soils that have a favorable moisture content. All of these grasses respond well to fertilizers, particularly nitrogen.

White clover, crimson clover, vetch, and winter peas are the most commonly grown legumes. All of these respond well to lime, particularly on acid soils.

Proper grazing is essential for high quality forage, stand survival, and erosion control. Brush and weed control, application of fertilizer and lime, and renovation of the pasture are also important.

Proper grazing includes withholding livestock until the plants have a good start in spring, controlling grazing height, rotating grazing, grazing at the best time, and periodically resting the pasture. The addition of fertilizer as needed helps to maintain an adequate supply of plant nutrients. Clipping helps to distribute grazing and stimulate even regrowth. Where the stand is thin, controlling weeds by mowing or spraying leaves more moisture and plant nutrients for desirable pasture plants.

Forage production can be increased by grazing the understory native plants in woodland. About 1,000 acres of woodland is grazed in Jackson Parish. Forage volume varies with the woodland site, the condition of native forage, and the density of the timber stand. Although most woodland is managed mainly for timber, substantial volumes of forage can be obtained if these areas are properly managed. Stocking rates and grazing periods need to be carefully managed for optimum forage production and to maintain an adequate cover of understory plants to control erosion.

Fertilizing and liming. The soils in Jackson Parish range from extremely acid to slightly acid in the upper 20 inches of the profile. Calcium content ranges from very low to low. Most of the soils contain quantities of exchangeable aluminum and manganese that are potentially toxic to some crops. The acidity of the surface layer and low levels of calcium necessitates that a judicious liming program be carried out to counteract the excessive levels of aluminum and manganese in the soils. Generally, the soils of Jackson Parish need lime and a complete fertilizer to improve them for crops. The amount of fertilizer needed depends upon the crop to be grown, on past cropping history, on the level of yield desired, and on the kind of soil. The amount should be based on the results of soil tests. Agricultural agencies in the parish can supply detailed information and instructions on collecting and testing soil samples.

Organic matter content. Organic matter is an important source of nitrogen for plant growth. It also increases the rate of water intake, reduces surface crusting, and improves tilth. Most of the cultivated soils in Jackson Parish are low in organic matter content. To a limited extent, organic matter can be maintained or improved by leaving plant residue on the surface, by growing crops that produce an abundance of foliage and root systems, by adding barnyard manure, and by growing perennial grasses and legumes in rotation with other crops.

Soil tillage. The major purpose of soil tillage is seedbed preparation and weed control. Excessive tillage should be avoided. A compacted layer can develop in the loamy soils if they are plowed at the same depth for long periods or if they are plowed when the soil is wet. The compacted layer, generally known as a traffic pan or plow pan, develops just below the plow layer. This condition can be avoided by not plowing when the soil is wet, by varying the depth of plowing, or by breaking the compacted layer by subsoiling or chiseling. Tillage implements that stir the surface but leave crop residue in place protect the soil from beating rains, thereby helping to control erosion, reduce runoff, and increase infiltration.

Drainage. A few of the soils in the parish need surface drainage to make them more suitable for crops and pasture. A properly designed system of field ditches can remove excess water from seasonally wet soils, such as the Frizzell soils; however, major flood-control structures are needed to protect the Guyton, Ouachita, and Ochlockonee soils.

Water for plant growth. The available water capacity of the soils in the parish range from low to very high, but in many years sufficient water is not available at the critical time for optimum plant growth unless irrigation is used. Rainfall is heavy in winter and spring. Sufficient rain generally falls in summer and autumn of most years; however, during dry periods in summer and autumn, most of the soils do not supply sufficient water for plants. 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 aid in weed control, a deep-rooted crop to utilize the fertility and maintain the permeability in the subsoil, and a close-growing crop to help maintain the organic matter content. The sequence of crops should keep the soil covered as much of the year as possible.

A suitable cropping system varies according to the needs of the farmer and the characteristics of the soil. Producers of livestock, for example, generally use cropping systems that have higher percentages of pasture and annual forages than the cropping system used on cash-crop farms. Very little cash-crop farming is done in Jackson Parish. Grasses and legumes can be grown as cover crops during the fall and winter.

Additional information on cropping systems can be obtained from the Natural Resources Conservation Service, the Cooperative Extension Service, or the Louisiana Agricultural Experiment Station.

Control of erosion. Erosion is a hazard on the uplands in Jackson Parish. It is not a serious problem on soils of the flood plains, mainly because the topography is level or nearly level. All of the soils of Jackson Parish, except the Betis, Briley, Ouachita, and Ochlockonee soils, have a claypan subsoil which restricts infiltration and increases runoff and erosion. Erosion is a particular problem on sloping areas of those soils when they are left without 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 are also lost.

Yields per Acre

The average yields per acre that can be expected of the principal pasture grasses under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

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

The management needed to obtain the indicated yields of the various pasture grasses depends on the kind of soil and the pasture grass. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding grass 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 grass; effective use of residue and barnyard manure; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal pasture grasses. 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.

Grasses and legumes other than those shown in the table are grown in the survey area, but estimated yields are not listed because the acreage of such grasses and legumes 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 grasses and legumes.

Land Capability Classification

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

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 subclass indicated by *w*.

Woodland Management and Productivity

Donald J. Lawrence, area forester, Natural Resources Conservation Service, helped to prepare this section.

This section provides information on the relation between trees and their environment, particularly trees and the soils in which they grow. It includes information on the kind, amount, and condition of woodland resources in

Jackson Parish. This section also includes soils interpretations in planning.

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

These soil, climate, and landscape characteristics, in combination, largely determine the forest stand species composition and influence management and utilization decisions. Sweetgum, for example, is tolerant of many soils and sites, but grows best on rich, moist, alluvial loamy soils of river bottoms. Use of heavy logging and site preparation equipment is more restricted on clay soils or soils with a clayey subsoil, such as the Bellwood soils, than on better drained sandy or loamy soils, such as the Betis, Briley, Ruston, or Cahaba soils.

Trees, such as the oaks, grow on a variety of soils. White oak grows on well drained flood plains, terrace ridges, uplands, coves, and well drained second bottoms. This species grows best on well drained, loamy soils; however, willow oak and water oak grow well on many alluvial soils and on well drained, loamy ridges. Swamp chestnut oak (cow oak) is widely distributed on well drained, loamy, first bottom ridges and thrives on well drained, loamy terraces and colluvial sites on the bottom lands of both large and small streams. At the other extreme, on uplands, southern red oak can grow well on dry, sandy soils, such as the Betis and Briley soils; or it can grow on more clayey soils, such as the Mahan and Sacul soils. Post oak is well adapted to uplands and grows on rocky ridges, outcroppings of sand, and southern exposures.

Loblolly pine and shortleaf pine are the predominant and most widely grown trees in Jackson Parish, in terms of board feet of sawtimber and cubic feet of growing stock. These species of pine trees grow well on a variety of soils and they can occupy similar sites. For these reasons, they are widely distributed and closely intermingled in the parish.

Loblolly pine grows best on soils with imperfect to poor surface drainage, a thick, medium-textured surface layer, and a fine-textured subsoil. It attains its highest site index on soils of stream bottoms and terraces. Its poorest growth is on shallow soils, very wet sites, and eroded soils.

Shortleaf pine grows well on well drained sandy loams. The least productive sites are the shallow soils, wet sites, and eroded soils. Site indexes at age 50 on the better sites may exceed 100 and be as low as 33 on poor sites. Shortleaf pine does not grow well on alkaline soils or soils that have a high content of calcium.

Woodland Resources

Jackson Parish has about 334,800 acres of commercial woodland or timberland *(33)*. These timbered acres make up about 92 percent of the total land area. Commercial woodland is defined as that producing or capable of producing crops of industrial wood and not withdrawn from timber use. Several wood-using or wood-associated industries are in Jackson Parish. About 57 percent of the commercial woodland is owned by the forest industry, 3 percent by corporations, and 40 percent by individuals.

About 16,000 acres of the Jackson-Bienville Wildlife Management Area's 30,845-acre tract is in the northwest corner of Jackson Parish. This area is predominantly hilly pine land. Hardwood trees are on the narrow stream bottoms.

Commercial woodland may be further divided into forest types *(33)*. Types can be based on tree species, site quality, or age. As used in this survey, forest types are stands of trees of similar character, composed of the same species, and growing under the same ecological and biological conditions. The forest types are named for the dominant trees.

The *longleaf-slash pine* forest type makes up about 5,300 acres of the forest land in Jackson Parish. This acreage has been planted.

The *loblolly-shortleaf pine* forest type makes up about 138,200 acres of the forest land in the parish. About 65 percent of this forest type is natural and 35 percent is planted. Loblolly pine generally is dominant except on drier sites. Scattered hardwoods, such as sweetgum, blackgum, southern red oak, post oak, water oak, white oak, mockernut hickory, and pignut hickory, can be mixed with pines on well drained soils. On the more moist sites, sweetgum, red maple, water oak, and willow oak can be mixed with the pines. American beech and ash are associated with this forest type along stream bottoms.

The *oak-pine* forest type makes up about 69,100 acres of the forest land in the parish. On the drier sites, the hardwood components tend to be post oak, southern red oak, white oak, sweetgum, blackgum, mockernut hickory, and pignut hickory. On the more moist sites, sweetgum, red maple, water oak, willow oak, American beech, and ash are associated with this forest type along stream bottoms.

The *oak-gum-cypress* forest type makes up about 37,200 acres of the forest land in the parish. This forest type is on the bottom lands of major streams. Dominant trees are blackgum, sweetgum, oak, and baldcypress. Associated trees are willow, ash, maple, and elm.

The *oak-hickory forest* type makes up about 85,000 acres of the forest land in the parish. Upland oaks or hickory, singly or in combination, make up a plurality of the stocking. Common associates are maple and elm.

The volume of growing stock in Jackson Parish is about 64 percent pine and 36 percent hardwood. The marketable timber is about 74 percent pine and 26 percent hardwood. About 48 percent of the forest acreage is sawtimber, 34 percent is seedlings and saplings, and 15 percent is pole timber. The remaining 3 percent is classified as "non-stocked areas."

The productivity of forest land is the amount of wood produced per acre per year measured in cubic feet. In Jackson Parish, about 13 percent of the stocked forest land produces 165 cubic feet or more per acre, 40 percent produces 120 to 165 cubic feet per acre, 40 percent produces 85 to 120 cubic feet per acre, and 7 percent produces 50 to 80 cubic feet per acre.

The importance of timber production to the economy of the parish is significant. Most of the upland pine sites are owned by the forest industry and are generally well managed. However, the small, privately-owned tracts and most of the bottom land areas are producing well below potential and would benefit if stands were improved by thinning out mature and undesirable species. Protection from overgrazing, fire, insects, and diseases; tree planting; and timber stand improvement are needed to improve stands.

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

Environmental Impact

Woodland is valuable for wildlife habitat, recreation, natural beauty, forage, and conservation of soil and water. The commercial forest land of Jackson Parish provides food and shelter for wildlife and offers opportunity for sport and recreation to many users annually. Hunting and fishing clubs in the parish lease or otherwise use the forest land. Forest land provides watershed protection, helps to arrest soil erosion and reduce sedimentation, and enhances the quality and value of water resources.

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 landscape. They produce fruits and nuts for use by people as well as wildlife. Trees and forests help filter out airborne dust and other impurities, convert carbon dioxide into life-giving oxygen, release moisture to the atmosphere, and provide shade from the sun's hot rays.

Woodland Production

This soil survey 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 7 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate,* and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

The table 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 *W* indicates a soil in which excessive water, either seasonal or year-round, causes a significant limitation. 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 *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: W, C, and S.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as wetness and susceptibility of the surface layer to compaction. The rating is *slight* if equipment use is restricted by wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if wetness restricts equipment use from 2 to 6 months per year or if special equipment is needed to prevent or minimize compaction. The rating is *severe* if wetness restricts equipment use for more than 6 months per year or if special equipment is needed to prevent or minimize compaction. Ratings of moderate or severe indicate a need to choose the 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 periods when the water table is high, and rock fragments in the surface layer. The mortality rate generally is highest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of moderate or severe indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, installing a surface drainage system, and providing artificial shade for seedlings. Reinforcement planting is often needed if the risk is moderate or severe.

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

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* and a *volume* number. 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 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 are based on the site index that was determined at age 30 years for eastern cottonwood, 35 years for American sycamore, and 50 years for all other species.

The *productivity class* represents an expected volume produced by the most important trees, expressed in cubic meters per hectare per year calculated at the age of culmination of mean annual increment.

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

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

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

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

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

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

Wildlife Habitat

Richard W. Simmering, wildlife biologist, Natural Resources Conservation Service, helped to prepare this section.

The upland forests of pine or mixed pine and hardwood, bottom land forests of hardwood, and the many scattered open areas of pastureland provide habitat for a large and varied population of wildlife. The uplands are nearly level to strongly sloping and are dissected by numerous small stream bottoms. Wide flood plains subject to frequent overflow are adjacent to the Dugdemona River and other perennial streams. The interspersion of pine woodland, hardwood creek bottoms, and pastureland provide excellent habitat for many resident and nonresident wildlife species. Jackson Parish has high populations of white-tailed deer and eastern wild turkey. Moderate to high numbers of gray and fox squirrels, bobwhite quail, swamp rabbit, and eastern cottontail rabbit are also present. Woodlands that have a dense understory also provide good wintering habitat for migratory woodcock. Numerous songbirds and birds of prey also rely on woodlands for nesting and/or wintering habitat. Scattered colonies of the endangered red cockaded woodpecker also reside in pine forests throughout the parish.

The portion of the Jackson-Bienville Wildlife Management Area covering the parish provides some of the most biologically productive wildlife habitat in the parish. The area is managed by the Louisiana Department of Wildlife and Fisheries.

Nuts, berries, acorns, seeds, and foliage produced by plants are utilized by wildlife for food and cover. Trees beneficial to wildlife that are common to the parish include red oak, white oak, water oak, willow oak, American beech, loblolly pine, and hickory. Some valuable understory shrubs and vines are Japanese honeysuckle, blueberry, flowering dogwood, french mulberry, greenbrier, blackberry, dewberry, and arrowhead. Pasture grasses and garden crops also enhance the habitat.

Sound forestry and wildlife management practices are essential to sustain and improve habitat and high wildlife populations. Using prescribed burning in pine forests, establishing food plots, and thinning tree stands are practices which will have a positive effect on habitat.

Proper pasture and hayland management will benefit many species of wildlife. Establishing winter annuals, such as ryegrass, oats, or rye, will provide food for deer, turkey, and other wildlife during the winter months when native plants are dormant and food is scarce.

Numerous streams, rivers, farm ponds, and reservoirs support viable fisheries resources in the survey area (fig. 4). The lower reaches of Cypress Creek and Castor Creek and the Dugdemona River support low to moderate populations of fish, such as largemouth bass, spotted bass, channel and blue catfish, black and white crappie, and sunfish. Many farm ponds are stocked with game fish. Caney Lake, a newly constructed 5,000-acre impoundment, is being managed by the Louisiana Department of Wildlife and Fisheries. Game fish populations in this lake are excellent.

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

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning

Figure 4.—This pond is in a wooded area of Frizzell-Guyton silt loam, 0 to 2 percent slopes. It provides fishing opportunities and enhances the habitat for wetland and woodland wildlife.

parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

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

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

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

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

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

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

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

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

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, and slope. Examples of wetland plants are smartweed, wild millet, 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 oxbow lakes, waterfowl feeding areas, ponds, artificially flooded croplands, and greentree reservoirs.

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

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

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

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, 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, 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 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to 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, and shrinking and swelling can cause the movement of footings. Depth to a high water table and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

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

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

Sanitary Facilities

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

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

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

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

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

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

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. Slope can cause construction problems.

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

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

The ratings in the table are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a water table, slope, and flooding affect both types of landfill. Texture, stones, and soil reaction 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 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 soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over the water table to permit revegetation. The soil material used as 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 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

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

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

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by a high water table 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 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 or slopes of 15 to 20 percent. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10 or a high shrink-swell potential. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

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

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

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source.

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, and rock fragments.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones, have little or no gravel, and have slopes of less than 8 percent. They 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 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 or stones, 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 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and 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 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 organic matter. 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 layers that affect the rate of water movement, permeability, depth to a high water table, slope, and susceptibility to flooding. Excavating and grading and the stability of ditchbanks are affected by slope and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The performance of a system is affected by the depth of the root zone 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 and wetness affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Wetness and slope affect the construction of grassed waterways. A low available water capacity, restricted rooting depth, 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 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under 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 of 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

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

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

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

Physical and Chemical Properties

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

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

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

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

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water through the soil when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems 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 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 the table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Soil and Water Features

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

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the 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 a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

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

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

Frequency, duration, and probable dates of occurrence are estimated. Frequency 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 a 50 percent in any year). *Common* is used when the occasional and frequent classes are grouped for certain purposes. Duration is expressed as *very brief* (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 the table are the depth to the seasonal high water table; the kind of water table, that is, *perched* or *apparent*; and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in the table.

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

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 both the environmental factors and the physical and chemical properties of the soils that affect their potential for crop production. It also lists the analytical methods that were used to determine the chemical properties of the sampled soils.

Factors Affecting Crop Production

Crop composition and yield are a function of many environmental, plant, and soil factors.

Environmental factors:
• Light—intensity and duration
• Temperature—air and soil
• Precipitation—distribution and amount
• Atmospheric carbon dioxide concentration

Plant factors (species and hybrid specific):
• Rate of nutrient and water uptake
• Rate of growth and related plant functions

Soil factors—physical properties:
• Distribution—texture
• Structure
• Surface area
• Bulk density
• Water retention and flow
• Aeration

Soil factors—chemical properties and soil fertility:
• Quantity factor. This describes the concentration of a nutrient ion absorbed or held in exchangeable form on the solid phase of the soil. This form of nutrient ion also is available for plant uptake.
• Intensity factor. This describes the concentration of a nutrient ion in soil solution. Since plant roots absorb nutrients directly from soil solution, this factor quantifies the amount of a nutrient element immediately available for uptake.
• Quantity/Intensity relationship factor. This describes the relationship between the quantity and intensity factors and is sometimes called the buffer power. As the plant root absorbs 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 with the greater quantity factor will provide more nutrients during the growing season since it will be able to maintain the intensity factor level for a longer period.
• Replenishment factor. This describes 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.

The goal of soil testing is to provide information for a soil and crop management program that establishes and maintains optimum levels and balance of the essential elements in soil for crop and animal nutrition and that protects the environment against the buildup of potentially toxic levels of essential and nonessential elements. Current soil tests attempt to 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. Where crop production is clearly limited by the available supply of one or more nutrients, existing soil tests can generally diagnose the problem and reliable recommendations to correct the problem can be made. Soil management systems generally are based on physical and chemical alteration of the plow layer. Characteristics of this layer can vary from one location to another, depending upon management practices and soil use.

Subsurface horizons are less subject to change or change very slowly as a result of alteration of the plow layer. 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. Crop production is then limited by 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 soil reaction; organic matter content; extractable phosphorus; exchangeable cations of calcium, magnesium, potassium, sodium, aluminum, and hydrogen; total acidity; and cation-exchange capacity. The results are summarized in Table 17. More detailed information on chemical analysis of soils is available *(1, 8, 9, 10, 21, 22, 24, 25, 26, 31, 32, 38)*. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods *(36)*.

Reaction (pH)—1:1 soil/water solution (8Cla).
Organic matter—acid-dichromate oxidation (6A1a).
Extractable phosphorus—Bray 2 extractant (0.03 molar ammonium fluoride-0.1 molar hydrochloric acid).
Exchangeable cations—pH 7, 1 molar ammonium acetate-calcium (6N2), magnesium (602), 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 cations/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 soils developed and a relatively young age or a less intense degree of weathering of the soil profile. None of the soils in Jackson Parish are in this group.

The second type includes soils that have relatively low levels of available nutrients in the surface layer, but generally have increasing levels with 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 the crop roots are able to penetrate to the more fertile subsoil as the growing season progresses. The majority of the soils in Jackson Parish are in this group.

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 low fertility parent material, 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. Soils such as the Briley and Ochlockonee soils are in this group.

The fourth type includes soils that have relatively low levels of available nutrients throughout the soil profile. These soils developed from low fertility parent material, 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. The Betis soils are in this group.

Soil reaction and acidity, organic matter content, sodium content, and cation-exchange capacity also can provide evidence of the general nutrient distribution patterns in soils. Distribution patterns are the result of the interactions of parent material, weathering (climate), time, and to a lesser extent organisms and topography.

Nitrogen. Generally, over 90 percent of the nitrogen in the surface layer is in the form of organic nitrogen. Most of the nitrogen in the subsoil is in the form of fixed ammonium nitrogen. These forms of nitrogen are unavailable for plant uptake, but 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 for it. In most cases, nitrogen fertilizer recommendations are based on the nitrogen requirement of the crop rather than nitrogen soil test levels, since no reliable nitrogen soil tests have been developed for Louisiana soils.

Information on the nitrogen fertility status of a soil can be obtained by measuring several soil nitrogen parameters. These include 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. Unfortunately, since the amounts and rates of transformation of the various forms of nitrogen in the soils of Jackson Parish have not been determined, no assessment of the nitrogen fertility status for these soils can be given. However, fertilizer nitrogen recommendations obtained from the Louisiana Cooperative Extension Service may be used to determine application rates.

Phosphorus. Phosphorus exists 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. Soil solution concentrations of phosphorus are generally low. Since plant roots obtain almost all phosphorus from the soil solution, phosphorus uptake depends on the ability of the soil solid phase phosphorus to maintain phosphorus concentration in soil solution. Soil test procedures generally attempt to measure soil solution phosphorus, plus the readily available solid phase phosphorus that buffers the solution phase concentration.

The Bray 2 *(9, 25, 36)* extractant tends to extract more phosphorus than the commonly used Bray 1 *(9, 25, 36)*, Mehlich 1 *(9, 25, 36)*, and Olsen *(9, 25, 36)* extractants. The Bray 2 extractant provides an estimate of both the readily available and slowly available supply of phosphorus in soils. The Bray 2 extractable phosphorus content of most of the soils in Jackson Parish is uniformly low throughout the soil profile except where addition of fertilizer phosphorus has raised the level of extractable phosphorus in the surface layer. These low levels of available phosphorus are a limiting factor in crop production. Continual addition of fertilizer phosphorus to such soils is 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 within the crystal lattice of minerals. 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 exchangeable potassium content of the soils is an estimate of the supply available to plants. The available supply of potassium in the soils of Jackson Parish is very low to low throughout the soil profile. Low exchangeable potassium levels indicate a general lack of micaceous minerals, which are a source of exchangeable potassium during weathering.

Crops respond to fertilizer potassium if exchangeable potassium levels are very low to low. Low levels can be gradually built up by adding fertilizer potassium to soils that contain a sufficient amount of clay to hold the potassium. Exchangeable potassium levels can be maintained by adding enough fertilizer potassium to account for crop removal, fixation of exchangeable potassium to nonexchangeable potassium, and leaching losses. The soils in Jackson Parish that have a sandier texture, such as Betis and Briley soils, do not have a sufficient amount of clay to hold the potassium; therefore, they do not have a sufficiently high cation-exchange capacity to maintain adequate quantities of available potassium for sustained crop production. More frequent additions of potassium are needed to balance losses of potassium by leaching in these soils.

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 and exchangeable magnesium generally are readily available for plant uptake, whereas structural magnesium must be converted to exchangeable magnesium during mineral weathering reactions.

According to soil test interpretation guidelines, the exchangeable magnesium content of the soils of Jackson Parish is low, medium, or high, depending upon soil texture. Low exchangeable magnesium levels are found throughout most of the soil profile in soils such as the Betis soil. The Bowie, Mahan, Glenmora, and Guyton soils have low levels in the upper part of the profile and medium to high levels in the lower part. Variable levels throughout the profile are evident in the Mahan soils. Higher levels of exchangeable magnesium in certain soil horizons are generally associated with higher clay content in those horizons.

The levels of exchangeable magnesium in most of the soils in Jackson Parish are more than adequate for crop production, especially where the plant roots can exploit the high levels found 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 intake while structural calcium is not.

Calcium deficiencies in plants are extremely rare.

Calcium is normally added to soils from liming materials used to correct problems associated with soil acidity.

Some soils in Jackson Parish, such as Oktibbeha and Vaiden soils, have low levels of exchangeable calcium in the upper part of the profile and medium to high levels in the lower part. Still other soils, such as Bellwood and Sacul soils, have variable levels throughout the soil profile. The higher levels of exchangeable calcium in the surface layer are normally associated with a higher soil reaction than in the subsoil and are probably the result of applications of lime to control soil acidity. Higher exchangeable calcium levels in the subsoil than in the surface layer generally are associated with a higher clay content in the subsoil.

Calcium is normally the most abundant exchangeable cation in soils; however, the exchangeable magnesium levels in the subsoil of the Bellwood, Bowie, Guyton, and Keithville soils 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, while low organic matter content can lead to many problems. Increasing the organic matter content can greatly improve the soil's structure, drainage, and other physical properties. It can also increase the moisture-holding capacity, cation-exchange capacity, and nitrogen content.

Increasing the organic matter content is very difficult because organic matter is continually subject to microbial degradation. This is especially true in Louisiana where higher soil temperatures and water content increase microbial activity. The rate of organic matter degradation in native plant communities is balanced by the rate of input of fresh material. Disruption of this natural process can lead to a decline in the organic matter content of the soil. Unsound management practices lead to a further decrease in organic matter content.

If no degradation of organic matter occurs, 10 tons of organic matter 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, several decades of adding large amounts of organic matter to the soil are needed to produce a small increase in the organic matter content. Conservation tillage and cover crops slowly increase the organic matter content over time, or at least prevent further declines.

The organic matter content of most of the soils of Jackson Parish is low. It decreases sharply with depth because fresh inputs of organic matter are confined to the surface layer. These low levels reflect the high rate of organic matter degradation, erosion, and use of cultural practices that make maintenance of organic matter difficult at higher levels.

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 is generally not strongly retained by soils, well drained soils subjected to moderate or high rainfall do not normally have significant amounts of sodium. Soils in low rainfall environments, soils that have restricted drainage in the subsoil, and soils of the Coastal Marsh 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.

Elevated exchangeable sodium levels are at depth in some soils, such as the Guyton soils. Higher than normal levels of exchangeable sodium in the soils are probably 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 crusting of the surface, dispersion of soil particles, low water infiltration rates, and low hydraulic conductivity.

pH, exchangeable aluminum and hydrogen, and exchangeable 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 for plant uptake by controlling mineral solubility, ion exchange, and absorption-desorption reactions at the surfaces of the soil minerals and organic matter. The pH also affects microbial activity.

Aluminum exists in soils as exchangeable polymeric hydrolysis species, aluminum oxides, and aluminosilicate minerals. Exchangeable aluminum in soils is determined by extraction with neutral salts, such as potassium chloride or 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. The amount of aluminum is toxic to plants. The toxic effects of aluminum on plant growth can be alleviated by adding lime to the soil 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. Exchangeable hydrogen, as determined by extraction with such neutral salts as potassium chloride, is normally not a major component of soil acidity. Exchangeable hydrogen is not readily replaced by other cations unless accompanied by a neutralization reaction. Most of the neutral salt exchangeable hydrogen in soils apparently comes from aluminum hydrolysis.

Acidity from hydrolysis of neutral salt exchangeable aluminum plus neutral salt exchangeable hydrogen from pH-dependent exchange sites makes up the exchangeable acidity in soils. Exchangeable acidity is determined by the pH of the soil. Titratable acidity is the amount of acidity neutralized to a selected pH, generally pH 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 base or incubation with lime; extraction with a buffered extractant followed by titration of the buffered extractant (pH 8.2, barium chloride-triethanolamine method); or equilibration with buffers followed by estimation of acidity from changes in buffer pH.

Most soils of Jackson Parish have a low pH, contain significant quantities of exchangeable aluminum, and have high levels of total acidity in many of the soil horizons. Examples are Bellwood, Cahaba, and Keithville soils. The high levels of exchangeable aluminum are a major limiting factor in crop production. High levels of exchangeable aluminum in the surface layer of the soils can be reduced by adding lime. No economical methods are presently available to neutralize soil acidity at depth. Some reduction of exchangeable aluminum levels at depth can be achieved by applying gypsum so that the calcium leaches through the soil and replaces the exchangeable aluminum.

Cation-exchange capacity. The cation-exchange capacity is a measure of the amount of nutrient and non-nutrient cations a soil can hold in an exchangeable form. The cation-exchange capacity depends on the number of negatively charged sites, both permanent and pH-dependent, 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 developed from ionization of surface hydroxyl groups on minerals and organic matter 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 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 (generally 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, which includes calcium, magnesium, potassium, and sodium. The effective cation-exchange capacity is 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 pH of the soil is about 8.2, the effective and sum cation-exchange capacity 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 soils of Jackson Parish. Since the cation-exchange capacity increases with pH, cation-exchange capacity of many of the soils can be increased by adding lime. This would result in a greater storage capacity for nutrient cations, such as potassium, magnesium, and calcium.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(35)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 18 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

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

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Udifluvents (*Ud*, meaning humid, plus *fluvent*, the suborder of the Entisols that are on flood plain in a humid climate).

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 Udifluvents.

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 coarse-loamy, siliceous, thermic, Typic Udifluvents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the substratum within a series. An example is the Ochlockonee series, which is a member of the coarse-loamy, siliceous, acid, thermic Typic Udifluvents.

Soil Series and Their Morphology

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

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(34)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(35)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

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

Bellwood Series

The Bellwood series consists of somewhat poorly drained, very slowly permeable soils that formed in acid, loamy, and clayey marine sediments of Tertiary age. These soils are on uplands. Slopes range from 1 to 15 percent. Soils of the Bellwood series are very-fine, montmorillonitic, thermic Aquentic Chromuderts.

Bellwood soils commonly are near Keithville, Mahan, Sacul, and Vaiden soils. Keithville soils are in slightly higher positions than the Bellwood soils and have a subsoil that is loamy in the upper part. Mahan and Sacul soils are at a higher elevation than the Bellwood soils and have a subsoil that contains less than 60 percent clay. Vaiden soils are in positions similar to those of the Bellwood soils and have a browner hue and an alkaline substratum.

Typical pedon of Bellwood silt loam, 1 to 5 percent slopes; about 3.5 miles southwest of Clay, 3 miles northwest of Ansley, 200 feet north of dirt road, SE¹/₄NW¹/₄ sec. 36, T. 17 N., R. 4 W.

A—0 to 3 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; common fine and medium roots; very strongly acid; abrupt smooth boundary.

Bssl—3 to 10 inches; yellowish red (5YR 5/6) clay; common medium prominent light brownish gray (10YR 6/2) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; very firm, plastic; about 30 percent of vertical ped faces consist of medium and large slickensides 2 to 8 inches wide; a few slickensides intersect; common fine and medium roots; extremely acid; gradual wavy boundary.

Bssg2—10 to 19 inches; light brownish gray (10YR 6/2) clay; many medium prominent red (2.5YR 4/6) mottles and few fine prominent strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium angular blocky; firm, plastic; about 50 percent of vertical ped faces consist of medium and large slickensides 3 to 8 inches wide; slickensides intersect; common very fine and fine roots; extremely acid; gradual wavy boundary.

Bssg3—19 to 42 inches; grayish brown (10YR 5/2) clay; common medium prominent red (2.5YR 4/6) mottles and few medium prominent strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium angular blocky; firm, plastic; about 50 percent of vertical ped faces consist of medium and large slickensides 3 to 8 inches wide; many slickensides intersect; common fine roots; extremely acid; clear smooth boundary.

BCg1—42 to 54 inches; grayish brown (10YR 5/2) clay; many medium prominent red (2.5YR 4/6) mottles; common medium distinct dark yellowish brown (10YR 4/6) mottles; weak coarse and medium angular blocky structure; very firm, very plastic; discontinuous shiny pressure faces on surface of peds and common intersecting slickensides; extremely acid; clear smooth boundary.

BCg2—54 to 60 inches; gray (10YR 6/1) clay; common medium prominent strong brown (7.5YR 5/6) mottles and many medium prominent red (2.5YR 4/6) mottles; weak coarse angular blocky structure; very firm; shiny pressure faces on surfaces of most peds and few slickensides; extremely acid.

The solum thickness ranges from 50 to 80 inches. Reaction ranges from extremely acid to strongly acid throughout the solum. Base saturation ranges from 10 to 25 percent throughout the B and BC horizons. Gilgai relief consists of microknolls and microdepressions with relief of 2 to 8 inches and distances of 8 to 15 feet between centers of knolls and depressions. Depth to intersecting slickensides ranges from 7 to 21 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 3 or 4 and chroma of 1 to 4. It is 2 to 6 inches thick.

The upper part of the Bss horizon has hue of 5YR, 2.5YR, or 10R, value of 4 or 5, and chroma of 4 to 8. Mottles are in shades of brown or gray. The lower part of the Bss horizon and the BC horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 3. Red mottles range from few to many within a depth of 20 inches. Texture of the Bss and BC horizons is clay or silty clay.

Betis Series

The Betis series consists of somewhat excessively drained, rapidly permeable soils that formed in sandy and loamy marine sediments of Tertiary age. These soils 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, McLaurin, and Ruston soils. Briley and McLaurin soils are in positions similar to those of the Betis soils and have a loamy subsoil within a depth of 40 inches below the soil surface. Ruston soils are in slightly lower positions and are loamy throughout the profile.

Typical pedon of Betis loamy fine sand, 1 to 5 percent slopes; 6 miles north of Eros, 1,400 feet south of Butler Cemetery, 200 feet north of parish road, SE¹/₄SE¹/₄ sec. 2, T. 17 N., R. 1 W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) loamy fine sand; weak fine granular structure; soft, very friable; many coarse, medium, and fine roots; strongly acid; clear smooth boundary.

E—4 to 24 inches; yellowish brown (10YR 5/4) loamy fine sand; few pockets of white (10YR 8/2) uncoated sand grains; single grained; soft, very friable; many coarse, medium, and fine roots; moderately acid; gradual smooth boundary.

Bw—24 to 38 inches; strong brown (7.5YR 5/6) loamy fine sand; few pockets of white (10YR 8/2) uncoated sand grains; single grained; soft, very friable; few coarse, medium, and fine roots; moderately acid; gradual smooth boundary.

E and Bt—38 to 76 inches; very pale brown (10YR 7/3) loamy fine sand (E), that contains common strong brown (7.5YR 5/8) fine sandy loam (Bt) lamellae 1/4 to 1/2 inch thick; single grained; lamellae are massive; soft, very friable; few coarse and medium roots in E material; lamellae have coated sand grains and some clay bridging; moderately acid.

The solum thickness ranges from 60 to 80 inches. Reaction ranges from very strongly acid to moderately acid throughout the solum. Texture of the matrix is fine sand or loamy fine sand. Base saturation at 72 inches ranges from 17 to 46 percent.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4.

The E horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 2 to 4.

The Bw horizon has hue of 10YR or 7.5YR and chroma of 6 or 8. Randomly distributed pockets of clean sand grains range from few to common.

The E portion of the E and Bt horizon has value of 5 to 7 and chroma of 3 or 4. The Bt portion (lamellae) has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 6 or 8. The lamellae are loamy fine sand or fine sandy loam.

Bowie Series

The Bowie series consists of moderately well drained, moderately slowly permeable soils that formed in loamy sediments of Tertiary age. These soils are on uplands. Slopes range from 1 to 5 percent. Soils of the Bowie series are fine-loamy, siliceous, thermic Plinthic Paleudults.

Bowie soils commonly are near Frizzell, McLaurin, Mahan, Metcalf, Ruston, and Sacul soils. Frizzell soils are on stream terraces and are coarse-silty. McLaurin soils are in positions similar to those of the Bowie soils and are coarse-loamy. Mahan soils are in higher positions and have a clayey and loamy subsoil. Metcalf soils are in lower positions and have a clayey and loamy subsoil. Ruston soils are in slightly higher positions and have a redder subsoil. Sacul soils are in slightly lower positions and have a clayey and loamy subsoil.

Typical pedon of Bowie fine sandy loam, 1 to 5 percent slopes; 3.3 miles east of Jonesboro on Highway 4, 150 feet north of highway, SW1/4NE1/4 sec. 34, T. 15 N., R. 3 W.

A—0 to 8 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; many fine roots; strongly acid; clear smooth boundary.

E—8 to 18 inches; pale brown (10YR 6/3) fine sandy loam; massive; very friable; many fine roots; common fine tubular pores; strongly acid; clear smooth boundary.

Bt—18 to 30 inches; strong brown (7.5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; common fine and medium roots; common fine pores; few faint clay films on faces of peds and in pores; few fine concretions of iron and manganese oxides; strongly acid; clear smooth boundary.

Btv1—30 to 44 inches; yellowish brown (10YR 5/6) sandy clay loam; common medium distinct strong brown (7.5YR 5/6) mottles and few medium prominent red (2.5YR 4/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine pores; few faint clay films on faces of peds and in pores; 5 percent plinthite nodules; few fine concretions of iron oxides; strongly acid; gradual wavy boundary.

Btv2—44 to 65 inches; strong brown (7.5YR 5/6) sandy clay loam; common medium distinct yellowish brown (10YR 5/6) mottles and few fine prominent gray (10YR 5/1) mottles; moderate coarse prismatic structure parting to weak medium subangular blocky; firm; few faint clay films; 10 percent, by volume, red mottles that range from soft to brittle; about 15 percent nodular plinthite; strongly acid.

The thickness of the solum ranges from 60 to 80 inches or more. Depth to horizons that contain more than 5 percent plinthite ranges from 25 to 60 inches. Strongly cemented to indurated iron oxide concretions less than 1 inch in diameter range from 0 to 5 percent, by volume, throughout the solum. 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 3 to 5 and chroma of 2 to 4. Horizons with value of 3 are less than 7 inches thick. Reaction ranges from very strongly acid to slightly acid, unless limed.

The E horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 5. Some horizons have an EB horizon that may have chroma of 6. In pedons that have a plow layer, the E horizon is absent. Texture is very fine sandy loam, fine sandy loam, or loamy fine sand. The combined thickness of the A and E horizons is 6 to 20 inches. Reaction ranges from very strongly acid to slightly acid, unless limed.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. Mottles in shades of red, brown, or yellow range from none to many. Lenses, interfingers, or pockets of uncoated sand range from none to 4 percent, by volume. These have hue of 10YR, value of 6, and chroma of 3 or 4. Nodular plinthite ranges from 0 to 4 percent, by volume. Ironstone pebbles range from none to 10 percent, by volume. Texture is fine sandy loam, loam, clay loam, or sandy clay loam. Clay content ranges from

18 to 35 percent. Reaction is very strongly acid or strongly acid.

The Btv horizon has value of 5 or 6 and chroma of 4 to 8. Mottles in shades of red and brown range from few to many in most pedons. The lower part of the Btv horizon may have grayish mottles below a depth of 30 inches from the soil surface. Lenses, interfingers, or pockets of uncoated sand range from 0 to 4 percent, by volume. These have hue of 10YR, value of 6 or 7, and chroma of 2 to 4. Nodular plinthite makes up about 5 to 15 percent, by volume. Ironstone pebbles range from none to 10 percent, by volume. Texture is fine sandy loam, loam, clay loam, or sandy clay loam. Reaction is very strongly acid or strongly acid.

Briley Series

The Briley series consists of well drained soils that formed in sandy and loamy sediments of Tertiary age. Permeability is rapid in the upper part of the soil and moderate in the lower part of the soil. These soils are on uplands. Slopes range from 1 to 12 percent. Soils of the Briley series are loamy, siliceous, thermic Arenic Paleudults.

Briley soils commonly are near Betis, McLaurin, Ruston, and Sacul soils. Betis and McLaurin soils are in positions similar to those of the Briley soils. Betis soils are sandy throughout the profile. McLaurin soils have a sandy surface layer and a loamy subsoil. Ruston soils are in slightly lower positions and are loamy throughout the profile. Sacul soils are in lower positions and have a loamy and clayey subsoil.

Typical pedon of Briley loamy fine sand, 5 to 12 percent slopes; 5 miles northeast of Hodge, 5.2 miles southeast of Quitman, 400 feet east of Highway 542, NE¼SW¼ sec. 2, T. 15 N., R. 3 W.

A—0 to 5 inches; dark brown (10YR 4/3) loamy fine sand; weak fine granular structure; very friable; common fine and medium roots; very strongly acid; clear smooth boundary.

E1—5 to 12 inches; brown (10YR 5/3) loamy fine sand; massive; loose; common fine roots; moderately acid; clear wavy boundary.

E2—12 to 24 inches; light yellowish brown (10YR 6/4) loamy fine sand; massive; loose; common fine roots; common fine yellowish brown (10YR 5/3) stains; moderately acid; clear smooth boundary.

BE—24 to 28 inches; yellowish red (5YR 4/6) fine sandy loam; weak fine and medium subangular blocky structure; friable; few fine roots; slightly acid; clear wavy boundary.

Bt1—28 to 40 inches; red (2.5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; friable; few fine roots; few distinct clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—40 to 52 inches; yellowish red (5YR 5/6) fine sandy loam; few fine distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few faint clay films on faces of some peds; strongly acid.

Bt3—52 to 65 inches; red (2.5YR 4/8) sandy clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; strongly acid.

The thickness of the solum ranges from 60 to 80 inches or more. Base saturation at a depth of 72 inches ranges from 15 to 35 percent. Ironstone pebbles range from none to about 5 percent, by volume, throughout the solum. In some pedons and in at least one subhorizon within a depth of 30 inches, exchangeable aluminum makes up 20 to 50 percent or more of the effective cation-exchange capacity.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4. Reaction ranges from very strongly acid to slightly acid.

The E horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 or 4. Reaction ranges from very strongly acid to slightly acid.

The BE horizon has hue of 10YR, 7.5YR, or 5YR, value of 4 or 5, and chroma of 4 or 6. Typically, texture is loamy fine sand or fine sandy loam. This horizon is less than 7 inches thick. Reaction ranges from very strongly acid to moderately acid.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8. Mottles in shades of red, brown, or yellow range from none to common in the upper part of the Bt horizon. Some pedons have a mottled matrix of these colors in the lower part. Texture is sandy clay loam, fine sandy loam, or loam. The clay content of the control section ranges from 18 to 28 percent. Some pedons contain streaks or pockets of uncoated sand grains. Reaction ranges from very strongly acid to moderately acid.

Cahaba Series

The Cahaba series consists of well drained, moderately permeable soils that formed in loamy and sandy sediment of late Pleistocene age. These soils are on stream terraces. Slopes range from 1 to 3 percent. Soils of the Cahaba series are fine-loamy, siliceous, thermic Typic Hapludults.

Cahaba soils commonly are near Frizzell, Guyton, Ochlockonee, and Ouachita soils. Frizzell soils are in lower positions than the Cahaba soils and are somewhat poorly drained and have a browner subsoil. Guyton soils are in lower positions, are poorly drained, and are fine-silty and grayish throughout the profile. Ochlockonee and Ouachita soils are on flood plains and do not have an argillic horizon.

Typical pedon of Cahaba fine sandy loam, 1 to 3 percent slopes; 5 miles southeast of Jonesboro, 200 feet north of Highway 4, about 1,100 feet east of the Dugdemona River, SE1/4SE1/4 sec. 8, T. 14 N., R. 4 W.

A—0 to 6 inches; grayish brown (10YR 5/2) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

E—6 to 12 inches; brown (10YR 5/3) fine sandy loam; weak fine granular structure; very friable; few fine and medium roots; strongly acid; clear smooth boundary.

EB—12 to 15 inches; light yellowish brown (10YR 6/4) loam; weak fine granular structure; friable; few fine roots; few fine discontinuous random tubular pores; strongly acid; clear smooth boundary.

Bt1—15 to 28 inches; red (2.5YR 4/6) loam; moderate medium subangular blocky structure; firm; few fine and medium roots; common fine discontinuous random tubular pores; few distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—28 to 39 inches; yellowish red (5YR 5/6) loam; weak medium subangular blocky structure; friable; common fine discontinuous random tubular pores; few distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

BC—39 to 65 inches; strong brown (7.5YR 5/6) sandy loam; weak fine subangular blocky structure; friable; few faint clay films on faces of some peds; few sand pockets; few light yellowish brown (10YR 6/4) stains; very strongly acid.

The thickness of the solum ranges from 36 to 65 inches. Reaction ranges from very strongly acid to moderately acid throughout the solum. In at least one subhorizon within a depth of about 30 inches, exchangeable aluminum makes up 20 to 50 percent of the effective cation-exchange capacity.

The A horizon has value of 3 to 5 and chroma of 2 to 4. It is 4 to 8 inches thick.

The E horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 4; or hue of 7.5YR, value of 5, and chroma of 6 or 8. Texture is fine sandy loam or sandy loam.

The EB horizon has value of 5 or 6 and chroma of 3 or 4. Texture is fine sandy loam or loam. Some pedons do not have an EB horizon.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. Texture is sandy clay loam, loam, or clay loam. Clay content ranges from 18 to 35 percent and averages about 25 percent in the control section. The content of silt ranges from 20 to 50 percent.

The BC horizon has hue of 2.5YR, 5YR, or 7.5YR, value of 4 or 5, and chroma of 6 or 8. In some pedons, the BC horizon is mottled in shades of yellow and brown. Texture is fine sandy loam or sandy loam.

The C horizon, where present, has hue ranging from 2.5YR to 10YR, value of 4 or 5, and chroma of 4 to 8. Texture commonly is stratified sand, loamy sand, fine sandy loam, and sandy loam.

Frizzell Series

The Frizzell series consists of somewhat poorly drained, slowly permeable soils that formed in loamy sediments of late Pleistocene age. These soils are on stream terraces. Slopes range from 0 to 2 percent. Soils of the Frizzell series are coarse-silty, siliceous, thermic Glossaquic Hapludalfs.

Frizzell soils commonly are near Cahaba, Guyton, Ochlockonee, and Ouachita soils. Cahaba soils are in slightly higher positions than the Frizzell soils and are fine-loamy. Guyton soils are in lower positions, are poorly drained, and are fine-silty. Ochlockonee and Ouachita soils are on flood plains and do not have an argillic horizon.

Typical pedon of Frizzell silt loam, in an area of Frizzell-Guyton silt loams, 0 to 2 percent slopes; 3/4 mile south of Ansley, 150 feet east of Highway 167, SW1/4NE1/4 sec. 8, T. 16 N., R. 3 W.

A—0 to 3 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many fine roots; strongly acid; abrupt smooth boundary.

B/E—3 to 31 inches; yellowish brown (10YR 5/4) silt loam (B); common medium distinct light brownish gray (10YR 6/2) mottles and few fine distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; many fine pores; about 15 percent of horizon is interfingers of light brownish gray (10YR 6/2) silt loam (E); few fine black concretions; very strongly acid; gradual wavy boundary.

Bt1—31 to 45 inches; mottled with about 55 percent yellowish brown (10YR 5/4) and 45 percent gray (10YR 6/1) silt loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine black concretions; few faint clay films on faces of peds and in root channels; very strongly acid; abrupt wavy boundary.

Bt2—45 to 60 inches; yellowish brown (10YR 5/6) silty clay loam; many fine prominent gray (10YR 6/1) mottles and common medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine pores; few faint clay films on faces of peds and in pores; very strongly acid.

The thickness of the solum ranges from 60 to 80 inches. Reaction is very strongly acid or strongly acid throughout the solum, except for surface layers that have been limed. Base saturation in the lower part of the Bt horizon is 35 to 60 percent. 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. It is 2 to 4 inches thick.

The Bt part of the B/E horizon has value of 5 or 6 and chroma of 3 to 6. Texture is silt loam or loam. The E part has value of 5 to 7 and chroma of 1 to 3. Mottles in shades of gray or brown range from few to many.

The Bt horizon has value of 4 to 6 and chroma of 3 to 6, or it is mottled in shades of gray and brown. Texture is silt loam, silty clay loam, loam, or clay loam.

Guyton Series

The Guyton series consists of poorly drained, slowly permeable soils that formed in loamy alluvium. These soils are on stream terraces and on flood plains. The soils on flood plains are frequently flooded. Slopes are less than 1 percent. Soils of the Guyton series are fine-silty, siliceous, thermic Typic Glossaqualfs.

Guyton soils commonly are near Cahaba, Frizzell, Ochlockonee, and Ouachita soils. Cahaba and Frizzell soils are in higher positions on stream terraces than the Guyton soils. Cahaba soils are fine-loamy. Frizzell soils are coarse-silty and have a brown hue throughout the profile. Ochlockonee and Ouachita soils are in high positions on flood plains, are well drained, and do not have an argillic horizon.

Typical pedon of Guyton silt loam, in an area of Guyton-Ouachita-Ochlockonee association, frequently flooded; 400 feet west of Castor Creek, 1.45 miles north of Highway 146, 3 miles northwest of Chatham, SW1/4NE1/4 sec. 19, T. 16 N., R. 1 W.

A—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak fine granular structure; friable; few fine and medium roots; very strongly acid; clear smooth boundary.

Eg1—6 to 12 inches; grayish brown (10YR 5/2) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few medium and fine roots; common fine discontinuous random tubular pores; few fine concretions of iron and manganese oxides; oxidation stains around root channels; strongly acid; clear smooth boundary.

Eg2—12 to 27 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine and medium roots; common fine discontinuous random tubular pores; few fine medium concretions of iron and manganese oxides; oxidation stains around roots; strongly acid; clear irregular boundary.

Btg/E—27 to 35 inches; gray (10YR 5/1) silty clay loam (Btg); few medium prominent yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; common fine discontinuous random tubular pores; few faint clay films on faces of peds and in pores; few fine concretions of iron and manganese oxides; tongues of light brownish gray (10YR 6/2) silt loam (E) make up about 15 percent of the horizon; very strongly acid; clear wavy boundary.

Btg1—35 to 50 inches; grayish brown (10YR 5/2) silty clay loam; common medium prominent strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; few very fine discontinuous random tubular pores; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg2—50 to 65 inches; gray (10YR 6/1) silty clay loam; few fine prominent strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; common distinct clay films on faces of peds; very strongly acid.

The thickness of the solum ranges from 55 to 80 inches. The sand content, which is dominantly very fine sand, ranges from 10 to 40 percent, by volume, in the control section. Exchangeable sodium ranges from less than 5 percent to 40 percent in the lower 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 A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 or 3. Reaction ranges from extremely acid to moderately acid. Thickness ranges from 4 to 8 inches.

The Eg horizon has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 1 or 2. Mottles in shades of brown range from few to many. The Eg horizon is silt loam, loam, or very fine sandy loam. Reaction ranges from extremely acid to moderately acid. The lower boundary of the Eg horizon is clear irregular or abrupt irregular, and tongues extend into the Btg horizon.

The Btg and E parts of the Btg/E horizon have the same range in color, texture, and reaction as the Btg and Eg horizons, respectively. Some pedons have an E/B horizon, 6 to 15 inches thick.

The Btg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. Few to many mottles are in shades of brown or gray. Texture is silt loam, silty clay loam, or clay loam. Reaction ranges from extremely acid to moderately acid.

The BC and Cg horizons, where present, have the same color range as the Btg horizon. Texture is silt loam, silty clay loam, clay loam, or sandy clay loam. Reaction ranges from extremely acid to moderately acid in the BC horizon and from strongly acid to moderately alkaline in the Cg horizon.

Keithville Series

The Keithville series consists of moderately well drained, very slowly permeable soils that formed in loamy and clayey sediments of Tertiary age. These soils are on uplands. Slopes range from 1 to 5 percent. Soils of the Keithville series are fine-silty, siliceous, thermic Glossaquic Paleudualfs.

Keithville soils commonly are near Bellwood, Bowie, Metcalf, and Sacul soils. All of these soils are at a higher elevation than the Keithville soils. Bellwood soils have a very fine-textured control section. Bowie soils are fine-loamy. Metcalf soils have tongues of albic material in the subsoil. Sacul soils have a fine-textured control section.

Typical pedon of Keithville very fine sandy loam, 1 to 5 percent slopes; 2.75 miles south of Jonesboro, about 1,500 feet west of Highway 167, 150 feet north of parish road, NW¼NW¼ sec. 17, T. 14 N., R. 3 W.

A—0 to 3 inches; dark grayish brown (10YR 4/2) very fine sandy loam, weak fine granular structure; very friable; many fine and medium roots; many fine pores; few fine dark brown (10YR 4/3) concretions of iron and manganese oxides; strongly acid; clear smooth boundary.

E—3 to 8 inches; light yellowish brown (10YR 6/4) very fine sandy loam; weak fine granular structure; very friable; common fine roots; many fine pores; few fine brown (10YR 5/3) concretions of iron and manganese oxides; moderately acid; clear smooth boundary.

Bt1—8 to 16 inches; yellowish red (5YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; common fine pores; common fine dark brown (10YR 4/3) concretions of iron and manganese oxides; few faint clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—16 to 28 inches; yellowish red (5YR 5/8) silty clay loam; common medium prominent red (2.5YR 4/6) mottles and few fine distinct brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; friable; common fine roots; common fine pores; common fine dark brown (10YR 4/3) concretions of iron and manganese oxides; few distinct clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt3—28 to 34 inches; strong brown (7.5YR 5/8) silty clay loam; common medium prominent light brownish gray (10YR 6/2) and red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; common fine pores; few faint clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt/E—34 to 37 inches; mottled light brownish gray (10YR 6/2) and reddish yellow (7.5YR 6/8) and red (2.5YR 4/6) clay loam (Bt); light brownish gray (10YR 6/2) silt coatings on peds are $^1/_{16}$ to $^1/_2$ inch thick and make up 15 percent of horizon (E); strong medium subangular blocky structure; firm; few fine roots; many fine pores; many fine and medium brown (10YR 5/3) concretions of iron and manganese oxides; few faint clay films in pores; very strongly acid; gradual wavy boundary.

2Btg4—37 to 50 inches; light brownish gray (10YR 6/2) clay; many medium prominent red (2.5YR 4/6) mottles and few fine prominent brownish yellow (10YR 6/8) mottles; strong medium angular blocky structure; fine; common fine roots; few distinct clay films on faces of peds; few fine black (10YR 2/1) concretions of manganese oxides; very strongly acid; gradual wavy boundary.

2Btg5—50 to 70 inches; light brownish gray (2.5Y 6/2) clay; common medium prominent red (2.5YR 5/6) mottles; strong medium angular blocky structure; firm; few fine roots; few black (10YR 2/1) stains in root channels; very strongly acid.

The thickness of the solum ranges from 60 to about 100 inches. Depth to the clayey 2Btg horizon ranges from 30 to 40 inches. Reaction ranges from extremely acid to moderately acid throughout the solum, except for surface horizons that have been limed. In at least one subhorizon within a depth of about 30 inches, exchangeable aluminum makes up 30 percent or more of the effective cation-exchange capacity.

The A horizon has value of 3 to 6 and chroma of 2 to 4. It is 3 to 7 inches thick.

The E horizon has value of 5 or 6 and chroma of 3 or 4. Texture is silt loam, loam, or very fine sandy loam.

The Bt horizon has dominant hue of 5YR or 7.5YR and value of 4 or 5. The Bt3 horizon may have hue of 10YR and value of 5 or 6. It has few to common red mottles and 1 or 2 chroma mottles. Texture of the Bt1 and Bt2 horizons is loam, silt loam, or silty clay loam. Total sand content, which is dominantly very fine sand, ranges from 25 to 40 percent. Texture of the Bt3 horizon is the same as that of the Bt1 and Bt2 horizons and includes clay loam.

The Bt part of the Bt/E horizon is mottled in hues of 2.5YR, 5YR, 7.5YR, or 10YR and values of 4 to 6. Texture is silt loam, loam, silty clay loam, or clay loam. The E part of the Bt/E horizon is grayish and consists of coatings of silt or very fine sand.

The 2Bt horizon is mottled with shades of gray, red, and brown. Texture is silty clay or clay.

Mahan Series

The Mahan series consists of well drained, moderately permeable soils that formed in loamy and clayey sediments of Tertiary age. These soils are on uplands. Slopes range from 1 to 15 percent. Soils of the Mahan series are clayey, kaolinitic, thermic Typic Hapludults.

Mahan soils commonly are near Bowie, Metcalf, and Sacul soils. Bowie soils are in lower positions than the Mahan soils and are fine-loamy. Metcalf and Sacul soils are at a lower elevation than the Mahan soils. Metcalf soils are fine-silty. Sacul soils have gray mottles in the upper part of the subsoil.

Typical pedon of Mahan fine sandy loam, 1 to 5 percent slopes; 3 miles northwest of Wyatt, 100 feet north of parish road, SE1/4NW1/4 sec. 26, T. 14 N., R. 4 W.

A—0 to 3 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; moderately acid; clear smooth boundary.

E—3 to 7 inches; brown (7.5YR 5/4) fine sandy loam; weak fine subangular blocky structure; very friable; common fine and few medium and coarse roots; moderately acid; clear wavy boundary.

Bt1—7 to 24 inches; red (2.5YR 4/6) clay; moderate coarse subangular blocky structure; friable; common medium and fine roots; common fine tubular pores; about 2 percent, by volume, ironstone gravel; many distinct clay films on faces of peds; strongly acid; clear wavy boundary.

Bt2—24 to 34 inches; red (2.5YR 4/8) clay; common medium distinct yellowish red (5YR 4/6) mottles; moderate medium subangular blocky structure; friable; few fine and medium roots; common medium and fine tubular pores; about 3 percent, by volume, ironstone gravel; common distinct clay films on faces of peds; strongly acid; clear smooth boundary.

Bt3—34 to 48 inches; yellowish red (5YR 4/6) clay; weak medium subangular blocky structure; friable; few fine roots; few distinct clay films on faces of peds; about 5 percent, by volume, ironstone gravel; strongly acid; clear smooth boundary.

BC—48 to 60 inches; yellowish red (5YR 4/6) sandy clay loam; weak medium subangular blocky structure; friable; few slightly brittle peds; few fine roots; about 9 percent, by volume, ironstone gravel; few faint clay films on faces of peds; common fine white (10YR 8/2) bodies of clay; common fine pockets of strong brown (7.5YR 5/6) sandy loam; strongly acid.

The thickness of the solum ranges from 40 to 60 inches or more. Gravel-size ironstone fragments make up from 0 to 40 percent of the volume of the A horizon and from 0 to 15 percent of the Bt and BC horizons. A few coarse fragments of ironstone 3 to 20 inches in diameter are in the A, Bt, and BC horizons of some pedons. The particle-size control section has 35 to 60 percent clay. In at least one subhorizon within a depth of about 30 inches, exchangeable aluminum makes up 20 to 70 percent or more of the effective cation-exchange capacity.

The A horizon has hue of 10YR, 7.5YR, or 5YR, value of 3 to 5, and chroma of 2 to 6. Texture is sandy loam, fine sandy loam, or their gravelly counterparts. Reaction is strongly acid or moderately acid, except where limed. Thickness ranges from 3 to 8 inches.

The E horizon has hue of 10YR, 7.5YR, or 5YR, value of 4 or 5, and chroma of 4 to 6. Texture is loamy fine sand, sandy loam, or fine sandy loam. Reaction is strongly acid or moderately acid.

The Bt horizon has hue of 5YR, 2.5YR, or 10R, value of 4 or 5, and chroma of 6 or 8. Texture is clay, sandy clay loam, sandy clay, clay loam, or loam. Silt content of the Bt horizon is less than 30 percent. Mottles in shades of brown and gray are in the lower parts of the Bt horizon in some pedons. Reaction ranges from very strongly acid to moderately acid.

The BC horizon has hue of 5YR, 2.5YR, or 10R, value of 4 or 5, and chroma of 6 or 8. Mottles in shades of brown or gray range from none to common. Texture is sandy loam, fine sandy loam, clay loam, or sandy clay loam. Reaction ranges from very strongly acid to moderately acid.

Some pedons have a C horizon. Where present, texture is typically stratified sandy clay loam, sandy loam, or clay loam. Loamy materials are reddish or brownish. Small pockets or horizontal seams of whitish clay (kaolin) range from none to many. Reaction ranges from very strongly acid to moderately acid.

McLaurin Series

The McLaurin series consists of well drained, moderately permeable soils that formed in sandy and loamy sediments of Tertiary age. These soils are on uplands. Slopes range from 1 to 8 percent. Soils of the McLaurin series are coarse-loamy, siliceous, thermic Typic Paleudults.

McLaurin soils are similar to Cahaba soils and commonly are near Betis, Bowie, and Briley soils. Bowie and Briley soils are in positions similar to those of the McLaurin soils. Betis and Briley soils have sandy surface and subsurface layers that together are more than 20 inches thick. Bowie and Cahaba soils are fine-loamy. Cahaba soils are on stream terraces.

Typical pedon of McLaurin loamy fine sand, 1 to 3 percent slopes; 3.2 miles northeast of Vernon, 1,100 feet northeast of Saints Rest Church, 200 feet north of parish road, SE¹/₄NE¹/₄ sec. 13, T. 16 N., R. 3 W.

A—0 to 6 inches; grayish brown (10YR 5/2) loamy fine sand; weak fine granular structure; very friable; many fine roots; few medium and coarse roots; strongly acid; clear smooth boundary.

E—6 to 14 inches; brown (7.5YR 5/4) loamy fine sand; weak fine granular structure; very friable; few fine and common coarse roots; strongly acid; gradual wavy boundary.

Bt—14 to 28 inches; yellowish red (5YR 5/6) sandy loam; weak medium subangular blocky structure; very friable; common fine roots; clay bridging of sandy grains and few faint clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt/E—28 to 48 inches; yellowish red (5YR 5/6) sandy loam (Bt); weak medium subangular blocky structure; very friable; common fine roots; many common light brown (7.5YR 6/4) pockets of uncoated sand grains (E) make up about 15 percent of the volume of the horizon; strongly acid; diffuse irregular boundary.

B't—48 to 65 inches; red (2.5YR 4/6) loam; weak medium subangular blocky structure; friable; sand grains coated and bridged with clay; moderately acid.

The solum is more than 60 inches thick. The clay content averages about 18 percent or less in the Bt horizon.

The A horizon has value of 3 to 5 and chroma of 2 to 4. It is 3 to 9 inches thick. Reaction is very strongly acid or strongly acid. In some pedons, exchangeable aluminum makes up 50 percent or more of the effective cation-exchange capacity.

The E horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 6; or it has hue of 7.5YR, value of 5, and chroma of 4. Texture is sandy loam, fine sandy loam, loamy sand, or loamy fine sand. Reaction is very strongly acid or strongly acid.

The Bt horizon has hue of 5YR, 2.5YR, or 10R, value of 4 or 5, and chroma of 4 to 8. Texture is sandy loam, fine sandy loam, or loam. The particle-size control section in the upper 20 inches of the Bt horizon is 10 to 18 percent clay and 20 to 50 percent silt. Reaction is very strongly acid or strongly acid.

The Bt part of the Bt/E horizon has the same range in color as the Bt horizon. Texture is loamy sand, sandy loam, or fine sandy loam. The E part has hue of 7.5YR or 10YR, value of 6 to 8, and chroma of 3 to 8. Texture is sand, fine sand, loamy sand, or loamy fine sand. The E part makes up about 10 to 25 percent of the volume in a discontinuous pattern. Some pedons have an E/B horizon. Reaction of the Bt/E horizon is very strongly acid or strongly acid.

The B't horizon has hue of 5YR, 2.5YR, or 10R, value of 4 or 5, and chroma of 4 to 8. Texture is sandy clay loam, sandy loam, or loam. Reaction ranges from very strongly acid to moderately acid.

Metcalf Series

The Metcalf series consists of somewhat poorly drained, very slowly permeable soils that formed in loamy and clayey sediments of Tertiary age. These soils are on uplands. Slopes range from 0 to 2 percent. Soils of the Metcalf series are fine-silty, siliceous, thermic Aquic Glossudalfs.

Metcalf soils commonly are near Guyton, Keithville, and Sacul soils. Guyton soils are on stream terraces and on flood plains, are poorly drained, and are grayish throughout the profile. Keithville and Sacul soils are at a higher elevation than the Metcalf soils. Keithville soils are moderately well drained. Sacul soils have a clayey particle-size control section.

Typical pedon of Metcalf very fine sandy loam, 0 to 2 percent slopes; 2.2 miles northeast of Vernon, 1,800 feet north of parish road, 1.2 miles west of Calston Creek, NE¹/₄NE¹/₄ sec. 12, T. 16 N., R. 2 W.

A—0 to 3 inches; brown (10YR 5/3) very fine sandy loam; weak fine granular structure; very friable; few fine and medium roots; few fine discontinuous random tubular pores; strongly acid; clear smooth boundary.

E—3 to 8 inches; light yellowish brown (10YR 6/4) very fine sandy loam; weak fine subangular blocky structure; friable; few fine and medium roots; few discontinuous random tubular pores; strongly acid; clear smooth boundary.

Bt1—8 to 20 inches; yellowish brown (10YR 5/6) loam; few fine distinct light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable; few medium and fine roots; few medium discontinuous random tubular pores; common distinct clay films on faces of some peds; few fine ironstone concretions; strongly acid; clear wavy boundary.

Bt2—20 to 29 inches; yellowish brown (10YR 5/6) silty clay loam; common medium distinct yellowish red (5YR 5/6) mottles and few fine distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable; few medium and fine roots; common fine discontinuous random tubular pores; common distinct clay films on faces of some peds; very strongly acid; clear wavy boundary.

Bt/E—29 to 36 inches; light brownish gray (10YR 6/2) silt loam (Bt); common medium prominent strong brown (7.5YR 5/6) mottles and many medium prominent red (2.5YR 4/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; friable; few fine discontinuous random tubular pores;

few faint clay films on faces of some peds; tongues of light gray (10YR 7/1) silt (E) 1/2 to 2 inches wide make up 30 percent of the horizon; very strongly acid; clear wavy boundary.

2Btg3—36 to 56 inches; light brownish gray (10YR 6/2) clay; common medium prominent yellowish brown (10YR 5/8) mottles and few medium prominent red (2.5YR 4/6) mottles; weak coarse prismatic structure parting to weak medium angular blocky; firm; few fine roots; few fine pores; many faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

2Btg4—56 to 65 inches; light brownish gray (10YR 6/2) silty clay; common medium distinct light yellowish brown (10YR 6/4) mottles and few medium prominent red (2.5YR 4/6) mottles; weak medium subangular blocky structure; firm; very strongly acid.

The thickness of the solum ranges from 60 to 80 inches or more. Depth to a clayey 2Bt horizon ranges from 27 to 40 inches. Reaction ranges from extremely acid to moderately acid throughout the solum, except for surface horizons that have been limed. 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 to 4. It is 3 to 6 inches thick.

The E horizon has value of 5 or 6 and chroma of 3 or 4. Texture is silt loam, loam, or very fine sandy loam.

The Bt1 horizon has value of 5 or 6 and chroma of 4 to 8. The Bt2 horizon has the same matrix color and has few to common mottles that have chroma of 1 to 3. The Bt horizon is loam, clay loam, silt loam, or silty clay loam.

The Bt part of the Bt/E horizon has value of 5 or 6 and chroma of 2 to 4. Texture is silt loam or loam. The E part of the Bt/E horizon is grayish. Texture is silt, silt loam, or very fine sandy loam.

Typically, the 2Btg horizon has a grayish matrix that has few to many mottles in shades of red and brown. Texture is clay loam, silty clay loam, clay, or silty clay.

Ochlockonee Series

The Ochlockonee series consists of well drained, moderately rapidly permeable soils that formed in loamy and sandy alluvium. These soils are on flood plains. They are frequently flooded. Slopes range from 1 to 3 percent. Soils of the Ochlockonee series are coarse-loamy, siliceous, acid, thermic Typic Udifluvents.

Ochlockonee soils commonly are near Cahaba, Guyton, and Ouachita soils. Cahaba soils are on stream terraces and are fine-loamy and have an argillic horizon. Guyton soils are on flood plains in lower positions than the Ochlockonee soils, are poorly drained, and are fine-silty. Ouachita soils are in positions similar to those of the Ochlockonee soils and are fine-silty.

Typical pedon of Ochlockonee sandy loam, in an area of Guyton-Ouachita-Ochlockonee association, frequently flooded; 4.3 miles north of Quitman on Highway 167, 2,700 feet east of Highway 167, SW1/4NE1/4 sec. 4, T. 16 N., R. 3 W.

A—0 to 10 inches; dark brown (10YR 4/3) sandy loam; weak fine granular structure; many fine roots; very friable; very strongly acid; clear wavy boundary.

C1—10 to 42 inches; yellowish brown (10YR 5/4) fine sandy loam; common medium distinct brownish yellow (10YR 6/6) mottles; weak medium granular structure; friable; strongly acid; gradual wavy boundary.

C2—42 to 48 inches; strong brown (7.5YR 5/6) fine sandy loam; common medium distinct light yellowish brown (10YR 6/4) mottles; massive; very friable; strongly acid; gradual wavy boundary.

C3—48 to 65 inches; yellowish brown (10YR 5/4) loamy fine sand; common medium distinct strong brown (7.5YR 5/6) mottles and few medium distinct light brownish gray (10YR 6/2) mottles; massive; very friable; very strongly acid.

Reaction ranges from very strongly acid to slightly acid throughout the profile. Buried soil horizons are present in some pedons below a depth of 25 inches. Some pedons have gravelly strata below 40 inches. The particle-size control section contains less than 13 percent clay.

The A horizon has hue of 2.5Y, 10YR, or 7.5YR, value of 3 to 6, and chroma of 2 to 4. It is 4 to 12 inches thick.

The C horizon has hue of 2.5Y, 10YR, or 7.5YR, value of 4 to 6, and chroma of 3 to 6. Most pedons have mottles of brown, yellow, or gray below a depth of 20 inches. Texture is sandy loam, fine sandy loam, silt loam, loam, loamy sand, or loamy fine sand.

An Ab horizon is present in some pedons. It has color and texture similar to the A horizon.

Oktibbeha Series

The Oktibbeha series consists of moderately well drained, very slowly permeable soils that formed in loamy and clayey sediments of Tertiary age. These soils are on uplands. Slopes range from 1 to 15 percent. Soils of the Oktibbeha series are very-fine, montmorillonitic, thermic Vertic Hapludalfs.

Oktibbeha soils commonly are near Bellwood, Keithville, Mahan, Sacul, and Vaiden soils. All of these soils, except the Vaiden soils, are acid throughout the profile. Vaiden soils are brownish throughout the profile. Bellwood and Keithville soils are at a lower elevation than the Oktibbeha soils. Mahan and Sacul soils are at higher elevations. Vaiden soils are on broad, nearly level ridgetops.

Typical pedon of Oktibbeha silty clay loam, 5 to 15 percent slopes; about 1 mile south of Highway 14, 2.5 miles southwest of Jonesboro, NE1/4NE1/4 sec. 14, T. 14 N., R. 4 W.

Ap—0 to 3 inches; dark brown (7.5YR 3/2) silty clay loam; moderate fine granular structure; firm; many fine and common medium roots; moderately acid; clear smooth boundary.

Bt1—3 to 11 inches; yellowish red (5YR 4/6) clay; common medium prominent light olive brown (2.5Y 5/4) mottles; moderate fine subangular blocky structure; firm, sticky, very plastic; common fine roots; common distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—11 to 20 inches; red (2.5YR 4/8) clay; common fine and medium distinct dark yellowish brown (10YR 4/6) mottles; moderate fine subangular and angular blocky structure; firm, sticky, very plastic; few fine roots; common distinct clay films on faces of peds; few fine slickensides that do not intersect; very strongly acid; gradual wavy boundary.

Bt3—20 to 32 inches; mottled olive yellow (2.5Y 6/8), olive (5Y 5/3), and yellowish red (5YR 4/6) clay; moderate fine blocky structure; firm, very plastic, very sticky; common distinct clay films on faces of peds; few fine slickensides that do not intersect; moderately acid; clear wavy boundary.

Ck1—32 to 39 inches; light olive brown (2.5Y 5/6) clay; massive; firm, sticky, plastic; few soft white accumulations of calcium carbonate; slightly alkaline; clear wavy boundary.

Ck2—39 to 54 inches; light olive brown (2.5Y 5/4) clay; few fine distinct light olive gray (5Y 6/2) mottles; massive; firm, sticky, plastic; many soft white accumulations of calcium carbonate; moderately alkaline; gradual wavy boundary.

Ck3—54 to 60 inches; olive (5Y 5/4) clay; few fine distinct light olive gray (5Y 6/2) mottles; massive; firm, sticky, plastic; many soft white accumulations of calcium carbonate; slightly alkaline.

The thickness of the solum ranges from 20 to 50 inches.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 to 4. It is 2 to 6 inches thick. Some pedons have a thin E horizon. Reaction ranges from very strongly acid to slightly acid.

The Bt1 and Bt2 horizons have hue of 7.5YR, 5YR, or 2.5YR, value of 4 or 5, and chroma of 3 to 8. Mottles range from none to common. Reaction ranges from very strongly acid to slightly acid.

The Bt3 horizon has the same color as the Bt1 and Bt2 horizons and also includes hue of 10YR, 5Y, or 2.5Y, value of 5 or 6, and chroma of 3 to 8. Mottles in shades of brown and gray range from few to many or the horizon is mottled in shades of brown, red, and gray. In some pedons, the matrix is gray. Reaction ranges from very strongly acid to slightly acid.

The Ck horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 to 7, and chroma of 3 to 8. Mottles in shades of gray and brown range from few to many. Soft bodies or concretions of calcium carbonate range from few to many. Reaction ranges from neutral to moderately alkaline.

Ouachita Series

The Ouachita series consists of well drained, moderately slowly permeable soils that formed in loamy alluvium. These soils are on flood plains. They are frequently flooded. Slopes range from 1 to 3 percent. Soils of the Ouachita series are fine-silty, siliceous thermic Fluventic Dystrochrepts.

Ouachita soils commonly are near Cahaba, Guyton, and Ochlockonee soils. Cahaba soils are on stream terraces and are fine-loamy. Ochlockonee soils are in positions similar to those of the Ouachita soils and are coarse-loamy. Guyton soils are in lower positions, are poorly drained, and are grayish throughout the profile.

Typical pedon of Ouachita silt loam, in an area of Guyton-Ouachita-Ochlockonee association, frequently flooded; 2.1 miles south of Clay, 4.2 miles northeast of Quitman, 1,200 feet east of Highway 167, NW1/4SW1/4 sec. 4, T. 16 N., R. 3 W.

A—0 to 6 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; friable; many fine, medium, and coarse roots; very strongly acid; clear smooth boundary.

Bw1—6 to 14 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; many medium and coarse roots; very strongly acid; clear wavy boundary.

Bw2—14 to 42 inches; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; friable; common medium and coarse roots; few pockets of light yellowish brown (10YR 6/4) sand grains; very strongly acid; clear wavy boundary.

Bw3—42 to 58 inches; mottled light brownish gray (10YR 6/2), yellowish brown (10YR 5/6), and dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; few coarse roots; very strongly acid; gradual wavy boundary.

Bg4—58 to 65 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct dark yellowish brown (10YR 4/4) mottles and common medium prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; very strongly acid.

The thickness of the solum ranges from 40 to 80 inches. The content of organic matter decreases irregularly with depth. In at least one subhorizon within a depth of 30 inches, exchangeable aluminum makes 50 percent or more of the effective cation-exchange capacity.

The A horizon has value of 4 and chroma of 2 to 4 or value of 5 and chroma of 3. It is 1 to 6 inches thick. Reaction ranges from very strongly acid to moderately acid, except where the surface layer has been limed.

The Bw and Bg horizons have value of 4 or 5 and chroma of 3 to 8 or value of 6 and chroma of 2 or 3. Texture is silt loam, loam, silty clay loam, or clay loam. Reaction is very strongly acid or strongly acid.

Ruston Series

The Ruston series consists of well drained, moderately permeable soils that formed in loamy sediments of Tertiary age. These soils are on uplands. Slopes range from 1 to 5 percent. Soils of the Ruston series are fine-loamy, siliceous, thermic Typic Paleudults.

Ruston soils are similar to Cahaba soils and commonly are near Betis, Bowie, Briley, and Sacul soils. Betis and Briley soils are in positions similar to those of the Ruston soils and have sandy surface and subsurface layers that together are more than 20 inches thick. Bowie soils are in slightly lower positions than the Ruston soils and have more than 5 percent plinthite in the subsoil. Cahaba soils are on stream terraces and have a thinner solum than the Ruston soils. Sacul soils are in slightly lower positions than the Ruston soils and have a clayey particle-size control section.

Typical pedon of Ruston fine sandy loam, 1 to 5 percent slopes; about 3.2 miles southwest of Chatham, 0.65 mile west of Highway 35, 50 feet northwest of dirt road, NW¼SW¼ sec. 21, T. 15 N., R. 1 W.

A—0 to 6 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

E—6 to 14 inches; pale brown (10YR 6/3) fine sandy loam; weak fine granular structure; very friable; few fine and medium roots; common fine pores; strongly acid; gradual smooth boundary.

Bt1—14 to 22 inches; yellowish red (5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; few medium roots; few fine pores; few distinct clay films on faces of peds; sand grains coated and bridged with clay; strongly acid; clear wavy boundary.

Bt2—22 to 30 inches; red (2.5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; friable; few medium and fine roots; few fine pores; few distinct dark red (2.5YR 3/6) clay films on faces of peds; sand grains coated and bridged with clay; strongly acid; clear wavy boundary.

Bt/E—30 to 50 inches; yellowish red (5YR 5/8) sandy loam (Bt); weak medium subangular blocky structure; friable; common fine roots; common fine pores; many fine light yellowish brown (10YR 6/4) pockets of fine sandy loam (E) that make up about ½ of the horizon; few faint clay films on faces of peds; strongly acid; clear wavy boundary.

B't1—50 to 64 inches; red (2.5YR 4/6) fine sandy loam; common medium distinct yellowish red (5YR 5/6) mottles; weak medium subangular blocky structure; firm; few faint clay films on faces of peds; strongly acid; clear wavy boundary.

B't2—64 to 80 inches; red (2.5YR 4/8) sandy clay loam; common medium prominent brown (7.5YR 5/4) mottles; moderate medium subangular blocky structure; firm and brittle; common distinct clay films on faces of peds; sand grains coated and bridged with clay; very strongly acid.

The solum is more than 60 inches thick. The Bt/E and B't horizons are definitive for the series. 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 to 6, and chroma of 2 to 4. It is 3 to 6 inches thick. Reaction ranges from very strongly acid to slightly acid.

The E horizon and E part of the Bt/E horizon have value of 5 or 6 and chroma of 3 or 4. Texture is fine sandy loam, loamy sand, or sandy loam. In some pedons, small dark colored bodies that are compact and brittle make up as much as 10 percent, by volume, of the Bt/E horizon. Reaction ranges from very strongly acid to slightly acid.

A thin BA or BE horizon is in some pedons. The Bt, Bt part of the Bt/E, and B't horizons have hue of 5YR or 2.5YR, value of 4 to 6, and chroma of 4 to 8. Texture is sandy clay loam, fine sandy loam, sandy loam, loam, or clay loam. The B't horizon has few to many mottles in shades of gray, brown, red, or yellow. The clay content of the Bt horizon averages between 18 and 30 percent in the upper 20 inches, and the silt content ranges from 20 to 50 percent. Reaction is very strongly acid to moderately acid in the Bt and B't horizons. In some pedons, fragments of ironstone make up as much as 15 percent, by volume, of the solum. The clay content decreases from the Bt horizon to the B/E horizon and increases again in the B't horizon.

Sacul Series

The Sacul series consists of moderately well drained, slowly permeable soils that formed in loamy and clayey sediments of Tertiary age. These soils are on uplands.

Slopes range from 1 to 20 percent. Soils of the Sacul series are clayey, mixed, thermic Aquic Hapludults.

Sacul soils commonly are near Bowie, Mahan, and Metcalf soils. Bowie and Mahan soils are at a higher elevation than the Sacul soils. Bowie soils are fine-loamy. Mahan soils do not have gray mottles in the upper part of the subsoil. Metcalf soils are at a lower elevation and are fine-silty.

Typical pedon of Sacul fine sandy loam, 5 to 20 percent slopes; 2 miles south of Vernon, 2,000 feet west of Highway 146, 1,900 feet south of Vernon Lookout Tower, NE¼SW¼ sec. 22, T. 16 N., R. 2 W.

A—0 to 2 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; many fine roots; strongly acid; clear smooth boundary.

E—2 to 5 inches; brown (10YR 5/3) fine sandy loam; weak fine subangular blocky structure; very friable; strongly acid; clear smooth boundary.

Bt1—5 to 12 inches; red (2.5YR 5/6) clay; common medium prominent light brownish gray (10YR 6/2) mottles and few fine prominent brownish yellow (10YR 6/8) mottles; strong medium angular blocky structure; firm; plastic; common fine roots; common distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—12 to 27 inches; yellowish red (5YR 5/6) clay; common medium prominent light brownish gray (10YR 6/2) and brownish yellow (10YR 6/6) mottles; moderate medium angular blocky structure; firm; plastic; few fine roots; common distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

Btg—27 to 42 inches; light brownish gray (10YR 6/2) clay; common medium and coarse prominent red (2.5YR 4/6) and brownish yellow (10YR 6/6) mottles; moderate medium angular blocky structure; firm; plastic; common distinct clay films on faces of peds; extremely acid; clear smooth boundary.

BCg—42 to 52 inches; mottled light brownish gray (10YR 6/2) and yellowish red (5YR 5/6) sandy clay loam; moderate medium angular blocky structure; firm; slightly plastic; common distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

Cg—52 to 65 inches; stratified light brownish gray (10YR 6/2) sandy clay loam and yellowish red (5YR 5/6) sandy loam; massive; friable; common voids and pores; very strongly acid.

The thickness solum ranges from 40 to 60 inches. Gray mottles begin 6 to 25 inches below the top of the Bt horizon. In at least one subhorizon within a depth of 30 inches, exchangeable aluminum makes up 20 to 70 percent of the effective cation-exchange capacity.

The A horizon has value of 3 or 4 and chroma of 2 or 3. It is 2 to 6 inches thick. Reaction ranges from very strongly acid to moderately acid.

The E horizon has value of 4 to 6 and chroma of 3 or 4. Texture is loamy fine sand, fine sandy loam, sandy loam, very fine sandy loam, or loam. Reaction ranges from very strongly acid to moderately acid.

The Bt horizon has hue of 5YR, 2.5YR, and 10R, value of 3 to 5, and chroma of 6 or 8. Mottles in shades of yellow, brown, and gray range from few to many. Texture is silty clay, clay, sandy clay, or clay loam. Reaction ranges from extremely acid to strongly acid.

The Btg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. Texture is silty clay loam, clay loam, sandy clay loam, clay, or sandy clay. Reaction ranges from extremely acid to strongly acid.

The BCg horizon is mottled in shades of gray, red, and brown. Texture is silty clay loam, sandy clay loam, clay loam, loam, or very fine sandy loam. Reaction ranges from extremely acid to strongly acid.

The Cg horizon is mottled in shades of red, yellow, and gray. Texture is stratified clay loam, sandy clay loam, sandy loam, or loam. Reaction ranges from extremely acid to strongly acid.

Vaiden Series

The Vaiden series consists of somewhat poorly drained, very slowly permeable soils that formed in loamy and clayey sediments of Tertiary age. These soils are on uplands. Slopes range from 0 to 2 percent. Soils of the Vaiden series are very-fine, montmorillonitic, thermic Vertic Hapludalfs.

Vaiden soils commonly are near Bellwood, Keithville, Mahan, Metcalf, Oktibbeha, and Sacul soils. All of these soils are acid throughout the profile, except the Oktibbeha soils. Oktibbeha soils have a subsoil that is reddish in the upper part. Bellwood soils are in positions similar to those of the Vaiden soils. Keithville, Mahan, and Metcalf soils are in higher positions. Sacul soils are at a lower elevation than the Vaiden soils.

Typical pedon of Vaiden silty clay loam, 1 to 5 percent slopes; 3.5 miles southwest of Jonesboro, 1.5 miles south of Highway 4, 50 feet west of dirt road, NW¼NW¼ sec. 24, T. 14 N., R. 4 W.

A—0 to 2 inches; dark grayish brown (10YR 4/2) silty clay loam; moderate medium granular structure; friable; common fine roots; strongly acid, abrupt wavy boundary.

Bt1—2 to 6 inches; yellowish brown (10YR 5/6) clay; moderate medium subangular blocky structure; friable; few fine black concretions; very strongly acid; clear wavy boundary.

Bt2—6 to 14 inches; yellowish brown (10YR 5/4) clay; common medium prominent yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine black concretions; very strongly acid; clear wavy boundary.

Bt3—14 to 32 inches; light olive brown (2.5Y 5/6) clay; common medium prominent light gray (10YR 6/1) and red (2.5YR 4/6) mottles; moderate fine angular blocky structure; firm, very sticky, very plastic; few fine roots; few fine slickensides that do not intersect; few fine black concretions; very strongly acid; gradual wavy boundary.

C—32 to 43 inches; light olive brown (2.5Y 5/4) clay; common medium distinct light gray (10YR 6/1) mottles; few fine prominent red (2.5YR 4/6) mottles; firm; very plastic; few fine roots along slickensides; many intersecting slickensides; strongly acid; gradual wavy boundary.

Ck1—43 to 57 inches; light olive brown (2.5Y 4/4) clay; common fine distinct light brownish gray (2.5Y 6/2) mottles; many intersecting slickensides; firm; very plastic; grooved shiny faces on slickensides; few fine concretions of calcium carbonate; moderately alkaline; clear wavy boundary.

Ck2—57 to 65 inches; olive brown (2.5Y 4/4) clay; common fine distinct light brownish gray (2.5Y 6/2) mottles; massive; firm; very plastic; few slickensides; common fine and medium black concretions; few soft accumulations of calcium carbonate; common fine concretions of calcium carbonate; moderately alkaline.

Depth to alkaline material ranges from 3 to 8 feet. There are many intersecting slickensides at depths of 24 inches or more. 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 a hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3. It is 2 to 6 inches thick. Reaction ranges from very strongly acid to slightly acid.

The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 4 to 8. Mottles in shades of gray, brown, and red range from few to many. In some pedons, the lower part of the Bt horizon does not have a dominant matrix color and is mottled in shades of yellow, brown, gray and red. The clay content ranges from 60 to 75 percent. Reaction ranges from very strongly acid to moderately acid.

The C horizon is mottled gray, yellow, brown, and red, or it has a matrix color of gray or brown with mottles in shades of gray, yellow, brown, and red. Texture is clay or silty clay. Content of black concretions ranges from few to many. Reaction ranges from very strongly acid to moderately acid.

The Ck horizon has the same colors and texture as the C horizon. Concretions or soft accumulations of calcium carbonate range from few to many. Reaction ranges from very strongly acid to moderately alkaline.

Formation of the Soils

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This section explains soil genesis and the processes and factors of soil formation as they relate to the soils of Jackson Parish.

Genesis of the Soils

Soil genesis is the phase of soil science that deals with the processes and factors of soil formation *(5)*. It is the study of the formation of soils on the land surface and of changes in soil bodies. It is the science of the evolution of soils that are conceived of as natural units *(11, 27)*.

Internal and external forces influence soils. Generally, the internal forces are synonymous with soil-forming processes, and the external forces are synonymous with soil-forming factors. Soils generally are perceived to be a stable component of our environment; unless the soils are disturbed, they show very little change. Soil scientists, however, view soils as a dynamic system and can observe minute but important changes in the composition of the soil, depending upon when and how samples are taken *(20)*. The following information can give a better understanding of how the soil survey can be used and how interpretations can be derived from it.

Processes of Soil Formation

The complex soil-forming processes are the gains, losses, translocations, and transformations that occur in the soil. These also influence the kind and degree of development of soil horizons *(29)*. Soil-forming processes result in either additions to or losses from the soil of organic, mineral, and gaseous materials; translocations of materials from one point to another within the soil; and physical and chemical transformations of mineral and organic materials within the soil.

The addition of organic material to the soil is an important process that occurs to some extent in all soils. However, more organic matter accumulates in some soils than in others. Organic matter increases the available water and cation-exchange capacities of the soil, helps granulate the soil, and releases plant nutrients in the soil. Organic matter accumulates mainly in and above the surface horizon; consequently, the surface horizon is higher in organic matter content and is darker than the lower horizons. The accumulation of organic matter has been significant in the Bellwood and Oktibbeha soils in Jackson Parish. These soils are clayey, and the organic matter tends to accumulate as it granulates the soil. Accumulated organic matter has only slightly darkened the surface layer of most of the soils in the parish.

Leaving crop residue and allowing leaf litter and other organic material to accumulate on the surface will maintain or increase the content of organic matter in the soil. Living organisms, through their activities, decompose these accumulations and mix them into the soil. Increasing the content of organic matter in the soil helps to control erosion.

The addition of mineral material on the surface has been important in the formation of some soils in Jackson Parish. The added material, generally in the form of alluvium, provides new parent material in which the processes of soil formation can occur. In many cases, new material has accumulated faster than the processes of soil formation could appreciably alter the material. As a result, depositional strata formed in the lower horizons of many of the alluvial soils. Even though most of the soils in Jackson Parish are alluvial, these depositional strata are evident only in the Ochlockonee and Ouachita soils. These soils have been forming in recent or relatively young alluvial sediments. Liquids or gases added to the soil are generally compounds of nitrates and sulfates dissolved or trapped in rainwater.

The loss of components from the soil is also important in the overall process of soil development, although it is generally less noticeable than the addition of materials to the soils during soil formation. For example, as organic matter is decomposed, carbon dioxide is emitted into the atmosphere. Water also escapes from the soil by evaporation and transpiration from plants. On some soils, erosion has removed both mineral and organic materials. These losses are natural, to some extent, but in some places they are accelerated by human activities. In Jackson Parish, moving water is the greatest cause of erosion.

Leaching removes many water soluble compounds and elements from the soil. Water moving through the soil carries these soluble elements out of the soil. In many soils, the soluble elements have been moved completely out of the soil profile. Sandy or loamy soils, such as the Betis, Briley, McLaurin, Cahaba, and Ouachita soils, are permeable, and most soluble bases are leached in a relatively short time. The more clayey soils are less permeable, and slowly moving water leaches smaller amounts of soluble elements. In some soils, such as Mahan soils, which formed from parent materials that contain carbonates, the free carbonates have been leached from the profile. The amount of rainfall and the length of time these parent materials have been exposed to weathering are sufficient to leach carbonates from the profile. Clayey soils, such as the Oktibbeha and Vaiden soils, formed in carbonate-rich materials. These soils have an accumulation of carbonates in the lower part of the profile because water moves slowly downward through the soils. Relatively young soils that were initially high in bases show the least amount of leaching.

The translocation of material in the soil, either in eluviation or illuviation, has been an important process in the development of most of the soils in the parish. Eluviation is the moving of solids out of part of the soil profile, and illuviation is the moving of solids into a lower part of the soil profile. In soils that have large pores, soil material that is small enough to go through these pores can be suspended in water as it moves downward. Clay particles, because of their small size, move downward in this manner. The translocation and accumulation of clay in the profile is evident in most of the soils in Jackson Parish.

In many soils in the parish, iron and manganese move to and accumulate in the lower part of the profile. These accumulations result from alternating oxidizing and reducing conditions related primarily to the fluctuations of water-saturated zones within the soils. Reduction occurs when water saturates the soil for relatively long periods and when low amounts of oxygen are in the soil. It results in gray compounds of iron and manganese characteristic of the Btg and BCg horizons in Guyton soils. Prevailing reduced conditions and a fluctuating water table can translocate iron and manganese to a lower horizon and can precipitate them at the top of the saturated zone. Bellwood, Frizzell, and Keithville soils commonly have brownish or reddish mottles.

The transformation of mineral and organic substances in soils is also a major process of soil formation. Transformation processes include oxidation, and reduction, hydration, solution and hydrolysis. Oxidation is a geochemical reaction in well aerated soils and parent material. It is important in Mahan soils. It is the oxidation of the ferrous ion to the ferric ion which colors the soil materials a dark red. This process is most common in ferrous, iron-rich parent material. Ferrous iron, the mineral species of high iron-bearing hornblende and pyroxene of the primary mineral group, is a component of soils that formed in glauconite or siderite.

Hydration occurs when water molecules or hydroxyl groups are united with minerals without their being a part of the mineral itself. It generally occurs on the surfaces or edges of mineral grains or, partly, as the structure in simple salts. For example, after hydration, anhydrite mineralizes. Gypsum is commonly in clayey soils that contain sulfate, presumably from marine sediments, and calcium, either from marine sediments or mineral weathering. Vaiden soils in Jackson Parish contain gypsum.

Hydrolysis is the chemical reaction of the hydrogen ion with individual elements within crystal structures. The highly reactive hydrogen ion replaces one of the basic ions in the structure of the mineral. Hydrolysis generally is the most important chemical weathering process. It completely disintegrates primary minerals in all soils, thus making plant nutrients available to plants.

Solution is the simple process of water as the dissolving agent of salts, such as carbonates and sulfates. In solution, salts move through the soil and are either removed from the soil profile or deposited at a lower depth.

Factors of Soil Formation

External factors control the character and development of soils *(14)*. These factors are important in understanding soil genesis. They may be an agent, force, condition, relationship, or a combination of these that influence parent material *(11)*. The five factors of soil formation are climate, organisms, parent material, relief, and time *(18)*. They determine the characteristics of the soil, but not in terms of processes, causes, or forces active in the system. They can vary either singly or collectively.

Climate

Detailed information on the climate in Jackson Parish is given in the section "General Nature of the Parish."

Rainfall and temperature are the most commonly measured features of climate and have been the most closely correlated to soil properties *(11)*. Although average climatic conditions are often given for a region, the extremes of climate in that region may have more influence in the development of certain soils properties. Rainfall and temperature can change, depending upon the relief or elevation within a general area.

Rainfall is relatively uniform throughout Jackson Parish. Major differences within the soils in the parish are not a result of variances in rainfall amounts. Betis and Cahaba are some of the most highly leached soils, but they are different because they have different parent material. The solubility of elements in minerals increases as the temperature rises in summer. When temperatures are below freezing, the physical action of water, primarily in the form of ice, plays an important role in the physical destruction of the soil. This process has minimal influence in Jackson Parish, however, which does not experience extremely cold conditions. To a degree, the intensity and annual distribution of rainfall are more important than the absolute amount of rainfall. Rainfall in the parish is not equally distributed throughout the year, and some storms are severe. The intensity of rainfall has an effect on the type and rate of reactions.

Water erodes and deposits soil material, but its most important functions are within the soil profile. Some morphological characteristics result from excessive or inadequate amounts of water. In soils that are highly leached and acid, excessive amounts of water are indicated by grayish colors in the profile. The gray color is caused by reduction. Inadequate amounts of water are indicated by the tendency of very clayey soils to shrink as they dry and swell when they become wet. Shrinking and swelling is a common feature in the Bellwood and Vaiden soils.

Temperature is considered an independent soil-forming factor that influences reactions in the soil-forming process. It is the driving force in most models of evapotranspiration. The combination of evapotranspiration and uneven rainfall distribution is perhaps the most important climatic factor in the soil-forming process. For every 10-degree rise in temperature, the speed of a chemical reaction increases by a factor of 2 to 3 *(37)*. Solar radiation generally increases with increasing elevation. It increases at the most rapid rate in the lower, dust-filled layers of the air. The absorption of solar radiation at the surface is affected by many variables, such as soil color, plant cover, and aspect. South-facing slopes are always warmer than north-facing slopes. Temperature, unlike solar radiation, generally decreases with increasing elevation. The changes in elevation in Jackson Parish are not sufficient to have a significant effect on the mean annual soil temperature.

Organisms

The effect of organisms as a soil-forming factor is indicated by the presence or absence of major horizons in the soil profile. Properties associated with living organisms are also important to soil formation. For example, living organisms play a significant role in the cycling of carbon.

The carbon cycle takes place mainly in the biosphere. In photosynthesis, the sun's energy in the form of carbon produces organic material. As organic matter decomposes, it releases nitrogen for plant use and returns carbon dioxide directly to the atmosphere. Humus, a somewhat resistant organic material, stays in the soil. Because of its size and chemical composition, humus increases infiltration, available water capacity, and cation-exchange capacity and the absorption and storage capabilities of such nutrients as calcium, magnesium, and potassium. It also improves soil tilth.

The natural vegetation in Jackson Parish is quite diverse. The low flats and drainageways are primarily in hardwoods. The gently sloping areas are in mixed hardwoods and pine, and areas on the upper slopes and ridges are in pine and a few hardwoods. In soils with the same parent material, generally the reaction of soils in areas of hardwoods is slightly higher than that of soils in areas of pine. Soils that formed under hardwoods, pines, and mixed pines and hardwoods generally are thicker in the eluvial horizon than those that formed under prairie vegetation. In soils that developed under grass, the surface horizon is generally thicker and has more organic matter than in those that formed under pine or under mixed hardwoods and pine. The amount of organic matter accumulated in the soils depends on other factors, such as temperature and rainfall. Under optimal conditions for microbial activity, the production and decomposition of organic matter are in equilibrium. Accumulation of organic matter will not occur without a change in the factor controlling the equilibrium. The content of organic matter increases when its annual production is high and conditions are not favorable for its decomposition. In Jackson Parish, most soils exist in an ecosystem in which the rate of decomposition of organic matter exceeds the ability of the vegetation to return organic matter to the soils; therefore, the soils are low in organic matter. Some frequently flooded Guyton soils are continuously saturated; therefore, organic matter decomposes (oxidizes) slowly in these soils.

Parent Material

Parent material has been defined as "the state of the soil system at time zero of soil formation" *(17)*. It is that physical body and its associated chemical and mineralogical properties at the starting point that are changed by the other soil-forming factors over time. The influence of parent material on soil properties is greater on the younger soils than on the older soils. For example, the young Ouachita and Ochlockonee soils exhibit more properties associated with the initial deposits than the much older Bowie soils, which may have very few properties in common with the initial parent material. In weathered soils, however, the influence of the parent material may be visible and the parent material can still be an independent factor in soil formation. The nature of the parent material can be expressed in the color, texture, and mineralogy of the soils. These properties can be related to physical and chemical properties, such as heat absorption, susceptibility to erosion, shrink-swell potential, and cation-exchange capacity. The characteristics associated with parent material in the parish are described in the section "Landforms and Surface Geology."

Relief

The relief in Jackson Parish ranges from low on flood plains to moderate in the uplands. Relief associated with the physiographic and geologic units within the parish is described in more detail in the section "Landforms and Surface Geology."

Relief and the geologic physiographic units influenced soil formation as a result of their effects on drainage, runoff, and erosion. Within specific geographic regions, several soil properties associated with relief are depth of the solum, thickness of the A horizon and its content of organic matter, wetness or dryness, color of the profile, degree of horizon differentiation, soil reaction, and content of soluble salts.

Relief also affects the moisture relationships in the soil, either in the form of ground water or in the amount of water available for photosynthesis. The water table is closer to the surface in depressions than on high points on the landscape. In soils with the same parent material, the seasonal high water table is more commonly close to the surface in soils in areas of low relief than in soils on convex landscapes. If the parent material is clayey and has low relief, the soils on ridgetops may be the wettest on the landscape.

Time

When considering soil formation, a pedologist normally does not think in terms of depth in inches or centimeters but rather in terms of horizons, sola, and profile development. Rather than absolute time, the rate of change is what affects soil properties. Time as a rate of change is what affects soil properties. Time as a rate of change can be described in terms of relative stages of development, absolute dating of horizons and profiles, the rate of soil formation, and the relation to the age and slope of the landform and associated weathering complex *(15, 16)*.

Several hypotheses or models in regard to time have been developed. The hypothesis of the continuous steady state system determined that time is uninterrupted and soil development begins at time zero *(7, 18)*. The continuous steady state model shows that once a process or feature has begun, it continues to develop over time until one of the soil-forming factors greatly changes. Assuming no major change, the morphological feature in time would develop to the maximum extent without giving way to other features. At time zero, for example, Ochlockonee soils have no subhorizons. As the processes of soil development begin, a cambic horizon would develop over time until it reached its maximum. According to this theory, no additional change takes place in the other soil-forming processes, and time is the only thing that changes. Because soils represent a dynamic system, however, the continuous steady state hypothesis probably errs in the way it relates time to pedogenic development.

Another hypothesis of soil formation is the sequential model *(4, 12)*. In this model all stages of soil development operate concurrently. Some processes of soil development proceed so slowly that they have very little effect, whereas others are so rapid that they determine the dominant features of the soil. As long as the relative rates of the process continue unchanged, a given set of properties expresses soil development. The sequential model, sometimes referred to as polygenesis, has two major characteristics. First, a soil morphological entity may be a consequence of a combination of several genetic factors. Second, the morphological expression of soil processes may be a result of several pathways. For example, a given soil begins to form in loamy parent material on gently sloping uplands covered with pine forest under a climate similar to that of the present. A darkened surface horizon may form because of the accumulation of organic carbon. Subsequently, an E horizon and an argillic horizon may form. The result is a soil similar to the McLaurin soils. As long as the parent material, climate, organisms, and relief did not change substantially over time, the soil would have formed sequentially. The factors, however, possibly could have changed. When some major factor changes, time as a factor of soil formation returns to zero. Because the changes made in a soil by any particular factor remain even after that factor changes, the total amount of time that the factors of soil formation were acting on the soil might not appear to differ from one soil to another.

Several methods can be used to determine the actual age of soils. Morphological properties, however, are most commonly used as a basis for dating the soils. For example, the Betis soils, which have a thick E horizon, would normally be considered older than the Sacul soils, which have a relatively thin E horizon. Other factors, however, such as parent material, climate, and living organisms, also are important in determining horizon thickness. Although geology can indicate in gross terms the relative age of the soil, pedogenic time returns to zero each time major or catastrophic events affect the landscape. These events generally begin a major geologic period.

The rate of change in weathering decreases over time *(13)*. It becomes constant only when the soil material has been weathered to the maximum extent possible under the effects of a given combination of soil-forming factors.

Soil formation is seldom a uniform process over time. Minor fluctuations can constantly readjust the environmental conditions in the system. The relative ages of the soils and their parent materials are described in the section "Landforms and Surface Geology."

Landforms and Surface Geology

Jackson Parish covers about 580 square miles in north-central Louisiana. Ouachita and Caldwell Parishes form its eastern boundaries, and Lincoln Parish forms its northern boundary. Bienville and Winn Parishes border it on the west and south, respectively.

The western part of Jackson Parish is drained by the Dugdemona River, which flows southward and eventually empties into the Little River. Many smaller streams, which originate in the parish, drain the eastern part of the parish.

Elevations in Jackson Parish range from 120 feet above sea level on the flood plain of the Dugdemona River to 340 feet above sea level in the north-central part of the parish.

The parish can be divided into three major physiographic regions, each characterized by soils formed in a different kind or age of parent material. The uplands, which make up about 71 percent of the parish, are well dissected Tertiary hills. The flood plains, which make up about 20 percent of the parish, are level and very gently sloping. The stream terraces, which make up the remaining 9 percent of the parish, are level to gently sloping and parallel the flood plains of major streams.

Uplands

Although a detailed geologic survey of Jackson Parish has not been published, literature on the Tertiary geology of central Louisiana is available *(6, 28)*. In addition, a geology map of Louisiana is available *(30)*. The Cockfield, Cook Mountain, and Sparta Formations were identified and mapped in Jackson Parish *(23)*. The Cockfield, Cook Mountain, and Sparta Formations are members of the Claiborne Group. The Claiborne is in the Eocene Series of the Tertiary System *(30)*.

Sediments of the three formations of the Claiborne Group were deposited during the Eocene Epoch of the Tertiary period *(30)*. The outcrop areas of these formations make up the entire upland area.

The oldest of the formations in Jackson Parish is the Sparta Formation. It consists of bedded nonmarine deposits of white to light gray massive sands with interbedded clays. It contains some thin beds of lignite or lignitic sands and shales *(6, 30)*. According to a recent geology map, the outcrop area of the Sparta Formation in Jackson Parish is only in the southwestern corner of the parish, east of the Dugdemona River, and about 2.5 miles west of U. S. Highway 167 *(30)*. Although the Mahan, Bowie, and Sacul soils are in the Sparta outcrop area, no individual soil series or suite of soils is restricted to the Sparta outcrop. The landscape in the area of the Sparta outcrop is one of narrow ridgetops and long, moderately steep slopes along drainageways. It is dissected by many narrow drainageways.

The Cook Mountain Formation is the next younger formation outcropping in Jackson Parish. It is bedded marine sediment consisting mostly of greenish gray sideritic and glauconitic clays in the upper part and yellowish to brownish clays and fossiliferous marl in the lower part.

The major outcrop area in Jackson Parish, identified as that of the Cook Mountain Formation on a recent geology map of Louisiana, is in a wide north-south trending band in the western part of the parish *(30)*. In part of the area, the landscape is similar to that of the Sparta Formation. In another part, the landscape is less dissected than that of the other Tertiary formations in the parish, and it has fewer streams and drainageways. The ridgetops generally are broad and show little or no erosion.

The main soils mapped in outcrop areas of the Cook Mountain Formation are the Bellwood, Betis, Bowie, Briley, Keithville, Mahan, McLaurin, Metcalf, Oktibbeha, Ruston, Sacul, and Vaiden soils. Most of these soils are also mapped in outcrop areas of the Cockfield Formation. Only the Mahan soils are restricted to sediments of the Cook Mountain Formation.

The Bellwood, Oktibbeha, and Vaiden soils are mapped mainly in an area of the Cook Mountain Formation where the landscape has broad ridgetops and few streams and drainageways. This area is about 6 miles wide and extends from about 7 miles north to 7 miles south of Jonesboro. It corresponds to the area of the Bellwood-Vaiden map unit on the General Soil Map. The Oktibbeha and Vaiden soils contain accumulations of calcium carbonate in the middle and lower parts of the profile. The calcium carbonate probably came from the mollusks, coral, and other fossilized marine animals contained within the sediments. Sediments containing calcium carbonates derived from marine animals are most commonly associated with sediments of the Jackson Group, and it is suspected that the sediments in which the Oktibbeha and Vaiden soils in Jackson Parish are forming are also those of the Jackson Group. More detailed geologic investigations are needed to confirm this suspicion.

The Cockfield Formation is the youngest of the Tertiary deposits exposed at the surface in Jackson Parish. This formation is predominantly nonmarine sediment of bedded brown lignitic clays, silts, and sands in the upper part and sideritic and glauconitic sands to clays in the lower part *(6, 30, 19)*. According to a geology map, the outcrop area of the Cockfield Formation covers about 60 percent of the parish *(30)*. The landscape of the Cockfield Formation is similar to that of the Sparta Formation. Although many of the soils in the parish are mapped in areas of the Cockfield Formation, only the Sacul soil in Jackson Parish is restricted to sediment of the Cockfield Formation.

Flood Plains

The flood plains of Jackson Parish consist primarily of Holocene alluvium that was derived primarily from the uplands within the parish and adjacent parishes.

Alluvial deposits of the flood plains make up about 20 percent of the parish. Major areas of these deposits correspond to the Guyton-Ouachita-Ochlockonee map unit on the General Soil Map. The alluvium of the flood plains in Jackson Parish is primarily loamy material that has a high content of silt. Sandy alluvium is minor in extent and occurs within the confines of major stream channels. Sandy colluvium occurs at the headwaters of some narrow drains. No significant areas of clayey alluvium were observed. The clayey alluvium probably was transported further downstream and deposited in or near the Catahoula Lake Basin of the Little River. The Guyton and Ouachita soils formed in the loamy alluvium on the flood plain. Guyton soils are also on stream terraces. The parent material of the Ochlockonee soils resulted from the partial sorting of sediments that occurs when overflow from streams constructs sandy or loamy natural levees that flank the stream channel.

The elevations on the flood plains in Jackson Parish range from about 120 feet above sea level along the Dugdemona River to about 200 feet above sea level on the flood plains of smaller streams.

The major streams that dissect the uplands of Jackson Parish include Bear Creek, Big Creek, Caney Creek, Castor Creek, Cypress Bayou, Flat Creek, Madden Creek, Redwine Creek, Sandy Creek, South Choudrant Creek, Sugar Creek, and the Dugdemona River. Many other smaller named creeks and unnamed drainageways contribute to the erosional and depositional processes occurring in the parish.

Stream Terraces

Terraces flanking major streams in Jackson Parish are identified on the geology map as the Prairie Terrace. The Prairie Terrace is considered to be of Late Pleistocene age *(30)*. Stratigraphically and topographically, the Prairie Terrace lies between the Tertiary uplands and the Holocene flood plain. The major areas of the Prairie Terrace in Jackson Parish correspond to the Frizzell-Cahaba-Guyton map unit on the General Soil Map. In Jackson Parish, these areas form a narrow and intermittent band that parallels the flood plains at an elevation only a few feet above that of the modern flood plains. When compared to Holocene meander belts along the streams that form the terrace, the landforms and the coarser nature of the deposits suggest that the stream had a greater stream competence in the Pleistocene when the terrace was forming than at present.

The Frizzell, Cahaba, and Guyton soils are the major soils mapped on the Prairie Terrace. The sediments in which these soils on the terrace formed originate as erosional detritus from upland areas of highly weathered soils. The low weatherable mineral content, low base status, and highly weathered nature of these sediments result in the formation of mostly Ultisols on the terrace.

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Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

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.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

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.

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 the 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.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

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.

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.

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.

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.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

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).

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.

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.

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.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

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
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

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.

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.

Seepage (in tables). The movement of water through the soil adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

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."

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.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1972-86 at Bienville, Louisiana)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average daily	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-----	54.0	32.7	43.4	80	10	82	6.22	2.53	9.33	7	1.0
February----	60.4	36.9	48.7	83	14	97	4.81	2.65	6.72	6	0.0
March-------	69.7	45.5	57.6	87	25	254	6.04	4.03	7.86	7	0.0
April-------	76.5	52.0	64.3	88	33	429	4.54	2.41	6.40	6	0.0
May---------	83.5	60.0	71.8	94	43	676	6.63	2.44	10.11	7	0.0
June--------	90.3	67.0	78.7	98	51	861	4.29	1.50	6.59	6	0.0
July--------	94.0	70.7	82.4	101	61	1,004	3.51	.99	5.54	6	0.0
August------	93.2	69.4	81.3	101	56	970	3.59	1.40	5.42	6	0.0
September---	86.6	64.0	75.3	98	40	759	4.11	1.76	6.11	5	0.0
October-----	77.4	52.5	65.0	93	32	465	5.68	2.65	8.27	6	0.0
November----	66.1	43.6	54.9	84	21	200	5.52	3.27	7.53	7	0.0
December----	58.0	35.8	46.9	79	14	90	5.62	2.16	8.51	6	0.0
Yearly:											
Average---	75.8	52.5	64.2	---	---	---	---	---	---	---	---
Extreme---	---	---	---	102	9	---	---	---	---	---	---
Total-----	---	---	---	---	---	5,887	60.56	50.71	69.93	75	1.0

* 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 1972-86 at Bienville, 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. 6	Mar. 15	Apr. 8
2 years in 10 later than--	Feb. 27	Mar. 10	Apr. 2
5 years in 10 later than--	Feb. 14	Feb. 27	Mar. 21
First freezing temperature in fall:			
1 year in 10 earlier than--	Nov. 27	Nov. 9	Oct. 15
2 years in 10 earlier than--	Dec. 1	Nov. 14	Oct. 23
5 years in 10 earlier than--	Dec. 9	Nov. 22	Nov. 6

TABLE 3.--GROWING SEASON

(Recorded in the period 1972-86 at Bienville, 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	275	247	206
8 years in 10	283	254	214
5 years in 10	299	268	229
2 years in 10	320	283	245
1 year in 10	>365	295	258

TABLE 4.--SUITABILITY AND LIMITATIONS OF GENERAL SOIL MAP UNITS FOR MAJOR LAND USES

Map unit	Extent of area	Cultivated crops	Pastureland	Woodland	Urban uses	Intensive recreation areas
	Pct					
1. Sacul-------------------------	46	Generally not suited (gently sloping areas are poorly suited): slope.	Moderately well suited (strongly sloping areas are poorly suited): slope, low fertility.	Moderately well suited: restricted use of equipment, erosion hazard, soil compaction, windthrow, plant competition.	Poorly suited: slow permeability, wetness, shrink-swell, slope, low strength for roads.	Moderately well suited: wetness, slow permeability, slope.
2. Briley-McLaurin---------------	9	Moderately well suited (strongly sloping areas are poorly suited): slope, soil droughtiness, low fertility.	Moderately well suited (very gently sloping areas of McLaurin soils are well suited): slope, low fertility, soil droughtiness.	Moderately well suited (Briley): soil droughtiness, seedling mortality. Well suited (McLaurin).	Moderately well suited (Briley): slope, seepage. Well suited (McLaurin).	Moderately well suited (very gently sloping areas of McLaurin soils are well suited): slope, sandy surface layer.
3. Metcalf-Keithville------------	5	Moderately well suited: low fertility, wetness, slope, potential aluminum toxicity.	Well suited.	Moderately well suited: restricted use of equipment, soil compaction, plant competition, windthrow.	Poorly suited: very slow permeability, wetness, low strength for roads.	Poorly suited: wetness, very slow permeability.
4. Bellwood-Vaiden---------------	4	Poorly suited (strongly sloping areas are generally not suited; nearly level areas are moderately well suited): wetness, poor tilth, slope, low fertility, potential aluminum toxicity.	Moderately well suited: wetness, slope, low fertility.	Moderately well suited: restricted use of equipment, erosion hazard, soil compaction, seedling mortality, windthrow, plant competition.	Poorly suited: wetness, very slow permeability, shrink-swell, slope, low strength for roads.	Poorly suited: very slow permeability, slope.

TABLE 4.--SUITABILITY AND LIMITATIONS OF GENERAL SOIL MAP UNITS FOR MAJOR LAND USES

Map unit	Extent of area	Cultivated crops	Pastureland	Woodland	Urban uses	Intensive recreation areas
	Pct					
5. Mahan-Bowie	5	Moderately well suited (strongly sloping areas are generally not suited): slope, low and medium fertility, potential aluminum toxicity.	Well suited (strongly sloping areas are moderately well suited).	Well suited.	Moderately well suited: slope, moderate and moderately slow permeability, wetness, low strength for roads.	Well suited (strongly sloping areas are moderately well suited).
6. Betis-McLaurin	2	Moderately well suited (strongly sloping areas are generally not suited): slope, low fertility, soil droughtiness.	Moderately well suited (very gently sloping areas are well suited; strongly sloping areas are poorly suited): slope, low fertility, soil droughtiness.	Moderately well suited (Betis): restricted use of equipment, seedling mortality, soil droughtiness. Well suited (McLaurin).	Moderately well suited (Betis): slope, seepage, rapid permeability, soil droughtiness. Well suited (McLaurin).	Moderately well suited (Betis): sandy surface layer, slope. Well suited (McLaurin; moderately sloping areas are moderately well suited).
7. Frizzell-Cahaba-Guyton	9	Moderately well suited (Frizzell and Guyton): wetness, low fertility, slope, potential aluminum toxicity. Well suited (Cahaba).	Well suited (Frizzell and Cahaba). Moderately well suited (Guyton): wetness, low fertility.	Moderately well suited (Frizzell and Guyton): restricted use of equipment, seedling mortality, soil compaction, windthrow, plant competition. Well suited (Cahaba).	Poorly suited (Frizzell and Guyton): wetness, slow permeability, flooding. Well suited (Cahaba).	Poorly suited (Frizzell and Guyton): wetness, slow permeability, flooding. Well suited (Cahaba).
8. Guyton-Ouachita-Ochlockonee	20	Generally not suited: flooding, wetness.	Poorly suited: flooding, wetness.	Moderately well suited: restricted use of equipment, seedling mortality, windthrow, soil compaction, plant competition.	Poorly suited: flooding, wetness.	Poorly suited: flooding, wetness.

TABLE 5.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
BdC	Bellwood silt loam, 1 to 5 percent slopes	5,300	1.4
BDE	Bellwood silt loam, 5 to 15 percent slopes	5,000	1.3
BeC	Betis loamy fine sand, 1 to 5 percent slopes	1,500	0.4
BEE	Betis loamy fine sand, 5 to 12 percent slopes	1,800	0.5
BoC	Bowie fine sandy loam, 1 to 5 percent slopes	13,500	3.6
BrC	Briley loamy fine sand, 1 to 5 percent slopes	5,100	1.4
BRE	Briley loamy fine sand, 5 to 12 percent slopes	15,300	4.1
ChB	Cahaba fine sandy loam, 1 to 3 percent slopes	8,900	2.4
FzB	Frizzell-Guyton silt loams, 0 to 2 percent slopes	18,800	5.1
GuA	Guyton silt loam	4,200	1.1
GYA	Guyton-Ouachita-Ochlockonee association, frequently flooded	71,300	19.2
KeC	Keithville very fine sandy loam, 1 to 5 percent slopes	6,900	1.9
MaC	Mahan fine sandy loam, 1 to 5 percent slopes	3,600	1.0
MAE	Mahan fine sandy loam, 5 to 15 percent slopes	4,400	1.2
McB	McLaurin loamy fine sand, 1 to 3 percent slopes	17,800	4.8
MCD	McLaurin loamy fine sand, 3 to 8 percent slopes	1,600	0.4
MeB	Metcalf very fine sandy loam, 0 to 2 percent slopes	9,700	2.6
OkC	Oktibbeha silty clay loam, 1 to 5 percent slopes	200	0.1
OKE	Oktibbeha silty clay loam, 5 to 12 percent slopes	600	0.2
RuC	Ruston fine sandy loam, 1 to 5 percent slopes	6,700	1.8
ScC	Sacul fine sandy loam, 1 to 5 percent slopes	46,100	12.4
SCE	Sacul fine sandy loam, 5 to 20 percent slopes	115,500	31.2
VaB	Vaiden silty clay loam, 0 to 2 percent slopes	1,500	0.4
	Water	5,500	1.5
	Total	370,800	100.0

TABLE 6.--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*
BdC----------------------- Bellwood	IVe	5.5	5.0	---
BDE----------------------- Bellwood	VIe	5.5	5.0	---
BeC----------------------- Betis	IIIs	6.0	---	8.0
BEE----------------------- Betis	VIe	5.5	---	7.0
BoC----------------------- Bowie	IIIe	8.0	5.5	12.0
BrC----------------------- Briley	IIIe	7.0	---	9.0
BRE----------------------- Briley	IVe	6.5	---	8.0
ChB----------------------- Cahaba	IIe	8.0	5.5	11.0
FzB**:				
Frizzell-----------------	IIw	7.0	5.5	10.0
Guyton-------------------	IIIw	6.5	5.0	---
GuA----------------------- Guyton	IIIw	6.5	5.0	---
GYA**:				
Guyton-------------------	Vw	---	4.0	---
Ouachita-----------------	Vw	7.0	7.0	9.0
Ochlockonee--------------	Vw	6.0	6.5	7.0
KeC----------------------- Keithville	IIIe	6.5	4.5	10.0
MaC----------------------- Mahan	IIIe	7.0	4.0	---
MAE----------------------- Mahan	VIe	6.0	4.0	---
McB----------------------- McLaurin	IIe	8.0	5.5	10.0
MCD----------------------- McLaurin	IIIe	7.0	5.5	8.5
MeB----------------------- Metcalf	IIw	7.0	5.0	11.0

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF PASTURE--Continued

Soil name and map symbol	Land capability	Bahiagrass	Common bermudagrass	Improved bermudagrass
		AUM*	AUM*	AUM*
OkC----------------------- Oktibbeha	IIIe	5.0	4.5	---
OKE----------------------- Oktibbeha	VIe	5.0	4.5	---
RuC----------------------- Ruston	IIIe	8.0	5.5	12.0
ScC----------------------- Sacul	IVe	7.5	5.5	7.5
SCE----------------------- Sacul	VIe	6.5	5.0	7.0
VaB----------------------- Vaiden	IIIw	7.0	4.5	---

* 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 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
BdC, BDE--------Bellwood	8C	Severe	Moderate	Moderate	Moderate	Loblolly pine-------	78	8	Loblolly pine, shortleaf pine.
						Shortleaf pine------	68	7	
						White oak-----------	70	4	
						Southern red oak----	75	4	
BeC, BEE--------Betis	7S	Moderate	Severe	Slight	Slight	Shortleaf pine------	63	7	Loblolly pine, shortleaf pine.
						Loblolly pine-------	70	6	
BoC-------------Bowie	9A	Slight	Slight	Slight	Slight	Loblolly pine-------	86	9	Loblolly pine, shortleaf pine.
						Shortleaf pine------	80	9	
BrC, BRE--------Briley	8S	Slight	Moderate	Slight	Slight	Loblolly pine-------	80	8	Loblolly pine, shortleaf pine.
						Shortleaf pine------	70	8	
ChB-------------Cahaba	9A	Slight	Slight	Slight	Slight	Loblolly pine-------	87	9	Loblolly pine, shortleaf pine, sweetgum, water oak.
						Shortleaf pine------	70	8	
						Yellow poplar-------	---	--	
						Sweetgum------------	90	7	
						Southern red oak----	---	--	
						Water oak-----------	---	--	
FzB**:									
Frizzell-------	9W	Moderate	Slight	Moderate	Severe	Loblolly pine-------	90	9	Loblolly pine, shortleaf pine, Shumard oak, water oak, cherrybark oak.
						Sweetgum------------	90	7	
						Water oak-----------	---	--	
Guyton---------	8W	Severe	Moderate	Severe	Severe	Loblolly pine-------	85	8	Loblolly pine, water oak, cherrybark oak, Shumard oak, swamp chestnut oak.
						Sweetgum------------	---	--	
						Green ash-----------	---	--	
						Cherrybark oak------	---	--	
						Water oak-----------	---	--	
						Willow oak----------	78	5	
GuA-------------Guyton	8W	Severe	Moderate	Severe	Severe	Loblolly pine-------	85	8	Loblolly pine, water oak, cherrybark oak, Shumard oak, swamp chestnut oak.
						Sweetgum------------	---	--	
						Green ash-----------	---	--	
						Cherrybark oak------	---	--	
						Water oak-----------	---	--	
						Willow oak----------	78	5	
GYA**:									
Guyton---------	6W	Severe	Severe	Severe	Severe	Green ash-----------	100	6	Green ash, Nuttall oak, American sycamore, eastern cottonwood.
						Sweetgum------------	---	--	
						Black willow--------	---	--	
						Nuttall oak---------	---	--	
						Eastern cottonwood--	---	--	
						Sugarberry----------	---	--	
						Loblolly pine-------	95	10	
Ouachita-------	11W	Moderate	Moderate	Slight	Severe	Loblolly pine-------	100	11	Green ash, Nuttall oak, eastern cottonwood.
						Sweetgum------------	100	10	
						Eastern cottonwood--	100	9	
						Cherrybark oak------	100	10	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Productivity class*	
GYA**:									
Ochlockonee----	11W	Moderate	Moderate	Slight	Moderate	Loblolly pine-------	100	11	Green ash,
						Eastern cottonwood--	---	--	Nuttall oak,
						Sweetgum------------	---	--	eastern
						Cherrybark oak------	---	--	cottonwood,
									American
									sycamore.
KeC-------------	9A	Slight	Slight	Slight	Moderate	Loblolly pine-------	90	9	Loblolly pine,
Keithville						Shortleaf pine------	80	9	shortleaf pine.
						Sweetgum------------	---	--	
						Southern red oak----	---	--	
						Hickory-------------	---	--	
MaC, MAE--------	9A	Slight	Slight	Slight	Slight	Loblolly pine-------	90	9	Loblolly pine,
Mahan						Shortleaf pine------	---	--	shortleaf pine.
						Hickory-------------	---	--	
						Southern red oak----	---	--	
						Sweetgum------------	---	--	
						White oak-----------	---	--	
						Post oak------------	---	--	
McB, MCD--------	8A	Slight	Slight	Slight	Slight	Loblolly pine-------	83	8	Loblolly pine,
McLaurin						Shortleaf pine------	70	8	shortleaf pine.
MeB-------------	10W	Moderate	Slight	Moderate	Severe	Loblolly pine-------	92	10	Loblolly pine,
Metcalf						Shortleaf pine------	74	8	shortleaf pine,
						Sweetgum------------	---	--	Shumard oak,
						Southern red oak----	---	--	cherrybark oak.
						White oak-----------	---	--	
OkC, OKE--------	7C	Moderate	Moderate	Slight	Moderate	Loblolly pine-------	76	7	Loblolly pine,
Oktibbeha						Shortleaf pine------	66	7	shortleaf pine.
						Eastern redcedar----	45	4	
						Southern red oak----	70	4	
RuC-------------	8A	Slight	Slight	Slight	Slight	Loblolly pine-------	84	8	Loblolly pine,
Ruston						Shortleaf pine------	75	8	shortleaf pine.
						Southern red oak----	---	--	
						Post oak------------	---	--	
						Sweetgum------------	---	--	
						Hickory-------------	---	--	
ScC, SCE--------	8C	Moderate	Slight	Moderate	Moderate	Loblolly pine-------	84	8	Loblolly pine,
Sacul						Shortleaf pine------	74	8	shortleaf pine.
VaB-------------	8C	Moderate	Moderate	Slight	Severe	Loblolly pine-------	79	8	Loblolly pine,
Vaiden						Shortleaf pine------	66	7	eastern
						Eastern redcedar----	45	4	redcedar.
						Southern red oak----	70	4	

* 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 8.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
BdC------------------- Bellwood	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Severe: erodes easily.	Slight.
BDE------------------- Bellwood	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: slope, percs slowly.
BeC------------------- Betis	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
BEE------------------- Betis	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: droughty, slope.
BoC------------------- Bowie	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
BrC------------------- Briley	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
BRE------------------- Briley	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: droughty, slope.
ChB------------------- Cahaba	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
FzB*:					
Frizzell-------------	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
Guyton---------------	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
GuA------------------- Guyton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
GYA*:					
Guyton---------------	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Ouachita-------------	Severe: flooding.	Moderate: flooding, percs slowly.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
Ochlockonee----------	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
KeC------------------- Keithville	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight----------	Slight.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
MaC------------------- Mahan	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Slight.
MAE------------------- Mahan	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
McB, MCD-------------- McLaurin	Slight----------	Slight----------	Moderate: slope.	Slight----------	Moderate: droughty.
MeB------------------- Metcalf	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Moderate: wetness.	Moderate: wetness.
OkC------------------- Oktibbeha	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight----------	Slight.
OKE------------------- Oktibbeha	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Slight----------	Moderate: slope.
RuC------------------- Ruston	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Slight.
ScC------------------- Sacul	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Slight----------	Slight.
SCE------------------- Sacul	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Slight----------	Moderate: slope.
VaB------------------- Vaiden	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

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
BdC----------------- Bellwood	Fair	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
BDE----------------- Bellwood	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BeC, BEE----------- Betis	Poor	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
BoC----------------- Bowie	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
BrC----------------- Briley	Poor	Fair	Good	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
BRE----------------- Briley	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
ChB----------------- Cahaba	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
FzB*:											
Frizzell-----------	Fair	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Guyton-------------	Fair	Fair	Fair	Fair	Fair	Good	Good	Good	Fair	Fair	Good.
GuA----------------- Guyton	Fair	Fair	Fair	Fair	Fair	Good	Good	Good	Fair	Fair	Good.
GYA*:											
Guyton-------------	Poor	Fair	Fair	Fair	Fair	Poor	Good	Good	Poor	Fair	Good.
Ouachita-----------	Poor	Fair	Fair	Good	Poor	Fair	Good	Fair	Fair	Good	Fair.
Ochlockonee--------	Poor	Fair	Fair	Good	Good	Fair	Poor	Very poor.	Fair	Good	Very poor.
KeC----------------- Keithville	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
MaC----------------- Mahan	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
MAE----------------- Mahan	Poor	Good	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
McB----------------- McLaurin	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MCD----------------- McLaurin	Fair	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MeB----------------- Metcalf	Fair	Good	Good	Good	Good	Good	Fair	Fair	Fair	Good	Fair.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
OkC----------------- Oktibbeha	Fair	Fair	Fair	Good	Good	Fair	Poor	Very poor.	Fair	Good	Poor.
OKE----------------- Oktibbeha	Fair	Fair	Fair	Good	Good	Fair	Very poor.	Very poor.	Fair	Good	Very poor.
RuC----------------- Ruston	Good	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.
VaB----------------- Vaiden	Fair	Fair	Fair	Good	Good	Fair	Poor	Fair	Fair	Good	Poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition 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
BdC: Bellwood	Severe: cutbanks cave, wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
BDE: Bellwood	Severe: cutbanks cave, wetness.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope, percs slowly.
BeC: Betis	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: droughty.
BEE: Betis	Severe: cutbanks cave.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
BoC: Bowie	Moderate: wetness.	Slight	Slight	Moderate: low strength.	Slight.
BrC: Briley	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: droughty.
BRE: Briley	Severe: cutbanks cave.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
ChB: Cahaba	Severe: cutbanks cave.	Slight	Slight	Slight	Slight.
FzB*:					
Frizzell	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Guyton	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: wetness.
GuA: Guyton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
GYA*:					
Guyton	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
Ouachita	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Ochlockonee	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
KeC: Keithville	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: low strength, wetness.	Slight.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
MaC-------------- Mahan	Moderate: too clayey.	Slight-----------	Slight-----------	Moderate: low strength.	Slight.
MAE-------------- Mahan	Moderate: too clayey, slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
McB-------------- McLaurin	Severe: cutbanks cave.	Slight-----------	Slight-----------	Slight-----------	Moderate: droughty.
MCD-------------- McLaurin	Severe: cutbanks cave.	Slight-----------	Moderate: slope.	Slight-----------	Moderate: droughty.
MeB-------------- Metcalf	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: low strength.	Moderate: wetness.
OkC-------------- Oktibbeha	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
OKE-------------- Oktibbeha	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: slope.
RuC-------------- Ruston	Severe: cutbanks cave.	Slight-----------	Slight-----------	Slight-----------	Slight.
ScC-------------- Sacul	Severe: wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
SCE-------------- Sacul	Severe: wetness.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: slope.
VaB-------------- Vaiden	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition 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
BdC: Bellwood	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
BDE: Bellwood	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
BeC: Betis	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
BEE: Betis	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
BoC: Bowie	Severe: wetness, percs slowly.	Moderate: seepage, slope, wetness.	Moderate: wetness, too clayey.	Slight	Fair: too clayey.
BrC: Briley	Moderate: percs slowly.	Severe: seepage.	Slight	Severe: seepage.	Good.
BRE: Briley	Moderate: percs slowly, slope.	Severe: seepage, slope.	Moderate: slope.	Severe: seepage.	Fair: slope.
ChB: Cahaba	Slight	Severe: seepage.	Severe: seepage.	Slight	Fair: thin layer.
FzB*:					
Frizzell	Severe: wetness, percs slowly.	Moderate: seepage.	Severe: wetness.	Severe: wetness.	Fair: wetness.
Guyton	Severe: wetness, percs slowly.	Moderate: seepage.	Severe: wetness.	Severe: wetness.	Poor: wetness.
GuA: Guyton	Severe: wetness, percs slowly.	Moderate: seepage.	Severe: wetness.	Severe: wetness.	Poor: wetness.
GYA*:					
Guyton	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Ouachita	Severe: flooding, percs slowly.	Severe: flooding.	Severe: flooding, seepage.	Severe: flooding.	Fair: too clayey.

See footnote at end of table.

TABLE 11.--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
GYA*:					
Ochlockonee	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Fair: wetness.
KeC Keithville	Severe: wetness, percs slowly.	Moderate: slope.	Moderate: wetness, too clayey.	Moderate: wetness.	Poor: thin layer.
MaC Mahan	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
MAE Mahan	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
McB, MCD McLaurin	Slight	Severe: seepage.	Slight	Severe: seepage.	Good.
MeB Metcalf	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Moderate: wetness.	Poor: thin layer.
OkC Oktibbeha	Severe: percs slowly.	Moderate: slope.	Severe: too clayey, too acid.	Slight	Poor: too clayey, hard to pack.
OKE Oktibbeha	Severe: percs slowly.	Severe: slope.	Severe: too clayey, too acid.	Moderate: slope.	Poor: too clayey, hard to pack.
RuC Ruston	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too sandy.	Slight	Fair: too sandy.
ScC Sacul	Severe: wetness, percs slowly.	Moderate: slope.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
SCE Sacul	Severe: wetness, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
VaB Vaiden	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
BdC, BDE: Bellwood	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
BeC, BEE: Betis	Good	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy.
BoC: Bowie	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
BrC: Briley	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
BRE: Briley	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, slope.
ChB: Cahaba	Good	Probable	Improbable: too sandy.	Fair: too clayey.
FzB*:				
Frizzell	Fair: thin layer, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Guyton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
GuA: Guyton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
GYA*:				
Guyton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Ouachita	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Ochlockonee	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
KeC: Keithville	Fair: low strength, thin layer, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.
MaC, MAE: Mahan	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
McB, MCD: McLaurin	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
MeB: Metcalf	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer, too clayey.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
OkC, OKE: Oktibbeha	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, too acid.
RuC: Ruston	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, small stones.
ScC, SCE: Sacul	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
VaB: Vaiden	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
BdC: Bellwood	Moderate: slope.	Severe: hard to pack.	Percs slowly, slope.	Slope, wetness.	Erodes easily, wetness.	Erodes easily, percs slowly.
BDE: Bellwood	Severe: slope.	Severe: hard to pack.	Percs slowly, slope.	Slope, wetness.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
BeC: Betis	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
BEE: Betis	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
BoC: Bowie	Moderate: seepage.	Moderate: piping.	Deep to water	Slope	Favorable	Favorable.
BrC: Briley	Severe: seepage.	Moderate: piping.	Deep to water	Slope, droughty, fast intake.	Soil blowing	Droughty.
BRE: Briley	Severe: seepage, slope.	Moderate: piping.	Deep to water	Slope, droughty, fast intake.	Slope, soil blowing.	Slope, droughty.
ChB: Cahaba	Severe: seepage.	Moderate: thin layer, piping.	Deep to water	Favorable	Favorable	Favorable.
FzB*:						
Frizzell	Moderate: seepage.	Severe: piping, wetness.	Percs slowly	Wetness, percs slowly, erodes easily.	Erodes easily, wetness.	Erodes easily, percs slowly.
Guyton	Moderate: seepage.	Severe: piping, wetness.	Percs slowly	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
GuA: Guyton	Moderate: seepage.	Severe: piping, wetness.	Percs slowly	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, 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.
Ouachita	Slight	Severe: piping.	Deep to water	Erodes easily, flooding.	Erodes easily	Erodes easily.
Ochlockonee	Severe: seepage.	Severe: piping.	Deep to water	Flooding	Favorable	Favorable.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
KeC-----------------Keithville	Moderate: slope.	Moderate: piping, wetness.	Percs slowly, slope.	Slope, wetness.	Erodes easily, wetness.	Erodes easily, percs slowly.
MaC-----------------Mahan	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope, soil blowing.	Soil blowing---	Favorable.
MAE-----------------Mahan	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, soil blowing.	Slope, soil blowing.	Slope.
McB-----------------McLaurin	Severe: seepage.	Severe: piping.	Deep to water	Droughty-------	Favorable------	Droughty.
MCD-----------------McLaurin	Severe: seepage.	Severe: piping.	Deep to water	Slope, droughty.	Favorable------	Droughty.
MeB-----------------Metcalf	Slight---------	Moderate: piping, wetness.	Percs slowly---	Wetness, percs slowly, erodes easily.	Erodes easily, wetness.	Erodes easily, percs slowly.
OkC-----------------Oktibbeha	Moderate: slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly.	Percs slowly---	Percs slowly.
OKE-----------------Oktibbeha	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly.	Slope, percs slowly.	Slope, percs slowly.
RuC-----------------Ruston	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope, soil blowing.	Too sandy, soil blowing.	Favorable.
ScC-----------------Sacul	Moderate: slope.	Moderate: hard to pack, wetness.	Percs slowly, slope.	Slope, wetness.	Wetness, soil blowing.	Percs slowly.
SCE-----------------Sacul	Severe: slope.	Moderate: hard to pack, wetness.	Percs slowly, slope.	Slope, wetness.	Slope, wetness, soil blowing.	Slope, percs slowly.
VaB-----------------Vaiden	Slight---------	Severe: hard to pack.	Percs slowly---	Wetness--------	Wetness, percs slowly.	Wetness, percs slowly.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--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		Fragments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
BdC, BDE--------- Bellwood	0-3	Silt loam--------	ML, CL-ML, SC-SM, SM	A-4	0	100	100	95-100	40-65	<25	NP-7
	3-60	Silty clay, clay	CH, MH	A-7	0	100	100	100	90-95	60-90	35-50
BeC, BEE---------- Betis	0-24	Loamy fine sand	SM, SP-SM	A-2	0	100	97-100	90-100	10-35	---	NP
	24-76	Loamy fine sand, fine sandy loam.	SM	A-2, A-4	0	100	97-100	90-100	25-50	---	NP
BoC-------------- Bowie	0-18	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
	18-30	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
	30-65	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
BrC-------------- Briley	0-6	Loamy fine sand	SM	A-2-4, A-4	0	95-100	95-100	80-100	17-45	<25	NP-4
	6-24	Loamy fine sand	SM	A-2-4, A-4	0	97-100	95-100	80-100	17-45	<25	NP-4
	24-65	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
BRE-------------- Briley	0-5	Loamy fine sand	SM	A-2-4, A-4	0	95-100	95-100	80-100	17-45	<25	NP-4
	5-24	Loamy fine sand	SM	A-2-4, A-4	0	97-100	95-100	80-100	17-45	<25	NP-4
	24-65	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
ChB-------------- Cahaba	0-12	Fine sandy loam	SM	A-4, A-2-4	0	95-100	95-100	65-90	30-45	---	NP
	12-39	Sandy clay loam, loam, clay loam.	SC, CL	A-4, A-6	0	90-100	80-100	75-90	40-75	22-35	8-15
	39-65	Sand, loamy sand, sandy loam.	SM, SP-SM	A-2-4	0	95-100	90-100	60-85	10-35	---	NP
FzB*: Frizzell---------	0-31	Silt loam--------	CL-ML, ML, CL	A-4	0	100	100	90-100	65-90	11-30	NP-10
	31-45	Silt loam, loam	CL-ML, ML, CL	A-4	0	100	100	90-100	65-90	11-30	NP-10
	45-60	Silty clay loam, silt loam, clay loam, loam.	CL	A-6	0	100	100	90-100	70-95	31-40	11-19
Guyton----------	0-24	Silt loam--------	ML, CL-ML	A-4	0	100	100	95-100	65-90	<27	NP-7
	24-33	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
	33-60	Silt loam, silty clay loam, sandy clay loam.	CL, CL-ML, ML	A-6, A-4	0	100	100	95-100	50-95	<40	NP-18

See footnote at end of table.

TABLE 14.--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	
GuA-------------- Guyton	0-22	Silt loam--------	ML, CL-ML	A-4	0	100	100	95-100	65-90	<27	NP-7
	22-54	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
	54-65	Silt loam, silty clay loam, sandy clay loam.	CL, CL-ML, ML	A-6, A-4	0	100	100	95-100	50-95	<40	NP-18
GYA*:											
Guyton----------	0-27	Silt loam--------	ML, CL-ML	A-4	0	100	100	95-100	65-90	<27	NP-7
	27-50	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
	50-65	Silt loam, silty clay loam, sandy clay loam.	CL, CL-ML, ML	A-6, A-4	0	100	100	95-100	50-95	<40	NP-18
Ouachita--------	0-6	Silt loam--------	ML, CL-ML, CL	A-4	0	100	100	85-95	55-85	<30	2-10
	6-14	Silt loam, loam, very fine sandy loam.	ML, CL-ML, CL	A-4	0	100	100	85-95	55-85	<30	2-10
	14-65	Silt loam, loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	100	100	85-95	55-90	25-40	5-15
Ochlockonee-----	0-10	Sandy loam	SM, ML, SC-SM, CL-ML	A-4, A-2	0	100	95-100	65-90	40-70	<26	NP-5
	10-48	Fine sandy loam, sandy loam, silt loam.	SM, ML, SC, CL	A-4	0	100	95-100	95-100	36-75	<32	NP-9
	48-65	Loamy sand, sandy loam, silt loam.	SM, ML, CL, SC	A-4, A-2	0	100	95-100	85-99	13-80	<32	NP-9
KeC-------------- Keithville	0-8	Very fine sandy loam.	ML, CL-ML	A-4	0	100	100	85-100	50-90	<25	NP-6
	8-37	Silt loam, loam, silty clay loam.	CL	A-6, A-4	0	100	100	90-100	65-95	25-35	8-16
	37-70	Silty clay, clay, sandy clay.	CH, CL	A-7-6	0	100	100	85-95	50-95	41-66	22-38
MaC-------------- Mahan	0-7	Fine sandy loam	SM, SC-SM, ML, SC	A-2-4, A-4	0-1	90-100	85-100	65-80	30-55	<25	NP-8
	7-48	Sandy clay loam, sandy clay, clay.	CL, MH, ML, CH	A-7-6, A-6, A-7-5	0-2	90-100	85-95	80-90	50-85	36-55	12-22
	48-60	Sandy loam, fine sandy loam, sandy clay loam.	SC, SC-SM, CL, CL-ML	A-4, A-6	0-2	90-100	85-95	65-85	35-55	16-35	4-18
MAE-------------- Mahan	0-14	Fine sandy loam	SM, SC-SM, ML, SC	A-2-4, A-4	0-1	90-100	85-100	65-80	30-55	<25	NP-8
	14-42	Sandy clay loam, sandy clay, clay.	CL, MH, ML, CH	A-7-6, A-6, A-7-5	0-2	90-100	85-95	80-90	50-85	36-55	12-22
	42-65	Sandy loam, fine sandy loam, sandy clay loam.	SC, SC-SM, CL, CL-ML	A-4, A-6	0-2	90-100	85-95	65-85	35-55	16-35	4-18

See footnote at end of table.

TABLE 14.--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	
McB-------------- McLaurin	0-14	Loamy fine sand	SM	A-2	0	90-100	90-100	50-75	15-30	<20	NP-4
	14-28	Sandy loam, fine sandy loam, loam.	SM, SC, SC-SM	A-4	0	90-100	90-100	85-95	36-45	<30	NP-10
	28-48	Loamy fine sand, loamy sand, sandy loam.	SM	A-2, A-4	0	90-100	90-100	50-85	15-45	<20	NP-4
	48-65	Sandy loam, sandy clay loam, loam.	SC, ML, CL, SM	A-4, A-6	0	90-100	90-100	70-80	36-55	30-40	6-15
MCD-------------- McLaurin	0-17	Loamy fine sand	SM	A-2	0	90-100	90-100	50-75	15-30	<20	NP-4
	17-44	Sandy loam, fine sandy loam, loam.	SM, SC, SC-SM	A-4	0	90-100	90-100	85-95	36-45	<30	NP-10
	44-50	Loamy fine sand, loamy sand, sandy loam.	SM	A-2, A-4	0	90-100	90-100	50-85	15-45	<20	NP-4
	50-60	Sandy loam, sandy clay loam, loam.	SC, ML, CL, SM	A-4, A-6	0	90-100	90-100	70-80	36-55	30-40	6-15
MeB-------------- Metcalf	0-8	Very fine sandy loam.	ML, CL-ML	A-4	0	100	100	90-100	65-90	<25	NP-6
	8-36	Silt loam, loam, clay loam.	CL	A-6	0	100	100	90-100	65-95	31-40	11-18
	36-65	Silty clay, clay, clay loam.	CH, CL	A-7-6	0	100	100	95-100	85-100	46-66	20-38
OkC, OKE--------- Oktibbeha	0-3	Silty clay loam	CL	A-6, A-7	0	100	95-100	90-100	70-100	32-50	12-28
	3-32	Clay--------------	CH	A-7	0	100	95-100	95-100	95-100	55-65	30-40
	32-60	Clay, silty clay	CL	A-7	0-5	95-100	90-100	90-100	90-100	41-49	25-30
RuC-------------- Ruston	0-14	Fine sandy loam	SM, ML	A-4, A-2-4	0	85-100	78-100	65-100	30-75	<20	NP-3
	14-30	Sandy clay loam, loam, clay loam.	SC, CL	A-6	0	85-100	78-100	70-100	36-75	30-40	11-20
	30-50	Fine sandy loam, sandy loam, loamy sand.	SM, ML, CL-ML, SC-SM	A-4, A-2-4	0	85-100	78-100	65-100	30-75	<27	NP-7
	50-80	Sandy clay loam, loam, clay loam.	SC, CL	A-6, A-7-6	0	85-100	78-100	70-100	36-75	30-42	11-20
ScC-------------- 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
	3-5	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
	5-35	Clay, silty clay, clay loam, sandy clay.	CH, CL, SC	A-7	0	85-100	85-100	70-100	40-95	45-70	20-40
	35-60	Silty clay loam, clay loam, 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

See footnote at end of table.

TABLE 14.--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	
SCE-------------- Sacul	0-2	Fine sandy loam	SM, SC-SM	A-4, A-2	0	75-100	75-100	45-85	25-50	<25	NP-7
	2-5	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
	5-42	Clay, silty clay, clay loam, sandy clay.	CH, CL, SC	A-7	0	85-100	85-100	70-100	40-95	45-70	20-40
	42-65	Silty clay loam, clay loam, 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
VaB-------------- Vaiden	0-2	Silty clay loam	MH, CH	A-7	0	100	100	95-100	70-90	50-60	20-30
	2-32	Clay-------------	CH, MH	A-7	0	100	100	95-100	85-95	50-90	30-50
	32-65	Clay-------------	CH	A-7	0	100	100	95-100	85-95	50-90	30-52

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

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
BdC, BDE--------- Bellwood	0-3	10-27	1.40-1.55	0.6-2.0	0.15-0.20	3.6-5.5	Low----------	0.43	5	.5-6
	3-60	45-75	1.05-1.35	<0.06	0.14-0.18	3.6-5.5	High---------	0.28		
BeC, BEE--------- Betis	0-24	2-10	1.20-1.50	6.0-20	0.05-0.09	4.5-6.0	Low----------	0.17	5	<1
	24-76	5-15	1.20-1.50	6.0-20	0.08-0.11	4.5-6.0	Low----------	0.17		
BoC-------------- Bowie	0-18	3-15	1.40-1.69	2.0-6.0	0.10-0.15	4.5-6.5	Low----------	0.32	5	.5-1
	18-30	18-35	1.60-1.69	0.6-2.0	0.11-0.18	4.5-5.5	Low----------	0.32		
	30-65	18-35	1.60-1.80	0.2-0.6	0.11-0.18	4.5-5.5	Low----------	0.32		
BrC-------------- Briley	0-6	5-18	1.50-1.65	6.0-20	0.07-0.11	4.5-6.5	Low----------	0.20	5	<2
	6-24	5-18	1.50-1.65	6.0-20	0.07-0.11	4.5-6.5	Low----------	0.20		
	24-65	15-35	1.55-1.69	0.6-2.0	0.13-0.17	4.5-6.0	Low----------	0.24		
BRE-------------- Briley	0-5	5-18	1.50-1.65	6.0-20	0.05-0.09	4.5-6.5	Low----------	0.20	5	<2
	5-24	5-18	1.50-1.65	6.0-20	0.05-0.09	4.5-6.5	Low----------	0.20		
	24-65	15-35	1.55-1.69	0.6-2.0	0.10-0.16	4.5-6.0	Low----------	0.24		
ChB-------------- Cahaba	0-12	7-17	1.35-1.60	2.0-6.0	0.10-0.14	4.5-6.0	Low----------	0.24	5	.5-2
	12-39	18-35	1.35-1.60	0.6-2.0	0.12-0.20	4.5-6.0	Low----------	0.28		
	39-65	4-20	1.40-1.70	2.0-20	0.05-0.10	4.5-6.0	Low----------	0.24		
FzB*:										
Frizzell---------	0-31	8-18	1.35-1.65	0.6-2.0	0.15-0.22	4.5-5.5	Low----------	0.49	5	.5-2
	31-45	8-18	1.35-1.65	0.6-2.0	0.15-0.20	4.5-5.5	Low----------	0.43		
	45-60	14-30	1.35-1.65	0.06-0.2	0.15-0.20	4.5-5.5	Low----------	0.43		
Guyton-----------	0-24	7-25	1.35-1.65	0.6-2.0	0.20-0.23	3.6-6.0	Low----------	0.43	5	.5-4
	24-33	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-6.0	Low----------	0.37		
	33-60	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-6.0	Low----------	0.37		
GuA-------------- Guyton	0-22	7-25	1.35-1.65	0.6-2.0	0.20-0.23	3.6-6.0	Low----------	0.43	5	.5-4
	22-54	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-6.0	Low----------	0.37		
	54-65	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-6.0	Low----------	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
	27-50	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-6.0	Low----------	0.37		
	50-65	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-6.0	Low----------	0.37		
MaC-------------- Mahan	0-7	2-15	1.35-1.70	2.0-6.0	0.10-0.15	5.1-6.0	Low----------	0.28	5	.5-4
	7-48	35-60	1.30-1.70	0.6-2.0	0.12-0.18	4.5-6.0	Low----------	0.32		
	48-60	10-35	1.35-1.70	0.6-2.0	0.10-0.17	4.5-6.0	Low----------	0.28		
MAE-------------- Mahan	0-14	2-15	1.35-1.70	2.0-6.0	0.10-0.15	5.1-6.0	Low----------	0.28	5	.5-4
	14-42	35-60	1.30-1.70	0.6-2.0	0.12-0.18	4.5-6.0	Low----------	0.32		
	42-65	10-35	1.35-1.70	0.6-2.0	0.10-0.17	4.5-6.0	Low----------	0.28		
McB-------------- McLaurin	0-14	1-5	1.30-1.70	6.0-20	0.05-0.10	4.5-5.5	Very low-----	0.17	5	.5-3
	14-28	10-18	1.40-1.60	0.6-2.0	0.10-0.15	4.5-5.5	Low----------	0.20		
	28-48	5-15	1.30-1.70	2.0-6.0	0.05-0.10	4.5-5.5	Very low-----	0.20		
	48-65	5-27	1.40-1.60	0.6-2.0	0.10-0.15	4.5-6.0	Low----------	0.20		

See footnote at end of table.

TABLE 15.--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
MCD-------------- McLaurin	0-17	1-5	1.30-1.70	6.0-20	0.05-0.10	4.5-5.5	Very low-----	0.17	5	.5-3
	17-44	10-18	1.40-1.60	0.6-2.0	0.10-0.15	4.5-5.5	Low----------	0.20		
	44-50	5-15	1.30-1.70	2.0-6.0	0.05-0.10	4.5-5.5	Very low-----	0.20		
	50-60	5-27	1.40-1.60	0.6-2.0	0.10-0.15	4.5-6.0	Low----------	0.20		
MeB-------------- Metcalf	0-8	7-22	1.35-1.65	0.6-2.0	0.12-0.18	3.6-6.0	Low----------	0.49	5	.5-2
	8-36	18-27	1.35-1.65	0.2-0.6	0.15-0.20	3.6-6.0	Low----------	0.37		
	36-65	40-60	1.20-1.60	<0.06	0.15-0.18	3.6-6.0	High---------	0.32		
OkC, OkE--------- Oktibbeha	0-3	27-40	1.20-1.50	0.06-2.0	0.13-0.17	4.5-6.5	Moderate-----	0.32	4	3-6
	3-32	60-80	1.00-1.30	<0.06	0.12-0.16	4.5-6.5	High---------	0.32		
	32-60	50-70	1.10-1.40	<0.06	0.05-0.10	6.6-8.4	High---------	0.32		
RuC-------------- Ruston	0-14	5-20	1.30-1.70	0.6-2.0	0.09-0.16	4.5-6.5	Low----------	0.28	5	.5-3
	14-30	18-35	1.40-1.70	0.6-2.0	0.12-0.17	4.5-6.0	Low----------	0.28		
	30-50	10-20	1.30-1.70	0.6-2.0	0.12-0.15	4.5-6.0	Low----------	0.32		
	50-80	15-38	1.40-1.70	0.6-2.0	0.12-0.17	4.5-6.0	Low----------	0.28		
ScC-------------- 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	1-3
	3-5	2-25	1.40-1.60	0.6-2.0	0.07-0.17	4.5-6.0	Low----------	0.28		
	5-35	35-60	1.25-1.40	0.06-0.2	0.15-0.18	3.6-5.5	High---------	0.32		
	35-60	15-40	1.30-1.45	0.2-0.6	0.14-0.18	3.6-5.5	Low----------	0.28		
SCE-------------- Sacul	0-2	5-20	1.30-1.50	0.6-2.0	0.09-0.12	4.5-6.0	Low----------	0.28	5	1-3
	2-5	2-25	1.40-1.60	0.6-2.0	0.07-0.17	4.5-6.0	Low----------	0.28		
	5-42	35-60	1.25-1.40	0.06-0.2	0.15-0.18	3.6-5.5	High---------	0.32		
	42-65	15-40	1.30-1.45	0.2-0.6	0.14-0.18	3.6-5.5	Low----------	0.28		
VaB-------------- Vaiden	0-2	27-40	1.10-1.40	0.06-0.2	0.10-0.15	4.5-6.5	Moderate-----	0.32	5	.5-3
	2-32	60-75	1.00-1.30	<0.06	0.10-0.15	4.5-6.0	Very high----	0.32		
	32-65	40-75	1.10-1.40	<0.06	0.10-0.15	4.5-8.4	Very high----	0.32		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--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	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
BdC, BDE---------- Bellwood	D	None---------	---	---	2.0-4.0	Apparent	Dec-Apr	High-----	Moderate.
BeC, BEE---------- Betis	A	None---------	---	---	>6.0	---	---	Low------	Moderate.
BoC--------------- Bowie	B	None---------	---	---	3.5-5.0	Perched	Jan-Apr	Moderate	High.
BrC, BRE---------- Briley	B	None---------	---	---	>6.0	---	---	Moderate	High.
ChB--------------- Cahaba	B	None---------	---	---	>6.0	---	---	Moderate	Moderate.
FzB*:									
Frizzell----------	C	None---------	---	---	1.5-4.0	Apparent	Dec-Apr	High-----	High.
Guyton------------	D	Rare---------	---	---	0-1.5	Perched	Dec-May	High-----	High.
GuA--------------- Guyton	D	None---------	---	---	0-1.5	Perched	Dec-May	High-----	High.
GYA*:									
Guyton------------	D	Frequent----	Brief to long.	Jan-Dec	0-1.5	Perched	Dec-May	High-----	High.
Ouachita----------	C	Frequent----	Brief to long.	Jan-Dec	>6.0	---	---	Moderate	Moderate.
Ochlockonee-------	B	Frequent----	Brief to long.	Jan-Dec	3.0-5.0	Apparent	Dec-Apr	Low------	High.
KeC--------------- Keithville	C	None---------	---	---	2.0-3.0	Perched	Dec-Apr	High-----	Moderate.
MaC, MAE---------- Mahan	C	None---------	---	---	>6.0	---	---	High-----	High.
McB, MCD---------- McLaurin	B	None---------	---	---	>6.0	---	---	Low------	Moderate.
MeB--------------- Metcalf	D	None---------	---	---	1.5-2.5	Perched	Dec-Apr	High-----	Moderate.
OkC, OKE---------- Oktibbeha	D	None---------	---	---	>6.0	---	---	High-----	High.
RuC--------------- Ruston	B	None---------	---	---	>6.0	---	---	Moderate	Moderate.
ScC, SCE---------- Sacul	C	None---------	---	---	2.0-4.0	Perched	Dec-Apr	High-----	High.
VaB--------------- Vaiden	D	None---------	---	---	1.0-2.0	Apparent	Nov-Mar	High-----	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--FERTILITY TEST DATA FOR SELECTED SOILS

(Analyses by the Soil Fertility Laboratory, Louisiana Agricultural Experiment Station. Dashes indicate data is not available.)

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	
Bellwood silt loam:[1]	A	0-3	5.81	4.6	41	9.3	4.2	0.5	0.1	3.4	2.0	31.2	45.3	19.5	31.1	0.2	17.4	2.2
(S89LA-049-20)	Bss1	3-10	1.89	4.4	24	6.0	4.7	0.5	0.1	13.0	0.8	27.0	38.3	25.1	29.5	0.3	51.8	1.3
	Bssg2	10-19	1.03	4.3	18	4.0	3.9	0.5	0.1	17.2	1.6	30.6	39.1	27.3	21.7	0.3	63.0	1.0
	Bssg3	19-42	0.61	4.2	16	2.5	3.5	0.5	0.3	18.6	0.8	31.2	38.0	26.2	17.9	0.8	71.0	0.7
	BCg1	42-54	0.33	4.2	14	2.7	3.9	0.5	0.6	18.8	0.2	31.8	39.5	26.7	19.5	1.5	70.4	0.7
	BCg2	54-60	0.14	4.1	14	3.2	4.4	0.5	0.7	17.6	0.6	28.8	37.6	27.0	23.4	1.9	65.2	0.7
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	19.2[2]	---	---	---
Betis loamy fine sand:[1]	A	0-4	0.87	5.5	34	0.7	0.3	0.1	0.1	0.0	1.2	7.8	9.0	2.4	13.3	1.1	0.0	2.3
(S89LA-049-22)	E	4-24	0.31	5.7	28	0.4	0.2	0.1	0.0	0.0	1.6	4.8	5.5	2.3	12.7	0.0	0.0	2.0
	Bw	24-38	0.07	5.6	18	0.4	0.1	0.2	0.0	0.0	1.2	7.8	8.5	1.9	8.2	0.0	0.0	4.0
	E & Bt	38-76	0.05	5.7	18	0.7	0.2	0.2	0.0	0.0	1.0	7.7	8.8	2.1	12.5	0.0	0.0	3.5
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.2[2]	---	---	---
Betis loamy fine sand:[3]	A	0-12	0.39	5.4	15	0.4	0.1	0.0	0.1	0.0	1.6	4.2	4.8	2.2	12.5	2.1	0.0	4.0
(S89LA-049-23)	E	12-24	0.07	5.6	15	0.6	0.1	0.0	0.0	0.0	0.8	5.4	6.1	1.5	11.5	0.0	0.0	6.0
	Bw	24-42	0.03	5.5	16	0.5	0.1	0.0	0.0	0.0	1.0	6.0	6.6	1.6	9.1	0.0	0.0	5.0
	E/Bt	42-73	0.03	5.5	13	0.8	0.3	0.0	0.0	0.0	1.0	1.8	2.9	2.1	37.9	0.0	0.0	2.7
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	45.5[2]	---	---	---
Bowie fine sandy loam:[1]	A	0-8	0.84	5.2	44	1.0	0.3	0.1	0.0	0.4	0.2	2.9	4.3	2.0	32.6	0.0	20.0	3.3
(S89LA-049-1)	E	8-18	0.32	5.4	26	0.5	0.1	0.1	0.0	0.4	0.2	3.0	3.7	1.3	18.9	0.0	30.8	5.0
	Bt	18-30	0.21	5.4	39	2.6	2.6	0.2	0.1	0.2	0.4	6.0	11.5	6.1	47.8	0.9	3.3	1.0
	Btv1	30-44	0.08	5.1	38	1.3	2.8	0.2	0.1	2.2	0.0	8.4	12.8	6.6	34.4	0.8	33.3	0.5
	Btv2	44-65	0.04	5.1	38	0.8	2.5	0.2	0.1	4.4	0.0	8.5	12.1	8.0	29.8	0.8	55.0	0.3
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	12.6[2]	---	---	---

See footnotes at end of table.

TABLE 17.--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:[4]	A	0-8	1.47	5.2	23	1.9	0.7	0.2	0.0	0.8	1.2	3.6	6.4	4.8	43.8	0.0	16.7	2.7
(S89LA-049-14)	E	8-14	0.50	5.4	21	1.3	0.6	0.1	0.0	0.0	1.4	1.8	3.8	3.4	52.6	0.0	0.0	2.2
	Bt1	14-23	0.39	4.9	17	3.3	2.9	0.3	0.0	2.8	1.8	7.2	13.7	11.1	47.4	0.0	25.2	1.1
	Bt2	23-36	0.20	4.8	5	1.6	1.9	0.2	0.0	4.6	0.4	9.0	12.7	8.7	29.1	0.0	52.9	0.8
	Bt3	36-50	0.05	4.8	13	0.5	1.3	0.2	0.0	4.2	0.8	7.8	9.8	7.0	20.4	0.0	60.0	0.4
	Bt4	50-66	0.01	4.8	28	0.2	1.6	0.2	0.1	4.6	1.0	6.6	8.7	7.7	24.1	0.1	59.7	0.1
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17.4[2]	---	---	---
Briley loamy fine sand:[5]	A	0-6	0.07	5.7	12	0.7	0.3	0.1	0.0	0.0	0.4	1.2	2.3	1.5	47.8	0.0	0.0	2.3
(S89LA-049-2)	E1	6-10	0.10	5.7	12	0.5	0.2	0.1	0.0	0.0	0.4	1.1	1.9	1.2	42.1	0.0	0.0	2.5
	E2	10-24	0.03	5.7	12	0.5	0.2	0.1	0.0	0.0	0.4	1.1	1.9	1.2	42.1	0.0	0.0	2.5
	BE	24-29	0.11	5.6	10	0.8	0.2	0.1	0.0	0.0	0.8	1.6	2.7	1.9	40.7	0.0	0.0	4.0
	Bt1	29-33	0.04	5.8	14	1.4	0.3	0.1	0.0	0.0	0.4	0.5	2.3	2.2	78.3	0.0	0.0	4.7
	Bt2	33-41	0.67	5.9	18	2.4	0.5	0.2	0.0	0.0	0.4	1.8	4.9	3.5	63.3	0.0	0.0	4.8
	Bt3	41-66	0.05	5.7	18	2.3	0.7	0.2	0.0	0.0	0.8	2.4	5.6	4.0	57.1	0.0	0.0	3.3
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	62.3[2]	---	---	---
Briley loamy fine sand:[1]	A	0-5	1.57	4.8	47	1.2	0.2	0.1	0.0	0.4	0.8	3.8	5.3	2.7	28.3	0.0	14.8	6.0
(S89LA-049-3)	E1	5-12	0.44	5.6	52	0.5	0.1	0.0	0.0	0.0	1.0	1.8	2.4	1.6	25.0	0.0	0.0	5.0
	E2	12-24	0.25	5.9	28	0.5	0.1	0.0	0.0	0.0	0.4	0.6	1.2	1.0	50.0	0.0	0.0	5.0
	BE	24-28	0.13	6.1	23	1.2	0.2	0.1	0.0	0.0	0.4	1.2	2.7	1.9	56.6	0.0	0.0	6.0
	Bt1	28-40	0.21	5.5	19	2.5	0.7	0.2	0.0	0.4	0.4	1.8	5.2	4.2	65.4	0.0	9.5	3.6
	Bt2	40-52	0.00	5.5	12	1.7	0.8	0.1	0.0	0.2	0.4	1.6	4.2	3.2	61.9	0.0	6.3	2.1
	Bt3	52-65	0.00	5.3	15	1.7	1.2	0.1	0.0	0.4	0.4	2.4	5.4	3.8	55.6	0.0	10.5	1.4
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	41.5[2]	---	---	---
Cahaba fine sandy loam:[1]	A	0-6	1.29	5.2	49	1.1	0.3	0.1	0.0	0.2	0.8	3.0	4.5	2.5	33.3	0.0	8.0	3.7
(S89LA-049-4)	E	6-12	0.45	5.4	91	0.7	0.3	0.1	0.0	0.4	0.4	1.8	2.9	1.9	37.9	0.0	21.1	2.3
	EB	12-15	0.05	5.1	36	1.1	0.3	0.1	0.0	0.6	0.2	2.4	3.9	2.3	38.5	0.0	26.1	3.7
	Bt1	15-28	0.10	4.9	28	1.6	0.3	0.2	0.0	1.4	0.6	5.4	7.5	4.1	28.0	0.0	34.1	5.3
	Bt2	28-39	0.10	4.9	28	1.6	0.3	0.2	0.0	1.4	0.6	5.4	7.5	4.1	28.0	0.0	34.1	5.3
	BC	39-65	0.08	5.0	87	1.1	0.4	0.2	0.0	1.6	0.8	6.0	7.7	4.1	22.1	0.0	39.0	2.8
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	21.3[2]	---	---	---

See footnotes at end of table.

TABLE 17.--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	
Guyton silt loam:[6] (S89LA-049-5)	A	0-6	1.68	4.7	23	0.9	0.3	0.1	0.0	0.6	0.8	6.6	7.9	2.7	16.5	0.0	22.2	3.0
	E1	6-13	0.67	4.7	16	0.6	0.3	0.1	0.0	0.8	0.6	5.4	6.4	2.4	15.6	0.0	33.3	2.0
	E2	13-22	0.24	4.6	18	0.3	0.4	0.1	0.0	1.6	0.6	5.3	6.1	3.0	13.1	0.0	53.3	0.8
	B/E	22-33	0.23	4.6	23	0.5	0.9	0.1	0.5	3.2	0.8	9.0	11.0	6.0	18.2	4.5	53.3	0.6
	Btg1	33-54	0.12	4.4	18	0.5	1.4	0.1	1.0	5.0	0.8	12.0	15.0	8.8	20.0	6.7	56.8	0.4
	Btg2	54-68	0.09	4.3	24	0.6	1.5	0.1	1.6	4.6	1.4	11.9	15.7	9.8	24.2	10.2	46.9	0.4
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	30.7[2]	---	---	---
Guyton silt loam:[1] (S89LA-049-6)	A	0-6	1.69	4.8	41	0.5	0.6	0.1	0.1	10.0	1.0	15.6	16.9	12.3	7.7	0.6	81.3	0.8
	Eg1	6-12	0.15	5.1	15	0.6	0.8	0.1	0.6	7.6	0.8	14.4	16.5	10.5	12.7	3.6	72.4	0.8
	Eg2	12-27	0.18	5.2	15	0.8	1.0	0.1	0.8	7.5	0.6	14.4	17.1	10.8	15.8	4.7	69.4	0.8
	Btg/E	27-35	0.25	4.8	15	1.4	1.5	0.1	1.7	7.0	0.6	13.2	17.9	12.3	26.3	9.5	56.9	0.9
	Btg1	35-50	0.20	4.8	25	1.8	1.9	0.1	2.4	7.7	0.8	10.2	16.4	14.7	37.8	14.6	52.4	0.9
	Btg2	50-65	0.16	4.7	28	2.4	2.2	0.2	4.3	2.6	0.6	7.8	16.9	12.3	53.8	25.4	21.1	1.1
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	70.7[2]	---	---	---
Mahan fine sandy loam:[1] (S89LA-049-8)	A	0-3	2.36	5.8	23	1.1	0.4	0.1	0.0	0.0	0.2	3.6	5.2	1.8	30.8	0.0	0.0	2.8
	E	3-7	0.39	5.6	32	0.9	0.3	0.1	0.0	0.0	0.4	4.8	6.1	1.7	21.3	0.0	0.0	3.0
	Bt1	7-24	0.57	5.1	30	4.4	3.0	0.3	0.0	0.8	0.8	9.6	17.3	9.3	44.5	0.0	8.6	1.5
	Bt2	24-34	0.01	5.2	27	3.1	3.9	0.2	0.1	2.6	0.8	12.0	19.3	10.7	37.8	0.5	24.3	0.8
	Bt3	34-48	0.00	5.2	23	2.1	2.8	0.2	0.0	2.8	0.2	11.9	17.0	8.1	30.0	0.0	34.6	0.8
	BC	48-60	0.01	5.2	25	1.8	2.7	0.2	0.0	3.4	0.6	11.4	16.1	8.7	29.2	0.0	39.1	0.7
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	32.3[2]	---	---	---
Mahan fine sandy loam:[8] (S89LA-049-9)	A	0-4	1.30	5.4	16	1.8	0.7	0.2	0.0	0.0	0.4	5.4	8.1	3.1	33.3	0.0	0.0	2.6
	E	4-19	0.82	5.8	23	2.4	1.0	0.2	0.0	0.0	0.2	4.2	7.8	3.8	46.2	0.0	0.0	2.4
	Bt1	19-27	0.60	5.0	36	5.5	5.2	0.5	0.0	2.8	0.2	12.6	23.8	14.2	47.1	0.0	19.7	1.1
	Bt2	27-42	0.11	4.9	18	0.4	1.6	0.2	0.0	7.0	0.6	13.2	15.4	9.8	14.3	0.0	71.4	0.3
	BC	42-56	0.01	4.9	14	0.1	0.6	0.1	0.0	3.4	1.0	4.8	5.6	5.2	14.3	0.0	65.4	0.2
	C	56-66	0.01	4.6	16	0.1	0.6	0.1	0.0	5.4	1.6	9.0	9.8	7.8	8.2	0.0	69.2	0.2
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See footnotes at end of table.

TABLE 17.--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	
McLaurin loamy fine sand:[1] (S89LA-049-10)	A	0-6	0.36	5.1	19	0.3	0.1	0.0	0.0	0.0	0.6	2.4	2.8	1.0	14.3	0.0	0.0	3.0
	E	6-14	0.19	5.3	16	1.0	0.2	0.1	0.0	0.0	0.8	1.8	3.1	2.1	41.9	0.0	0.0	5.0
	Bt	14-28	0.00	5.4	16	1.9	0.4	0.1	0.0	0.2	0.8	2.4	4.8	3.4	50.0	0.0	5.9	4.8
	Bt/E	28-48	0.07	5.5	15	1.0	0.4	0.1	0.0	0.0	0.4	1.2	2.7	1.9	55.6	0.0	0.0	2.5
	B't	48-65	0.00	5.6	16	1.1	0.8	0.1	0.0	0.0	1.0	1.1	3.1	3.0	64.5	0.0	0.0	1.4
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	45.5[2]	---	---	---
McLaurin loamy fine sand:[9] (S89LA-049-17)	A	0-4	2.98	4.8	13	0.3	0.3	0.1	0.0	0.0	0.8	7.2	7.9	1.5	8.9	0.0	0.0	1.0
	E	4-10	0.52	5.0	6	0.1	0.1	0.1	0.0	0.8	0.2	1.6	1.9	1.3	15.8	0.0	61.5	1.0
	EB	10-14	0.30	5.1	8	0.1	0.1	0.1	0.0	0.0	1.4	2.4	2.7	1.7	11.1	0.0	0.0	1.0
	Bt1	14-25	0.24	5.1	8	0.4	0.4	0.2	0.0	0.0	1.2	1.8	2.8	2.2	35.7	0.0	0.0	1.0
	Bt2	25-34	0.10	5.1	11	0.9	0.9	0.2	0.1	0.0	1.0	4.8	6.9	3.1	30.4	1.4	0.0	1.0
	Bt3	34-44	0.12	5.3	9	1.2	1.2	0.2	0.0	0.0	1.8	1.6	4.2	4.4	61.9	0.0	0.0	1.0
	B/E	44-54	0.00	5.4	8	1.3	1.3	0.1	0.0	0.0	1.2	2.4	5.1	3.9	52.9	0.0	0.0	1.0
	B't	54-60	0.02	5.3	8	2.0	2.0	0.1	0.1	0.0	2.0	3.6	7.8	6.2	53.8	1.3	0.0	1.0
Metcalf very fine sandy loam:[1] (S89LA-049-11)	A	0-3	1.62	5.3	21	1.6	0.3	0.1	0.0	0.0	0.8	4.8	6.8	2.8	29.4	0.0	0.0	5.3
	E	3-8	0.14	5.3	14	1.4	0.2	0.0	0.0	0.2	0.6	1.8	3.4	2.4	47.1	0.0	8.3	7.0
	Bt1	8-20	0.19	5.1	17	2.2	1.4	0.1	1.3	1.4	0.8	4.2	8.0	6.0	47.5	1.3	23.3	1.6
	Bt2	20-29	0.08	4.7	20	1.2	1.7	0.1	0.9	5.2	1.0	8.4	11.5	9.3	27.0	0.9	55.9	0.7
	Bt/E	29-36	0.00	4.7	19	0.8	2.3	0.1	1.4	7.0	1.0	10.8	14.2	11.4	23.9	1.4	61.4	0.3
	2Btg3	36-56	0.00	4.9	17	0.6	2.8	0.1	2.0	7.8	0.8	11.4	15.2	12.4	25.0	2.0	62.9	0.2
	2Btg4	56-65	0.10	4.5	36	0.5	7.5	0.5	1.2	16.6	1.0	24.6	33.5	26.5	26.6	1.2	62.6	0.1
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	37.1[2]	---	---	---
Oktibbeha silty clay loam:[1] (S89LA-049-31)	Ap	0-3	4.40	5.8	48	20.6	3.2	0.6	0.1	0.0	0.8	13.3	37.8	25.3	64.8	0.3	0.8	6.4
	Bt1	3-11	0.94	5.0	36	18.1	3.5	0.4	0.1	2.0	0.8	17.0	39.1	24.9	56.5	0.3	8.0	5.2
	Bt2	11-20	0.35	4.6	38	24.4	3.6	0.6	0.1	2.2	0.8	17.0	45.7	31.7	62.8	0.2	6.9	6.8
	Bt3	20-32	0.15	5.6	40	27.1	3.7	0.7	0.1	1.6	1.0	13.3	44.9	34.2	70.4	0.2	4.7	7.3
	Ck1	32-39	0.43	7.8	68	39.8	0.6	0.5	0.1	0.0	1.0	7.0	48.0	42.0	85.4	0.2	0.0	66.3
	Ck2	39-54	0.16	8.2	73	45.7	0.7	0.6	0.1	0.0	1.0	2.2	49.3	48.1	95.5	0.2	0.0	65.3
	Ck3	54-60	0.03	7.8	90	39.0	0.6	0.4	0.1	0.0	1.4	1.0	41.1	41.5	97.6	0.2	0.0	65.0
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See footnotes at end of table.

TABLE 17.--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	
Ruston fine sandy loam:[1] (S89LA-049-21)	A	0-6	3.05	5.2	10	2.1	0.4	0.1	0.0	0.0	1.2	9.6	12.2	3.8	21.3	0.0	0.0	5.2
	E	6-14	0.63	5.1	6	0.4	0.1	0.0	0.0	0.0	1.0	7.8	8.3	1.5	6.0	0.0	0.0	4.0
	Bt1	14-22	0.24	5.1	10	2.4	2.1	0.2	0.0	1.0	1.2	9.0	13.7	6.9	34.3	0.0	14.5	1.1
	Bt2	22-30	0.14	5.2	11	1.5	1.9	0.2	0.1	1.6	0.6	9.6	13.3	5.9	27.8	0.8	27.1	0.8
	Bt/E	30-50	0.04	5.2	9	1.0	0.8	0.1	0.0	0.0	1.4	9.6	11.5	3.3	16.5	0.0	0.0	1.3
	B't1	50-64	0.07	5.1	10	0.9	1.2	0.1	0.1	0.6	0.8	10.8	13.1	3.7	17.6	0.8	16.2	0.7
	B't2	64-80	0.40	5.0	8	0.4	1.4	0.2	0.1	2.8	1.2	10.8	12.9	6.1	16.3	0.8	45.9	0.3
	---	---	---	---	---	---	---	---	---	---	---	---	---	---	13.2[2]	---	---	---
Sacul fine sandy loam:[10] (S89LA-049-12)	A	0-2	2.09	5.5	14	4.0	0.9	0.2	0.1	0.0	0.8	1.6	6.8	6.0	76.5	1.5	0.0	4.4
	E	2-9	0.95	5.7	13	2.6	0.5	0.1	0.0	0.0	1.2	4.2	7.4	4.4	43.2	0.0	0.0	5.2
	Bt1	9-19	0.33	4.6	16	3.5	6.7	0.4	0.1	10.6	0.2	14.4	25.1	21.5	42.6	0.4	49.3	0.5
	Bt2	19-31	0.28	4.5	17	3.5	7.4	0.4	0.2	12.0	0.2	13.2	24.7	23.7	46.6	0.8	50.6	0.5
	Bt3	31-40	0.21	4.5	16	3.1	7.4	0.4	0.2	14.0	0.6	14.6	25.7	25.7	43.2	0.8	54.5	0.4
	BC	40-60	0.11	4.7	11	1.7	5.1	0.2	0.4	11.0	1.0	12.8	20.2	19.4	36.6	2.0	56.7	0.3
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Sacul fine sandy loam:[1] (S89LA-049-13)	A	0-2	1.45	5.2	32	1.7	0.6	0.1	0.0	1.4	0.0	7.8	10.2	3.8	23.5	0.0	36.8	2.8
	E	2-5	1.14	5.1	22	1.1	1.3	0.2	0.0	1.2	1.4	6.6	9.2	5.2	28.3	0.0	23.1	0.8
	Bt1	5-12	0.78	4.5	33	7.6	7.5	0.5	0.1	8.2	0.4	17.4	33.1	24.3	47.4	0.3	33.7	1.0
	Bt2	12-27	0.26	4.6	19	6.4	6.7	0.3	0.1	11.0	0.4	16.8	30.3	24.9	44.6	0.3	44.2	1.0
	Btg	27-42	0.10	4.3	32	6.5	6.8	0.3	0.2	11.0	0.6	16.4	30.2	25.4	45.7	0.7	43.3	1.0
	BCg	42-52	0.01	4.6	19	2.7	5.4	0.2	0.1	11.0	1.0	16.8	25.2	20.4	33.3	0.4	53.9	0.5
	Cg	52-65	0.00	4.6	15	2.3	5.2	0.2	0.1	10.2	1.6	16.2	24.0	19.6	32.5	0.4	52.0	0.4
Sacul fine sandy loam:[11] (S89LA-049-15)	A	0-2	1.86	5.2	10	1.7	0.8	0.1	0.0	0.8	1.0	6.6	9.2	4.4	28.3	0.0	18.2	2.1
	E	2-7	0.66	5.1	12	1.0	0.8	0.1	0.0	1.0	1.0	7.2	9.1	3.9	20.9	0.0	25.6	1.3
	Bt1	7-20	0.76	4.7	7	1.3	8.8	0.6	0.1	8.2	1.2	17.4	28.2	20.2	38.3	0.4	40.6	0.1
	Bt2	20-25	0.50	4.5	11	0.8	6.4	0.5	0.1	14.8	1.2	22.2	30.0	23.8	26.0	0.3	62.2	0.1
	Bt3	25-42	0.21	4.6	10	0.3	2.9	0.3	0.1	8.8	2.0	14.4	18.0	14.4	20.0	0.6	61.1	0.1
	Bt4	42-56	0.12	4.4	13	0.3	7.0	0.5	0.3	18.4	1.4	27.0	35.1	27.9	23.1	0.9	65.9	0.0
	BC	56-66	0.13	4.6	8	0.5	8.8	0.5	0.4	10.6	0.4	25.2	35.4	21.2	28.8	1.1	50.0	0.1
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See footnotes at end of table.

TABLE 17.--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	Effective cation-exchange capacity Al	Ca/Mg
		In	Pct		Ppm	Milliequivalents/100 grams of soil									Pct	Pct	Pct	
Vaiden silty clay loam:[1]	A	0-2	3.02	5.2	14	7.1	1.5	0.1	0.0	1.0	0.2	7.8	16.5	9.9	52.7	0.0	10.1	4.7
	Bt1	2-6	0.85	4.9	9	7.6	2.4	0.1	0.1	4.4	0.2	9.0	19.2	14.8	53.1	0.5	29.7	3.2
	Bt2	6-14	0.87	4.6	14	12.9	4.9	0.3	0.2	9.4	0.0	13.2	31.5	27.7	58.1	0.6	33.9	2.6
	Bt3	14-32	0.72	4.6	14	17.1	6.2	0.3	0.4	7.6	0.4	16.8	40.8	32.0	58.8	1.0	23.8	2.8
	C	32-43	0.36	5.2	16	24.3	8.4	0.5	1.0	2.6	0.4	2.8	37.0	37.2	92.4	2.7	7.0	2.9
	Ck1	43-57	0.37	7.9	26	45.9	9.9	0.7	1.8	0.0	1.0	2.4	60.7	59.3	96.0	3.0	0.0	4.6
	Ck2	57-65	0.37	8.0	25	43.8	10.0	0.7	2.4	0.0	1.8	1.2	58.1	58.7	97.9	4.1	0.0	4.4
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[1] This pedon is the same as the typical pedon for the series. For the description and location of the soil, see the section "Soil Series and Their Morphology".

[2] This base saturation value is for the critical depth for classifying the soil at the order level.

[3] This pedon classifies as a Paleudalf rather than a Paleudult. The soil is mapped as a similar soil in map unit BEE, Betis loamy fine sand, 5 to 12 percent slopes. The pedon is located in the NW1/4NW1/4 sec. 11, T. 17 N., R. 1 W.

[4] This pedon of Briley loamy fine sand, 5 to 12 percent slopes, is located about 3.2 miles west of Chatham; about 0.3 miles north of Highway 4, 300 feet northeast of parish road; SW1/4NE1/4 sec. 7, T. 15 N., R. 1 W.

[5] This pedon classifies as a Paleudalf rather than a Paleudult. The soil is mapped as a similar soil in map unit BrC, Briley loamy fine sand, 1 to 5 percent slopes. The pedon is located about 4.5 miles east of Ansley, 2.4 miles north of Highway 155; SE1/4SE1/4 sec. 12, T. 16 N., R. 3 W.

[6] This pedon classifies as an Ultisol rather than an Alfisol. The soil is mapped as a similar soil in map unit GuA, Guyton silt loam. The pedon is located about 1 mile south of Highway 148, about 300 feet west of parish road 281; SE1/4NE1/4; sec. 30, T. 16 N., R. 1 E.

[7] This pedon classifies as an Ultisol rather than an Alfisol.

[8] This Mahan pedon is located about 3.2 miles northwest of Wyatt, 3 miles south of Highway 4, about 50 feet west of parish road; SE1/4SW1/4 sec. 23, T. 14 N., R. 4 W.

[9] This pedon classifies as an Alfisol rather than an Ultisol. The soil is mapped as a similar soil in map unit McD, McLaurin loamy fine sand, 3 to 8 percent slopes. The pedon is located about 1.9 miles northwest of Vernon, 1,500 feet northwest of dirt road; NW1/4 sec. 2, T. 16 N., R. 2 W.

[10] This pedon classifies as an Alfisol rather than an Ultisol. The soil is mapped as a similar soil in map unit ScC, Sacul fine sandy loam, 1 to 5 percent slopes. The pedon is located about 1 mile south of Highway 4, 150 feet east of dirt road; NW1/4NW1/4 sec. 19, T. 15 N., R. 1 W.

[11] This pedon of Sacul fine sandy loam, 5 to 20 percent slopes, is located about 1.7 miles west of Highway 146, 2 miles southwest of the intersection of Highways 145 and 146, about 200 feet south of company road; NW1/4SW1/4 sec. 16, T. 17 N., R. 2 W.

TABLE 18.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
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
Cahaba	Fine-loamy, siliceous, thermic Typic Hapludults
Frizzell	Coarse-silty, siliceous, thermic Glossaquic Hapludalfs
Guyton	Fine-silty, siliceous, thermic Typic Glossaqualfs
Keithville	Fine-silty, siliceous, thermic Glossaquic Paleudalfs
Mahan	Clayey, kaolinitic, thermic Typic Hapludults
McLaurin	Coarse-loamy, siliceous, thermic Typic Paleudults
Metcalf	Fine-silty, siliceous, thermic Aquic Glossudalfs
Ochlockonee	Coarse-loamy, siliceous, acid, thermic Typic Udifluvents
Oktibbeha	Very-fine, montmorillonitic, thermic Vertic Hapludalfs
Ouachita	Fine-silty, siliceous, thermic Fluventic Dystrochrepts
Ruston	Fine-loamy, siliceous, thermic Typic Paleudults
Sacul	Clayey, mixed, thermic Aquic Hapludults
Vaiden	Very-fine, montmorillonitic, thermic Vertic Hapludalfs

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