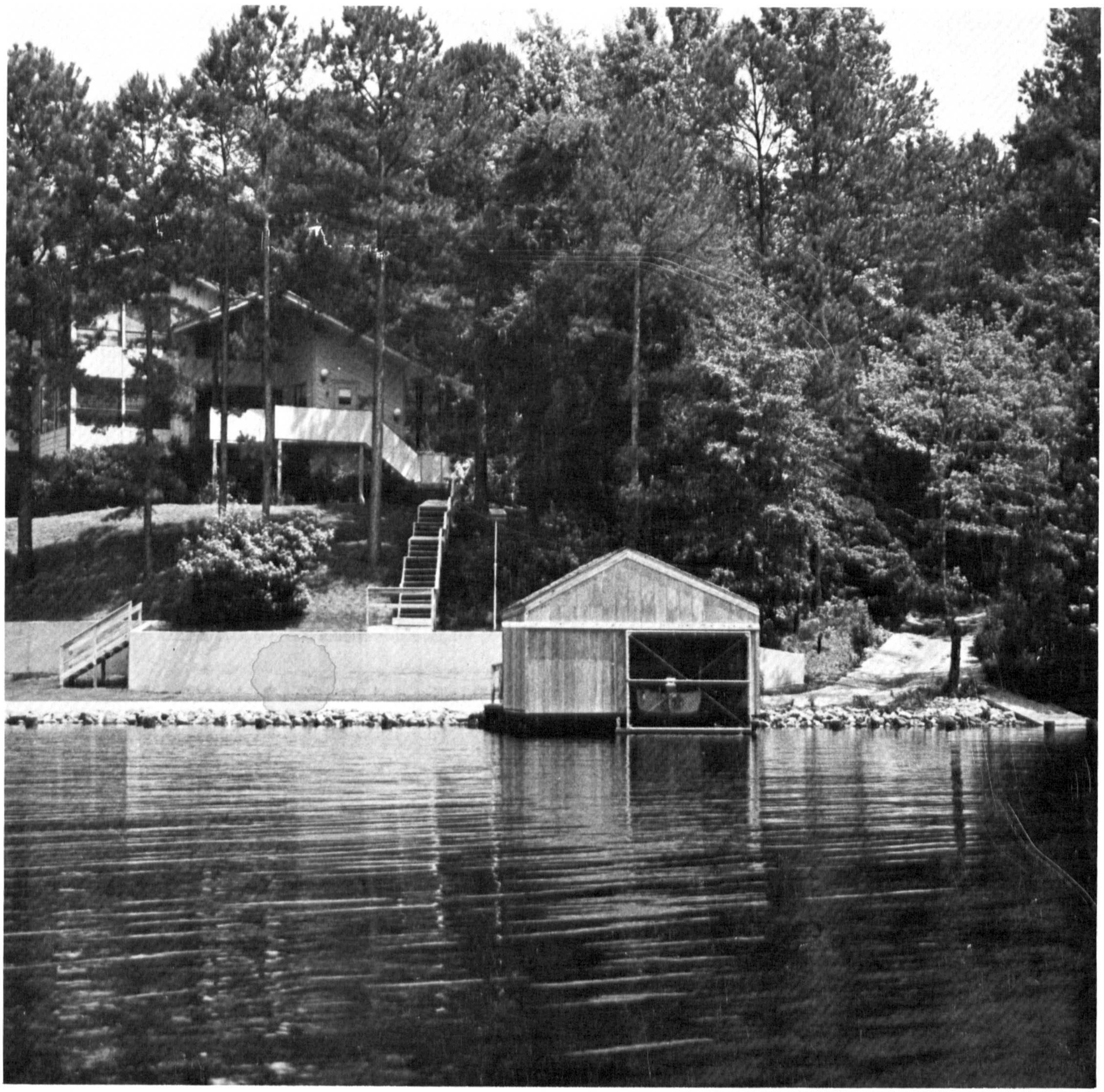
United States Department of Agriculture

Soil Conservation Service

In cooperation with United States Department of Agriculture, Forest Service; Louisiana Agricultural Experiment Station; and Louisiana Soil and Water Conservation Committee

Soil Survey of Claiborne Parish, Louisiana



How To Use This Soil Survey

General Soil Map

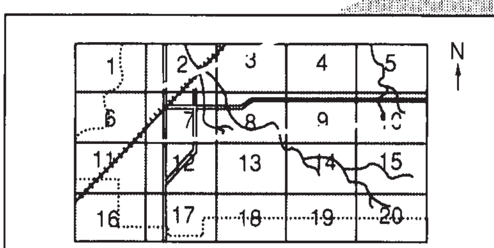
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

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.

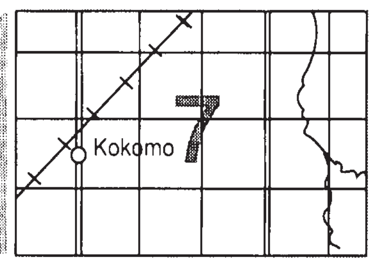
Detailed Soil Maps

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

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.

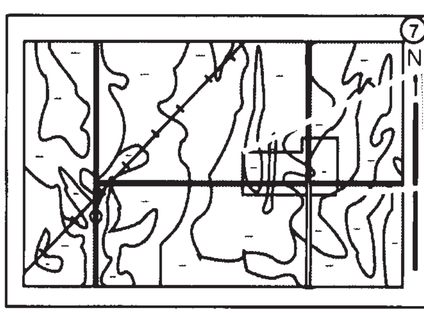


INDEX TO MAP SHEETS

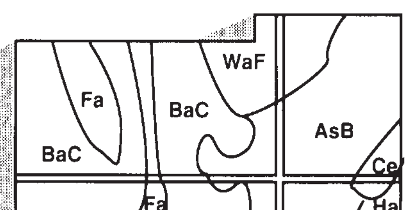


MAP SHEET

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 Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1985. Soil names and descriptions were approved in 1986. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1985. This soil survey was made cooperatively by the Soil Conservation Service, the U.S. Forest Service, the Louisiana Agricultural Experiment Station, the Louisiana Soil and Water Conservation Committee, and the Claiborne Parish Police Jury. It is part of the technical assistance furnished to the D'Arbonne Soil and Water Conservation District.

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

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

Cover: Lake Claiborne is the largest recreation lake in Claiborne Parish. Both seasonal and year-round residences are around the lake. The soil in this area is Darley gravelly fine sandy loam, 5 to 12 percent slopes.

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Issued May 1989

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Summary of Tables

Foreword

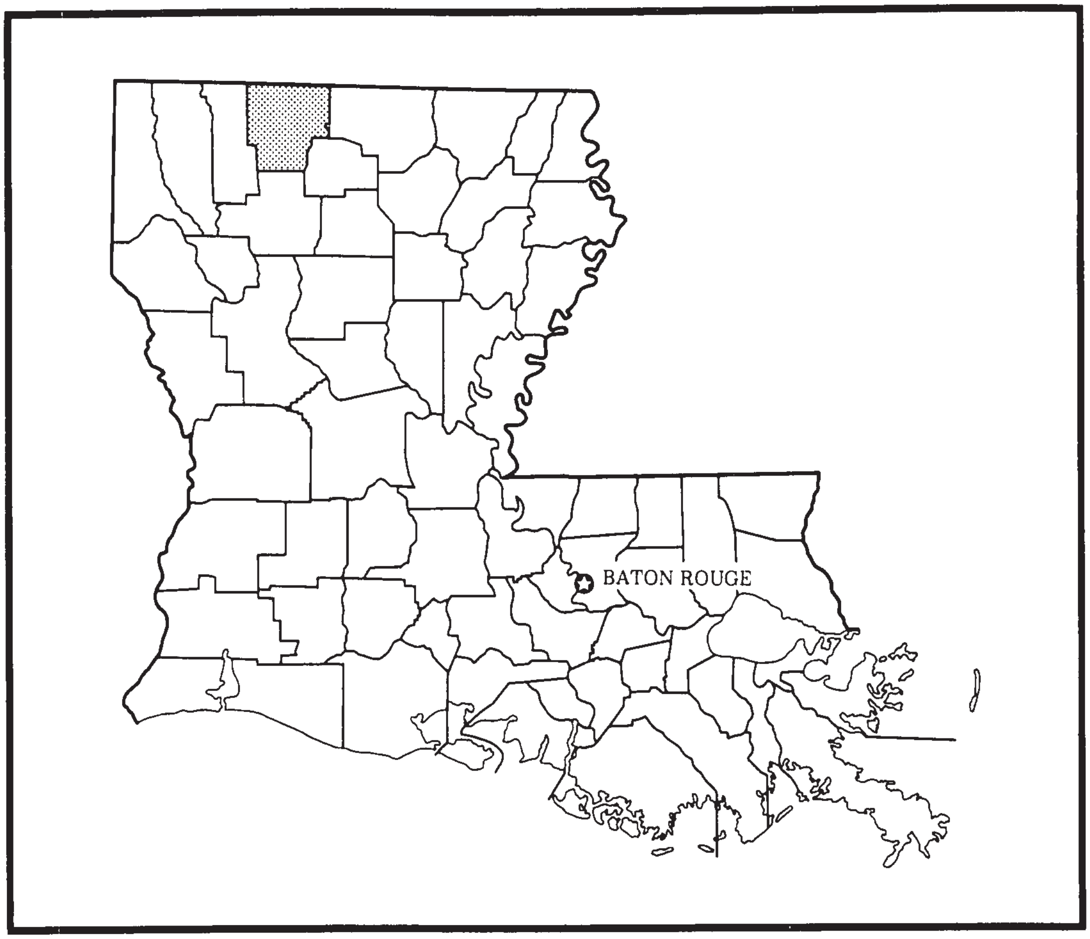
This soil survey contains information that can be used in land-planning programs in Claiborne Parish, Louisiana. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and 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 insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

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

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

Horace J. Austin
State Conservationist
Soil Conservation Service



Location of Claiborne Parish in Louisiana.

Soil Survey of Claiborne Parish, Louisiana

By W. Wayne Kilpatrick and Charles Henry, Jr., Soil Conservation Service

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

CLAIBORNE PARISH is in north-central Louisiana, about 40 miles east of Shreveport. The total area is 494,663 acres, of which 488,488 acres is land and 6,175 acres is water in the form of lakes, reservoirs, and streams. Claiborne Parish is bordered on the north by Arkansas. It is bordered on the east by Union and Lincoln Parishes, on the south by Bienville Parish, and on the west by Webster Parish. In 1980, the population was 18,367, according to the Bureau of the Census. Homer, with a population of 4,310, is the largest city and the parish seat. Other cities and communities are Haynesville, Junction City, Athens, and Lisbon. The parish is mostly rural.

The parish consists of two major physiographic areas: the nearly level flood plains and the very gently sloping to moderately steep uplands. The elevation ranges from about 508 feet above sea level on the uplands west of Athens to about 120 feet above sea level on the flood plains in the northeastern part of the parish *(17, 18, 22, 27)*.

The flood plains of streams that drain the uplands are throughout the parish. They make up about 16 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 natural levees along abandoned and present stream channels. They are also limited by flooding mainly during winter and spring.

The uplands, which are throughout the parish, make up about 84 percent of the land area. The soils on uplands are gravelly, sandy, or loamy and range from poorly drained to somewhat excessively drained. They are generally low in natural fertility. Most of the acreage is woodland or pastureland. A small acreage is used for homesites or cultivated crops. 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 Claiborne Parish. It describes the history and development, agriculture, climate, transportation, and industry.

History and Development

The area in which Claiborne Parish is included was inhabited by Caddo Indians before the earliest permanent settlement by immigrants to the Louisiana Territory in 1803.

Claiborne Parish was created in 1828 from an area that was part of Natchitoches Parish. It was named after William C.C. Claiborne, Louisiana's first governor. The influx of population to the area required the formation of new parishes. Bossier Parish and parts of Jackson, Bienville, Webster, and Lincoln Parishes were formed out of the immense original Claiborne Parish.

The first seat of government for the parish was the home of John Murrell, the earliest white settler in present-day Claiborne Parish. His home was along Military Road, which was constructed in 1828. A site known as Russellville served as the parish seat from 1828 until 1836. During the following years the parish seat was in several other locations. In 1849, the parish seat was relocated to its present site in Homer.

The parish was self-sustaining from the earliest days. Agriculture became the major enterprise, and cotton was the main cash crop. Cotton remained the "king" of income crops in the parish until timber production replaced it in the mid 1900's. The extensive oil and gas production activity in the area has resulted in a steady increase in population.

Agriculture

Agriculture is an important industry in Claiborne Parish. Cotton was the main cash crop before 1950, and at one time, Claiborne Parish was the primary cotton-producing parish in the state. However, thousands of acres of cropland has been converted to pine tree plantations and pastures in the last 40 years.

According to the 1982 Census of Agriculture, 395 farms are in the parish, which is a slight increase since 1978 *(33)*. The average farm is 221 acres with an average value of 931 dollars per acre. Total cropland in Claiborne Parish was 11,541 acres in 1982, a slight decrease from the 12,500 reported in 1978. Total pastureland reported in 1982 was 33,733 acres, down from 47,356 acres reported in 1978. The remaining acres in the parish are mainly woodland. Small acreages are used for homesites, urban areas, or industrial sites.

According to the 1984 Louisiana Summary of Agriculture and Natural Resources, the main cultivated crops in the parish were cotton, grain sorghum, corn, wheat, and hay *(16)*. Small acreages are in home vegetable gardens or commercial vegetable farms.

The present land use trend in Claiborne Parish appears to be fairly stable. Agricultural officials do not foresee any major land use changes in the near future.

Climate

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

Table 1 gives data on temperature and precipitation for the survey area as recorded at the Homer Experiment Station in the period 1951 to 1979. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 47 degrees F, and the average daily minimum temperature is 36 degrees. The lowest temperature on record, which occurred at the Homer Experiment Station on January 12, 1962, is -1 degrees. In summer the average temperature is 80 degrees, and the average daily maximum is 92 degrees. The highest recorded temperature, which occurred at the Homer Experiment Station on August 31, 1951, is 107 degrees.

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

The total annual precipitation is 52 inches. Of this, 26 inches, or 50 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 20 inches. The heaviest 1-day rainfall during the period of record was 5.77 inches at the Homer Experiment Station on April 29, 1953. 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. On an average, there is seldom a day with at least 1 inch of snow on the ground.

The average relative humidity in midafternoon is about 55 percent. Humidity is higher at night, and the average at dawn is about 90 percent. The sun shines 70 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 10 miles per hour, late in winter and early in spring.

Transportation

Claiborne Parish is served by one railroad that connects to two major railroad systems. A major bus line and a major motor carrier also serve the parish. Highway 79 provides highway transportation in the parish and connects with Interstate 20 south of the parish. Numerous other paved state and parish roads are available throughout the parish.

Two airports with lighted main runways serve the north and central parts of the parish. Commercial air service is available in Shreveport, which is less 60 miles from Homer.

Industry

Prolific oil and gas production throughout the parish provides employment and income for many people. Unemployment in Claiborne Parish consistently ranks among the lowest in the state. Service and supply companies to the oil and gas industry are also important.

Timber is second only to oil in the total dollar volume contributed to the parish's economy. Great strides have been made in reforestation.

Other major industries in the parish include a packaging company and a glove manufacturing firm. Most of the remaining industries are service companies related to the oil, timber, or the agricultural industries.

Enormous quantities of iron ore have been surveyed and mapped for future industrial use *(12)*. This resource is vast and untapped, offering untold opportunities for steel and iron production.

How This Survey Was Made

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

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape *(11, 28)*. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

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

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, soil 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 interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

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

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

Map Unit Composition

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

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The contrasting soils are named and 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.

Descriptions, names, and delineations of soils in this survey do not fully agree with those in published surveys of adjacent counties in Arkansas. These differences are the result of better information on soils, modifications in series concepts, intensity of mapping, or the extent of soils within the survey area.

General Soil Map Units

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

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

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

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

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

The boundaries of the general soil map units in Claiborne Parish were matched, where possible, with those of the previously published survey of Columbia County, Arkansas. In a few places, however, the lines do not join and 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 two general landscapes. Descriptions of each of the broad groups and the map units in each group follow.

Soils of the Uplands

The map units in this group consist of somewhat excessively drained to moderately well drained, very gently sloping to moderately steep soils on ridgetops and side slopes of uplands. These map units make up about 84 percent of Claiborne Parish. Most of the area is woodland or pastureland. Areas used as cropland generally are small and scattered. Steepness of slope is the main limitation for most uses.

1. Eastwood-Angie-Bowie

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

This map unit consists of soils on very gently sloping or gently sloping ridgetops and strongly sloping side slopes. These soils are in the northwestern part of the parish. The ridgetops are narrow or broad, and the side slopes are short to long. Slopes range from 1 to 5 percent on the ridgetops and from 5 to 12 percent on the side slopes.

This map unit makes up about 6 percent of the parish. It is about 59 percent Eastwood soils, 26 percent Angie soils, 10 percent Bowie soils, and 5 percent soils of minor extent.

The Eastwood soils are on gently sloping ridgetops and strongly sloping side slopes. These soils have a dark yellowish brown or dark grayish brown very fine sandy loam surface layer. The subsoil is red, mottled silty clay in the upper part and mottled light gray, red, and yellowish brown clay loam in the lower part.

The Angie soils are on very gently sloping, broad ridgetops. These soils have a yellowish brown very fine sandy loam surface layer. The subsoil is strong brown silty clay loam and yellowish brown, mottled silty clay in the upper part. It is gray, mottled silty clay and clay loam in the lower part.

The Bowie soils are on gently sloping, narrow or broad ridgetops. These soils have a brown fine sandy loam surface layer. The subsoil is strong brown and yellowish brown, mottled sandy clay loam in the upper and middle parts and mottled light brownish gray, red, and yellowish brown clay loam in the lower part.

The minor soils in this map unit are the Sacul and Guyton soils. Sacul soils are on side slopes and are moderately well drained. Guyton soils are in flat or depressional areas and in drainageways. These soils are poorly drained.

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

In most areas, these soils have high potential for the production of southern pines. The main limitations are seasonal wetness, which somewhat limits the use of equipment in areas of the Angie soils, and the hazard of erosion in strongly sloping areas of the Eastwood soils.

These soils are moderately well suited to crops and pasture. The main limitations are wetness, steepness of slope, low natural fertility, and high levels of aluminum that are potentially toxic to crops. Erosion is a hazard. The soils in strongly sloping areas generally are not suited to crops.

The soils in this map unit generally are poorly suited to most urban and intensive recreational uses. Moderately slow to very slow permeability, high and very high shrink-swell potential, wetness, and steepness of slope are the main limitations. The Bowie soils on ridgetops are well suited to urban and recreational uses.

2. Sacul-Bowie

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

This map unit consists of soils on gently sloping ridgetops and strongly sloping to moderately steep side slopes. These soils are in the western part of the parish. The ridgetops are narrow or broad. The landscape is dissected by many narrow drainageways. Slopes range from 1 to 5 percent on the ridgetops and from 5 to 30 percent on the side slopes.

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

The Sacul soils are on gently sloping ridgetops and strongly sloping and moderately steep side slopes. These soils have a brown very fine sandy loam or fine sandy loam surface layer or a dark brown gravelly fine sandy loam surface layer. The subsoil is red clay in the upper part; red, mottled clay in the middle part; and mottled grayish, reddish, or brownish sandy clay, clay, and sandy clay loam or clay loam in the lower part.

The Bowie soils are on gently sloping, narrow or broad ridgetops. These soils have a brown fine sandy loam surface layer. The subsoil is strong brown and yellowish brown, mottled sandy clay loam in the upper and middle parts and mottled light brownish gray, red, and yellowish brown clay loam in the lower part.

The minor soils in this map unit are the Angie, Mahan, and Guyton soils. Angie soils are on broad ridgetops and are moderately well drained. Mahan soils are on narrow, convex ridgetops and upper side slopes and are well drained. Guyton soils are in drainageways and are poorly drained.

The soils in this map unit are used mainly as woodland. They have moderately high or high potential for the production of pine trees. Erosion is a hazard on the steeper slopes. In areas of the Sacul soils, rutting and soil compaction are problems if logging is done during wet periods.

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

In most areas, these soils are moderately well suited to use as pastureland. On ridgetops, they are well suited. The soils in moderately steep areas are poorly suited. 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 extensive recreational uses. Slow permeability, high shrink-swell potential, steepness of slope, and low strength for roads are the main limitations. Bowie soils are well suited to urban and recreational uses.

3. Eastwood-Wolfpen

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

This map unit consists of soils on very gently sloping and gently sloping ridgetops and strongly sloping side slopes. These soils are mostly in the north-central part of the parish. Slopes range from 1 to 5 percent on the ridgetops and from 5 to 12 percent on the side slopes.

This map unit makes up about 14 percent of the parish. It is about 51 percent Eastwood soils, 38 percent Wolfpen soils, and 11 percent soils of minor extent.

The Eastwood soils are moderately well drained. They are on gently sloping ridgetops and strongly sloping side slopes. These soils have a dark yellowish brown or dark grayish brown very fine sandy loam surface layer. The subsoil is red, mottled silty clay in the upper part and mottled light gray, red, and yellowish brown clay loam in the lower part.

The Wolfpen soils are well drained. They are on broad, very gently sloping ridgetops. These soils have brownish loamy sand surface and subsurface layers. The subsoil is brownish, mottled sandy clay loam and sandy loam.

The minor soils in this map unit are the Larue and Bowie soils. Larue soils are on narrow, convex ridgetops and are well drained. Bowie soils are on narrow to broad ridgetops and are moderately well drained.

The soils in this map unit are used mainly as woodland or pastureland. In small, scattered areas, they are used for cultivated crops or homesites.

These soils are well suited to use as woodland. They have high potential for the production of southern pines. Erosion is a hazard on the Eastwood soils on side slopes. In areas of the Eastwood soils, rutting and soil compaction can be problems if logging is done during wet periods. On the Wolfpen soils, traction is poor during dry periods and seedling mortality is moderate because of soil droughtiness.

These soils generally are moderately well suited to crops. The soils on strongly sloping side slopes generally are not suited to crops because of the hazard of erosion. Low soil fertility and high and moderately high levels of aluminum that are potentially toxic to crops are additional limitations.

These soils are well suited to use as pastureland. Controlling erosion while pasture grasses are being established is the main concern in management. Lime and fertilizer are needed.

The soils in this map unit are poorly suited to most urban and intensive recreational uses. Very slow permeability, very high shrink-swell potential, steepness of slope, and low strength for roads are the main limitations. Wetness is an additional limitation in areas of the Wolfpen soils.

4. Flo-Smithdale-McLaurin

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

This map unit consists of soils on very gently sloping and gently sloping ridgetops and strongly sloping side slopes. These soils are mostly in the north-central part of the parish. Slopes range from 1 to 5 percent on the ridgetops and from 5 to 12 percent on the side slopes.

This map unit makes up about 3 percent of the parish. It is about 55 percent Flo soils, 24 percent Smithdale soils, 16 percent McLaurin soils, and 5 percent soils of minor extent.

The Flo soils are somewhat excessively drained. They are on gently sloping ridgetops and strongly sloping side slopes. These soils have a brownish loamy fine sand surface layer and a brownish and reddish loamy fine sand and fine sand subsoil.

The Smithdale soils are well drained. They are on short, strongly sloping side slopes. These soils have a dark brown fine sandy loam surface layer and a yellowish red sandy clay loam and sandy loam subsoil.

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

The minor soils in this map unit are the Larue and Wolfpen soils on some of the ridgetops. These soils are well drained.

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

These soils are moderately well suited to use as woodland. They have moderately high potential for the production of southern pine. On the sandy Flo and McLaurin soils, traction is poor during dry periods and seedling mortality is moderate because of soil droughtiness. The hazard of erosion is an additional concern on the strongly sloping soils.

These soils are somewhat poorly suited to crops. The main limitations are low soil fertility, low and moderate available water capacity, steepness of slope, and moderately high levels of aluminum that are potentially toxic to crops. Erosion is a severe hazard on the strongly sloping soils.

These soils are moderately well suited to use as pastureland. 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 soils in this map unit are moderately 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.

5. Sacul-Wolfpen-Darley

Very gently sloping to moderately steep, moderately well drained and well drained soils that have a loamy, gravelly, or sandy surface layer and a clayey and loamy subsoil or a loamy subsoil

This map unit consists of soils on very gently sloping and gently sloping ridgetops and strongly sloping and moderately steep side slopes. These soils are mainly in the central and eastern parts of the parish. Drainage is provided by deeply incised streams. Slopes range from 1 to 5 percent on the ridgetops and from 5 to 30 percent on the side slopes.

This map unit makes up about 14 percent of the parish. It is about 55 percent Sacul soils, 25 percent Wolfpen soils, 15 percent Darley soils, and 5 percent soils of minor extent.

The Sacul soils are moderately well drained. They are on gently sloping ridgetops and strongly sloping and moderately steep side slopes. These soils have a dark brown gravelly fine sandy loam or brown very fine sandy loam or fine sandy loam surface layer. The subsoil is red or yellowish red clay in the upper part; red, mottled clay in the middle part; and mottled reddish, grayish, and brownish clay, clay loam, sandy clay, or sandy clay loam in the lower part.

The Wolfpen soils are well drained. They are on broad, very gently sloping ridgetops. These soils have brownish loamy sand surface and subsurface layers. The subsoil is brownish, mottled sandy clay loam and sandy loam.

The Darley soils are well drained. They are on gently sloping ridgetops and strongly sloping and moderately steep side slopes. These soils have a dark brown or reddish brown gravelly fine sandy loam or gravelly loamy fine sand surface layer. The subsoil is red clay or sandy clay in the upper part, yellowish red and strong brown clay loam or clay in the middle part, and strong brown fine sandy loam in the lower part. The middle part of the subsoil is interlayered with ironstone.

The minor soils in this map unit are the Larue and Mahan soils. Larue soils are on narrow convex ridgetops, and Mahan soils are on convex ridgetops and on side slopes. These soils are well drained.

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

These soils are moderately well suited to use as woodland. They have moderately high potential for the production of southern pine. Erosion is a hazard on the more sloping soils. In areas of the Sacul soils, rutting and soil compaction are problems if logging is done during wet periods.

These soils generally are not suited to crops. The hazard of erosion is too severe for this use. The soils on very gently sloping and gently sloping ridgetops are moderately well suited to crops.

The soils in this map unit are moderately well suited to use as pastureland. Low or medium soil fertility and steepness of slope are the main limitations. Erosion is a hazard. Special conservation practices are needed to control erosion while the pasture grasses are being established. Lime and fertilizer are also needed.

These soils are poorly suited to urban development and moderately well suited to intensive recreational uses. Slow permeability, small stones on the surface, high shrink-swell potential, steepness of slope, and low strength for roads are the main limitations. Layers of ironstone in the subsoil are an additional limitation to the use of Darley soils for urban development. Wetness is also a limitation to use of the Wolfpen soils.

6. Darley-Mahan

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

This map unit consists of soils on gently sloping ridgetops and strongly sloping and moderately steep side slopes. These soils are mainly in the southwestern and eastern parts of the parish. The ridgetops are mostly narrow and convex, and the side slopes are short to long. Slopes range from 1 to 5 percent on the ridgetops and from 5 to 30 percent on the side slopes.

This map unit makes up about 17 percent of the parish. It is about 60 percent Darley soils, 25 percent Mahan soils, and 15 percent soils of minor extent.

The Darley soils are on gently sloping ridgetops and moderately steep side slopes. These soils have a dark brown or reddish brown gravelly fine sandy loam or gravelly loamy fine sand surface layer. The subsoil is red or yellowish red clay or sandy clay in the upper part; yellowish red and strong brown clay loam, clay, or sandy clay in the middle part; and strong brown fine sandy loam in the lower part. The middle part of the subsoil is interlayered with ironstone.

The Mahan soils are on gently sloping ridgetops and strongly sloping side slopes. These soils have a yellowish red or brown fine sandy loam surface layer. The subsoil is red and yellowish red sandy clay and sandy clay loam.

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

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

These soils are well suited to use as woodland. They have moderately high or high potential for the production of southern pine. Erosion is a hazard on the strongly sloping and moderately steep soils.

These soils generally are not suited to crops because of the steepness of slope and the severe hazard of erosion. The soils on gently sloping ridgetops are moderately well suited to crops.

These soils are moderately well suited to use as pastureland. Medium fertility is a limitation, and erosion is a hazard.

The soils in this map unit are moderately well suited to urban and intensive recreational uses. The ironstone layers in the subsoil, moderately slow permeability, small stones on the surface, and low strength for roads are the main limitations. The hazard of erosion is severe. Moderately steep soils are poorly suited to most urban and recreational uses.

7. Ruple-Sacul-Darley

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

This map unit consists of soils on gently sloping ridgetops and strongly sloping and moderately steep side slopes. These soils are mainly in the western part of the parish. Ridgetops are narrow and convex. Drainage is provided by deeply incised streams. Slopes range from 1 to 5 percent on the ridgetops and from 5 to 30 percent on the side slopes.

This map unit makes up about 1 percent of the parish. It is about 45 percent Ruple soils, 30 percent Sacul soils, 20 percent Darley soils, and 5 percent soils of minor extent.

The Ruple soils are well drained. They are on gently sloping ridgetops and strongly sloping side slopes. These soils have a dark reddish brown gravelly loam surface layer. The subsoil is dark reddish brown gravelly clay loam or dark red gravelly sandy clay in the upper part. The middle part is dark red gravelly clay, and the lower part is alternating layers of ironstone and dark red clay.

The Sacul soils are moderately well drained. They are on gently sloping ridgetops and strongly sloping and moderately steep side slopes. These soils have a brown very fine sandy loam or fine sandy loam surface layer or a dark brown gravelly fine sandy loam surface layer. The subsoil is red clay in the upper part; red, mottled clay in the middle part; and mottled grayish, reddish, or brownish sandy clay, clay, and sandy clay loam or clay loam in the lower part.

The Darley soils are well drained. They are on gently sloping ridgetops and strongly sloping and moderately steep side slopes. These soils have a dark brown or reddish brown gravelly fine sandy loam or gravelly loamy fine sand surface layer. The subsoil is red clay or sandy clay in the upper part, yellowish red and strong brown clay loam or clay in the middle part, and strong brown fine sandy loam in the lower part. The middle part of the subsoil is interlayered with ironstone.

The minor soils in this map unit are the Mahan soils on some of the side slopes. These soils are well drained.

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

These soils are well suited to use as woodland. They have high or moderately high potential for the production of southern pine. Erosion is a hazard in areas of the strongly sloping and moderately steep soils.

These soils generally are not suited to crops. The hazard of erosion is too severe for this use.

These soils are moderately well suited to use as pastureland. Low or medium soil fertility and steepness of slope are the main limitations. Erosion is the main hazard.

The soils in this map unit are moderately well suited to urban and intensive recreational uses. Steepness of slope, ironstone layers in the subsoil, and small stones on the soil surface are the main limitations. High shrink-swell potential is an additional limitation in areas of the Sacul soils.

8. Darley-Sacul

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

This map unit consists of soils on gently sloping ridgetops and strongly sloping or moderately steep side slopes. These soils are in the west-central part of the parish. Ridgetops are narrow. Drainage is provided by deeply incised streams. Slopes range from 1 to 5 percent on the ridgetops and from 5 to 30 percent on the side slopes.

This map unit makes up about 4 percent of the parish. It is about 50 percent Darley soils, 45 percent Sacul soils, and 5 percent soils of minor extent.

The Darley soils are well drained. They have a dark brown or reddish brown gravelly fine sandy loam or gravelly loamy fine sand surface layer. The subsoil is red clay or sandy clay in the upper part, yellowish red and strong brown clay loam or clay in the middle part, and strong brown fine sandy loam in the lower part. The middle part of the subsoil is interlayered with ironstone.

The Sacul soils are moderately well drained. They have a brown very fine sandy loam or fine sandy loam surface layer or a dark brown gravelly fine sandy loam surface layer. The subsoil is red clay in the upper part; red, mottled clay in the middle part; and mottled grayish, reddish, or brownish sandy clay, clay, and sandy clay loam or clay loam in the lower part.

The minor soils in this map unit are the Bowie and Mahan soils. Bowie soils are on ridgetops and are moderately well drained. Mahan soils are on ridgetops and upper side slopes and are well drained.

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

These soils are well suited to use as woodland. They have moderately high potential for the production of southern pine. Erosion is a hazard in areas of the strongly sloping and moderately steep soils. Logging should be done during the drier periods to reduce rutting and soil compaction.

These soils generally are not suited to crops. The hazard of erosion is too severe for this use. The soils on gently sloping ridgetops are moderately well suited or somewhat poorly suited to crops.

These soils are moderately well suited to use as pastureland. Low or medium soil fertility and steepness of slope are the main limitations. Special conservation practices are needed to control erosion while pasture grasses are being established.

The soils in this map unit are moderately well suited to urban and intensive recreational uses. Steepness of slope, ironstone layers in the subsoil, small stones on the surface, high shrink-swell potential, and low strength for roads are the main limitations.

9. Darley-Bowie

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

This map unit consists of soils on gently sloping ridgetops and strongly sloping or moderately steep side slopes. These soils are mainly in the southern part of the parish. Slopes range from 1 to 5 percent on the ridgetops and from 5 to 30 percent on the side slopes.

This map unit makes up about 6 percent of the parish. It is about 55 percent Darley soils, 41 percent Bowie soils, and 4 percent soils of minor extent.

The Darley soils are well drained. They are on gently sloping ridgetops and strongly sloping or moderately steep side slopes. These soils have a dark brown or reddish brown gravelly fine sandy loam or gravelly loamy fine sand surface layer. The subsoil is red clay or sandy clay in the upper part, yellowish red and strong brown clay loam or clay in the middle part, and strong brown fine sandy loam in the lower part. The middle part of the subsoil is interlayered with ironstone.

The Bowie soils are moderately well drained. They are on narrow to broad, gently sloping ridgetops. These soils have a brown fine sandy loam surface layer. The subsoil is strong brown and yellowish brown, mottled sandy clay loam in the upper and middle parts and mottled light brownish gray, red, and yellowish brown clay loam in the lower part.

The minor soils in this map unit are the Angie and Sacul soils. Angie soils are on broad ridgetops, and Sacul soils are on lower side slopes. These soils are moderately well drained.

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

These soils are well suited to use as woodland. They have high or moderately high potential for the production of southern pine. Erosion is a hazard in areas of the strongly sloping and moderately steep soils.

These soils generally are not suited to crops. The hazard of erosion is too severe for this use. The soils on gently sloping ridgetops are moderately well suited to crops.

These soils are moderately well suited to use as pastureland. Steepness of slope is the main limitation. The hazard of erosion is severe on side slopes. Lime and fertilizer are needed for optimum forage production.

The soils in this map unit generally are moderately well suited to urban and intensive recreational uses. Steepness of slope, layers of ironstone in the subsoil, and small stones on the surface are the main limitations. The moderately steep soils are poorly suited to urban and recreational uses.

10. Sacul-Darley-Darbonne

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

This map unit consists of soils on gently sloping ridgetops and strongly sloping to moderately steep side slopes. These soils are in the southeastern part of the parish. Ridgetops are narrow. Slopes range from 1 to 5 percent on the ridgetops and from 5 to 30 percent on the side slopes.

This map unit makes up about 15 percent of the parish. It is about 43 percent Sacul soils, 34 percent Darley soils, 9 percent Darbonne soils, and 14 percent soils of minor extent.

The Sacul soils are moderately well drained. They are on gently sloping ridgetops and strongly sloping or moderately steep side slopes. These soils have a brown very fine sandy loam or fine sandy loam surface layer or a dark brown gravelly fine sandy loam surface layer. The subsoil is red clay in the upper part; red, mottled clay in the middle part; and mottled grayish, reddish, or brownish sandy clay, clay and sandy clay loam or clay loam in the lower part.

The Darley soils are well drained. They are on gently sloping ridgetops and strongly sloping or moderately steep side slopes. These soils have a dark brown or reddish brown gravelly fine sandy loam or gravelly loamy fine sand surface layer. The subsoil is red clay or sandy clay in the upper part, yellowish red and strong brown clay loam or clay in the middle part, and strong brown fine sandy loam in the lower part. The middle part of the subsoil is interlayered with ironstone.

The Darbonne soils are well drained. They are on gently sloping ridgetops. These soils have a dark grayish brown loamy fine sand surface layer. The subsoil is red fine sandy loam in the upper part, red gravelly sandy clay loam in the middle part, and yellowish red sandy clay loam and yellowish brown fine sandy loam in the lower part.

The minor soils in this map unit are the Mahan and Smithdale soils. These soils are on upper or middle side slopes.

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

These soils are well suited to use as woodland. They have moderately high potential for the production of southern pine. Erosion is a hazard on side slopes. Logging needs to be done during the drier periods to reduce rutting and soil compaction.

These soils generally are not suited to crops because of the steepness of slope and the severe hazard of erosion. The soils on gently sloping ridgetops are moderately well suited or somewhat poorly suited to crops.

These soils are moderately well suited to use as pastureland. Conservation practices are needed to control erosion while pasture grasses are being established. The soils on gently sloping ridgetops are well suited to pasture.

The soils in this map unit are poorly suited to urban development and only moderately well suited to intensive recreational uses. Steepness of slope, slow and moderately slow permeability, high shrink-swell potential, and low strength for roads are the main limitations. The layers of ironstone in the Darley soils are an additional limitation.

Soils of the Flood Plains

This map unit consists of poorly drained, moderately well drained, and well drained, loamy soils on narrow flood plains. The soils are subject to frequent flooding. This map unit makes up about 16 percent of Claiborne Parish. Most of the area is woodland. Seasonal wetness and the hazard of flooding are the main limitations for most uses.

11. Guyton-Iuka-Ouachita

Level and nearly level, poorly drained, moderately well drained, and well drained soils that are loamy throughout

This map unit consists of soils on the flood plains of streams that drain the uplands. Flooding is frequent and occurs mainly in winter and spring, but it can occur during any season. Slopes range from 0 to 2 percent.

This map unit makes up about 16 percent of the parish. It is about 36 percent Guyton soils, 17 percent Iuka soils, 17 percent Ouachita soils, and 30 percent soils of minor extent.

The Guyton soils are level and are 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 light brownish gray, mottled silt loam and very fine sandy loam. The subsoil is grayish brown and light brownish gray, mottled silty clay loam and silt loam.

The Iuka soils are level and are moderately well drained. They are in low or intermediate positions on the flood plains. The surface layer is dark yellowish brown fine sandy loam. The underlying material is yellowish brown loam in the upper part and grayish brown and light brownish gray fine sandy loam, loam, and silt loam in the lower part.

The Ouachita soils are nearly level and are well drained. They are on low ridges on the flood plains. These soils have a brown silt loam surface layer. The subsoil is brown silt loam in the upper part and dark yellowish brown and yellowish brown silt loam and silty clay loam in the lower part.

The minor soils in this map unit are the Dela, Cahaba, and Harleston soils. Dela and Cahaba soils are well drained, and Harleston soils are moderately well drained. Cahaba and Harleston soils are on low stream terraces that appear as small islands within the flood plains. Dela soils are on low ridges and natural levees on the flood plains.

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

These soils are moderately well suited to use as woodland. They have high or very high potential for the production of southern pine and hardwoods. The use of equipment can be somewhat difficult and seedling mortality is moderate because of flooding and seasonal wetness.

These soils are somewhat poorly suited to crops and pasture because of flooding and seasonal wetness.

The soils in this map unit are poorly suited to urban and intensive recreational uses because of the 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 "Use and Management of the Soils."

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

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

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

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Sacul gravelly fine sandy loam, 1 to 5 percent slopes, is one of several phases in the Sacul series.

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

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Iuka-Dela complex, 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.

The boundaries of map units in Claiborne Parish were matched, where possible, with those of the previously completed survey of Columbia County, Arkansas. In a few places, the lines do not join and there are differences in the names of the map units. These differences result mainly from changes in soil series concepts, differences in map unit design, and changes in soil patterns near survey area boundaries.

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

An—Angie very fine sandy loam, 1 to 3 percent slopes. This soil is very gently sloping and is moderately well drained. It is on broad ridgetops on uplands. The areas of this soil are irregular in shape and range from 100 to several hundred acres.

Typically, this Angie soil has a yellowish brown, slightly acid very fine sandy loam surface layer about 8 inches thick. The subsurface layer to a depth of about 16 inches is light yellowish brown, medium acid very fine sandy loam. The subsoil to a depth of about 24 inches is strong brown, medium acid silty clay loam. To a depth of about 51 inches, it is yellowish brown, mottled, strongly acid and very strongly acid silty clay. The lower part of the subsoil to a depth of about 77 inches is gray, mottled, very strongly acid silty clay and clay loam.

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to most crops. Water and air move through this soil at a slow rate. Water runs off the surface at a medium rate.

The seasonal high water table is 3 to 5 feet below the soil surface from December through April. The shrink-swell potential is high.

Included with this soil in mapping are a few small areas of Bowie, Eastwood, and Sacul soils. Bowie soils are at a slightly higher elevation than the Angie soil and are loamy throughout the profile. Eastwood and Sacul soils are on side slopes. In these soils, the upper part of the subsoil is redder than that of the Angie soil. The included soils make up about 10 percent of the map unit.

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

This soil is well suited to the production of loblolly pine. The main concern in producing and harvesting timber is an equipment use limitation because of wetness. Conventional methods of harvesting timber can be used except sometimes during rainy periods, generally from December to April. To prevent rutting and soil compaction, mechanical site preparation and harvesting operations should be scheduled for the drier periods.

This soil is moderately well suited to cultivated crops. The main suitable crops are cotton and corn. The soil is limited mainly by wetness and the hazard of erosion. Potentially toxic levels of aluminum are in the root zone. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Conservation tillage, terraces, diversions, and grassed waterways can help to control erosion. Crop residue left on or near the surface helps to maintain tilth and organic matter content. Crops respond well to fertilizer and lime, which help to overcome the low soil fertility and reduce the high levels of exchangeable aluminum.

This Angie soil is well suited to pasture; however, wetness during December to April is a limitation. The main suitable pasture plants are bahiagrass, common bermudagrass, improved bermudagrass, ball clover, crimson clover, and arrowleaf clover. Grazing when the soil is wet results in compaction of the surface layer and damage to the plant community. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is poorly suited to urban development because of wetness, slow permeability, the clayey subsoil, high shrink-swell potential, and low strength for roads. Excess water can be removed by using shallow ditches and providing the proper grade. Revegetating disturbed areas around construction sites as soon as possible helps to control soil erosion. Increasing the size of septic tank absorption fields helps to compensate for the slow permeability of the subsoil. Buildings and roads can be designed to offset the effects of shrinking and swelling and to compensate for the limited ability of the soil to support a load.

This soil is moderately well suited to most recreational uses. It is limited mainly by slow permeability. Steepness of slope is a limitation for playgrounds. Good drainage should be provided for intensively used areas, such as playgrounds and camp areas. A good plant cover on playgrounds helps to control erosion.

This Angie soil is in capability subclass IIe. The woodland ordination symbol is 9W.

Bw—Bowie fine sandy loam, 1 to 5 percent slopes. This soil is gently sloping and moderately well drained. It is on narrow or broad, convex ridgetops on uplands. The areas of this soil range from about 20 to 200 acres.

Typically, this Bowie soil has a brown, strongly acid fine sandy loam surface layer about 7 inches thick. The subsurface layer to a depth of about 13 inches is light yellowish brown, strongly acid fine sandy loam. The subsoil to a depth of about 25 inches is strong brown, strongly acid sandy clay loam. To a depth of about 63 inches, it is yellowish brown, mottled, strongly acid sandy clay loam. The lower part of the subsoil to a depth of about 75 inches is mottled light brownish gray, red, and yellowish brown, strongly acid clay loam.

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to most crops. Water and air move through this soil at a moderately slow rate. Water runs off the surface at a medium rate. In some years, plants are damaged by lack of water during dry periods in summer and fall. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Angie, Darbonne, Eastwood, Larue, Mahan, and Wolfpen soils. Angie and Eastwood soils are at a slightly lower elevation than the Bowie soil and have a clayey subsoil. Darbonne, Larue, Mahan, and Wolfpen soils are in positions similar to those of the Bowie soil. Larue and Wolfpen soils have thick sandy surface and subsurface layers. Darbonne and Mahan soils contain layers and fragments of ironstone. The included soils make up about 15 percent of the map unit.

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

This soil is moderately well suited to crops and well suited to pasture (fig. 1); however, areas without a plant cover erode easily. Low soil fertility and potentially toxic levels of exchangeable aluminum are also limitations. The main suitable pasture plants are common

Figure 1.—Excess grass on Bowie fine sandy loam, 1 to 5 percent slopes, is harvested as hay for winter feedings.

bermudagrass, improved bermudagrass, bahiagrass, ryegrass, and crimson clover. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. Managing crop residue, stripcropping, farming on the contour, and terracing reduce soil loss by erosion. Most crops respond well to lime and fertilizer, which help to overcome the low fertility and reduce the high levels of exchangeable aluminum.

This Bowie soil is well suited to use as woodland. There are no significant limitations for producing and harvesting timber. The potential for production of loblolly pine is high.

This soil is well suited to urban development. It has few limitations to use as sites for buildings; however, the moderately slow permeability of the subsoil is a limitation to use as septic tank absorption fields. This limitation can be overcome by enlarging the size of the absorption field.

This soil is well suited to intensive recreational uses; however, steepness of slope is a moderate limitation for playgrounds.

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

Ca—Cahaba fine sandy loam, 1 to 3 percent slopes. This soil is very gently sloping and is well drained. It is on stream terraces. The areas of this soil range from about 20 to 200 acres.

Typically, this Cahaba soil has a dark yellowish brown, medium acid fine sandy loam surface layer about 8 inches thick. The next layer to a depth of about 15 inches is strongly acid, yellowish brown fine sandy loam and yellowish red sandy loam. The subsoil to a depth of about 59 inches is yellowish red, strongly acid and very strongly acid sandy clay loam and sandy loam. The lower part of the subsoil is mottled. The substratum to a depth of about 70 inches is yellowish red, very strongly acid sandy loam.

This soil has low fertility and moderately high levels of exchangeable aluminum that are potentially toxic to some crops. Water and air move through this soil at a moderate rate. In some years, plants are damaged by lack of water during dry periods in summer and fall. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Guyton and Harleston soils. Guyton soils are in drainageways and depressional areas. They are poorly drained and grayish throughout the profile. Harleston soils are at a slightly lower elevation than the Cahaba soil. They are moderately well drained and have a brownish subsoil. The included soils make up about 15 percent of the map unit.

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

This soil is well suited to cultivated crops; however, low fertility and the potentially toxic levels of exchangeable aluminum in the root zone are concerns in management. Erosion is a moderate hazard. The main suitable crops are cotton, soybeans, corn, and vegetables. Conservation tillage, terraces, diversions, and grassed waterways can help to control erosion. The organic matter content can be maintained by 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 high levels of exchangeable aluminum.

This soil is well suited to pasture; however, low fertility is a limitation. The main suitable pasture plants are improved bermudagrass, common bermudagrass, bahiagrass, ryegrass, ball clover, and crimson clover. Proper grazing practices, weed control, and fertilizer are needed for maximum quality of forage.

This Cahaba soil is well suited to use as woodland and has few limitations for producing and harvesting timber. The potential for production of loblolly pine is very high.

This soil is well suited to use for building sites, local roads and streets, and septic tank absorption fields. It has few limitations for these uses; however, cutbanks have a tendency to cave easily where shallow excavations are constructed. In addition, seepage is a problem if this soil is used for sewage lagoons or sanitary landfills, and ground water can be contaminated. Revegetating disturbed areas around construction sites as soon as possible helps to control soil erosion.

This soil is well suited to recreational uses; however, a good plant cover on playgrounds helps to control erosion.

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

Db—Darbonne loamy fine sand, 1 to 5 percent slopes. This soil is gently sloping and well drained. It is on ridgetops on uplands. The areas of this soil are irregular in shape and range from about 20 to 200 acres.

Typically, this Darbonne soil has a dark grayish brown, slightly acid loamy fine sand surface layer about 5 inches thick. The next layer to a depth of about 13 inches is yellowish red, slightly acid loamy fine sand. The subsoil to a depth of about 45 inches is red, medium acid fine sandy loam in the upper part and red, strongly acid gravelly sandy clay loam in the lower part. To a depth of about 57 inches, it is strongly acid, yellowish red sandy clay loam and yellowish brown fine sandy loam. The lower part of the subsoil to a depth of about 70 inches is red and yellowish red sandy clay loam and yellowish brown weakly cemented sandstone. Fragments of ironstone are throughout the subsoil.

This soil has low fertility. Water and air move through this soil at a moderately slow rate. The large volume of small to large fragments of ironstone in the subsoil reduces the available water capacity. In some years, plants are damaged by lack of water during dry periods in summer and fall. Water runs off the surface at a medium rate. This soil dries quickly after rains. The shrink-swell potential in the subsoil is low.

Included with this soil in mapping are a few small areas of Bowie, Darley, Larue, Mahan, and Sacul soils. These soils are on ridgetops in positions similar to those of the Darbonne soil. Darley, Mahan, and Sacul soils are also on side slopes. Bowie soils have a brownish subsoil and have more than 5 percent plinthite in the lower part of the subsoil. Larue soils have sandy surface and subsurface layers 20 to 40 inches thick. Darley soils have a clayey subsoil that contains layers of ironstone. Mahan and Sacul soils have a clayey subsoil. The included soils make up about 15 percent of the map unit.

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

This soil is well suited to use as woodland and has few limitations for producing and harvesting timber. The potential for production of loblolly pine is moderately high. Proper site preparation controls initial plant competition, and spraying controls subsequent growth.

This Darbonne soil is moderately well suited to cultivated crops. Low soil fertility is the main limitation, and erosion is a moderate hazard. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. Cotton, corn, and wheat are the main crops grown. Maintaining crop residue on or near the surface reduces runoff and helps to maintain soil tilth and organic matter content. Crops respond well to lime and fertilizer. Conservation tillage, terraces, diversions, and grassed waterways can help to control erosion.

This soil is well suited to pasture. It has few limitations for this use; however, erosion can be a problem during the pasture establishment period. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, ball clover, crimson clover, and ryegrass. Grasses and legumes grow well if adequate fertilizer is used. Rotation grazing helps to maintain the quality of forage.

This soil is well suited to urban development. It has slight limitations for building sites and local roads and streets, but the hazard of erosion is increased if this soil is left exposed during site development. This soil has severe limitations for use as sanitary facilities because of moderately slow permeability and seepage. Increasing the size of the septic tank absorption field helps to compensate for the moderately slow permeability. The bottom of sewage lagoons needs to be sealed to prevent seepage of effluent and contamination of nearby ground water.

This soil is moderately well suited to recreational uses. It is limited mainly by the small stones on the surface. Steepness of slope is an additional limitation for playgrounds. A good plant cover helps to control erosion. The cover can be maintained by adding fertilizer and by controlling traffic.

This Darbonne soil is in capability subclass IIIe. The woodland ordination symbol is 8F.

De—Darley gravelly loamy fine sand, 1 to 5 percent slopes. This soil is gently sloping and well drained. It is on upland ridgetops. The areas of this soil are irregular in shape and range from about 20 to 150 acres.

Typically, this Darley soil has a dark brown, strongly acid gravelly loamy fine sand surface layer about 4 inches thick. The subsurface layer to a depth of about 14 inches is yellowish red, strongly acid gravelly fine sandy loam. The subsoil to a depth of about 35 inches is red, very strongly acid clay. To a depth of about 60 inches, it is alternating layers of yellowish red and strong brown, very strongly acid clay loam and fractured layers of ironstone. The lower part of the subsoil to a depth of about 81 inches is strong brown, very strongly acid fine sandy loam.

This soil has medium fertility and high levels of exchangeable aluminum that are potentially toxic to most crops. Water and air move through this soil at a moderately slow rate. In some years, plants are damaged by lack of water during dry periods in summer and fall. The large amount of ironstone fragments in the surface layer and subsoil reduces the available water capacity. Water runs off the surface at a medium rate. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Bowie, Darbonne, and Mahan soils. These soils are on ridgetops in positions similar to those of the Darley soil. Mahan soils are also on side slopes. Bowie and Darbonne soils have a loamy subsoil. Mahan soils do not have layers of ironstone in the subsoil. The included soils make up about 10 percent of the map unit.

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

This soil is well suited to use as woodland (fig. 2) and has few limitations for producing and harvesting timber. The potential for production of loblolly pine is moderately high. Management that minimizes the risk of erosion should be used in harvesting, and logging should be done during the drier periods to reduce soil compaction.

This soil is moderately well suited to cultivated crops; however, it is limited by medium fertility and potentially toxic levels of exchangeable aluminum in the root zone. Erosion is a moderate hazard. The main suitable crops are cotton, corn, and wheat. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. Where coarse fragments on the surface are too concentrated, seedbed preparation is difficult and seed germination is reduced. Sprinkler irrigation systems work well on this soil. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Terraces reduce runoff and the risk of erosion and help to conserve moisture. Most crops respond well to fertilizer and lime, which help to overcome the medium fertility and reduce the high levels of exchangeable aluminum.

This Darley soil is well suited to pasture and has few limitations for this use. The main suitable pasture plants are common bermudagrass, improved bermudagrass, crimson clover, tall fescue, bahiagrass, and ryegrass. Where practical, seedbed preparation should be on the

Figure 2.—Hardwoods and pines grow well on Darley gravelly loamy fine sand, 1 to 5 percent slopes.

contour or across the slope. Fertilizer and lime are needed for optimum production of forage. Periodic mowing and clipping help to maintain uniform growth, discourage selective grazing, and reduce clumpy growth.

This soil is moderately well suited to urban development. It has slight limitations for building sites and severe limitations for most sanitary facilities. The main limitations are moderately slow permeability, the ironstone layers, and low strength for roads. Erosion is the main hazard. Revegetating disturbed areas around construction sites as soon as possible helps to control soil erosion. Plants are difficult to establish in areas where the clayey subsoil and ironstone layers are exposed. Mulching and fertilizing cut areas help to establish plants. The bottom of lagoons needs to be sealed to prevent seepage of effluent. Unless septic tank absorption lines are installed on the contour, effluent can surface in downslope areas and create a hazard to health. Roads can be designed to offset the limited ability of the soil to support a load.

This soil is moderately well suited to recreational uses. It is limited mainly by small stones on the surface or in the surface layer. Cuts and fills should be seeded or mulched to control erosion. Plant cover can be maintained by adding fertilizer and by controlling traffic.

This Darley soil is in capability subclass IIIe. The woodland ordination symbol is 8F.

Dr—Darley gravelly fine sandy loam, 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 are irregular in shape and range from about 30 to 250 acres.

Typically, this Darley soil has a reddish brown, strongly acid gravelly fine sandy loam surface layer about 3 inches thick. The subsurface layer to a depth of about 6 inches is yellowish red, strongly acid gravelly fine sandy loam. The subsoil to a depth of about 40 inches is red, very strongly acid sandy clay in the upper part and alternating layers of ironstone and yellowish red, very strongly acid clay in the lower part. The next layer to a depth of about 60 inches is strong brown, very strongly acid fine sandy loam.

This soil has medium fertility and high levels of exchangeable aluminum that are potentially toxic to most crops. Water and air move through this soil at a moderately slow rate. In some years, plants are damaged by lack of water during dry periods in summer and fall. Water runs off the surface at a rapid rate. Erosion is a severe hazard. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Darbonne, Mahan, and Sacul soils. Darbonne soils are on convex ridgetops and have a loamy subsoil. Mahan and Sacul soils are in positions similar to those of the Darley soil, but they do not have ironstone layers in the subsoil. In addition, 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 Darley soil is used mainly as woodland. In a few areas, it is used as pastureland or cropland.

This soil is well suited to use as woodland and has few limitations for producing and harvesting timber. The potential for production of loblolly pine is moderately high. Management that minimizes the risk of erosion should be used in harvesting. Roads and landings can be protected from erosion by constructing diversions and by seeding cuts and fills. Logging should be done during the drier periods to reduce soil compaction.

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

This soil is moderately well suited to pasture. Erosion is a hazard, and in places, stones on the surface interfere with equipment operations to some degree. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, tall fescue, ryegrass, and crimson clover. Proper grazing, weed control, and fertilizer are needed for maximum quality of forage.

This soil is moderately well suited to urban development. It has slight to severe limitations for dwellings and severe limitations for most sanitary facilities mainly because of moderately slow permeability, steepness of slope, the ironstone layers, the clayey subsoil, and low strength for roads. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed. Plants are difficult to establish in areas where the clayey subsoil and ironstone layers are exposed. Mulching and fertilizing cut areas help to establish plants. Effluent from septic tank absorption fields can surface in downslope areas and create a hazard to health. Roads can be designed to offset the limited ability of the soil to support a load.

This soil is moderately well suited to recreational uses. Steepness of slope and small stones on the soil surface are moderate limitations for most recreational uses and severe limitations for playgrounds. Cuts and fills should be seeded or mulched to control soil erosion. Plant cover can be maintained by adding fertilizer and by controlling traffic.

This Darley soil is in capability subclass VIe. The woodland ordination symbol is 8F.

Dy—Darley-Sacul complex, 12 to 30 percent slopes. These soils are moderately steep and are on side slopes on uplands. Slopes are short and irregular. This Darley soil is mainly on the upper parts of slopes and is well drained. This Sacul soil is on the lower parts of slopes and is moderately well drained. The areas of these soils range from 40 to 300 acres. They are about 45 percent Darley soil and 40 percent Sacul soil. These soils are too intermingled to be mapped separately at the scale used.

Typically, this Darley soil has a reddish brown, strongly acid gravelly fine sandy loam surface layer about 4 inches thick. The subsurface layer to a depth of about 8 inches is yellowish red, strongly acid gravelly fine sandy loam. The subsoil to a depth of about 60 inches is yellowish red, very strongly acid sandy clay and sandy clay loam in the upper part; alternating layers of ironstone and yellowish red, very strongly acid sandy clay in the middle part; and strong brown, very strongly acid fine sandy loam in the lower part.

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

Typically, this Sacul soil has a brown, strongly acid fine sandy loam surface layer about 3 inches thick. The subsurface layer to a depth of about 6 inches is light yellowish brown, strongly acid fine sandy loam. The subsoil to a depth of about 60 inches is red, very strongly acid clay in the upper part; red, mottled, very strongly acid clay in the middle part; and, mottled red, brown, and gray stratified clay and sandy loam in the lower part.

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to most crops. Water and air move through this soil at a slow rate. In some years, plants are damaged by lack of water during dry periods in summer and fall. Water runs off the surface at a rapid rate. This soil has gray mottles in the profile which indicate wetness, but a seasonal high water table has not been observed. The shrink-swell potential is high.

Included with these soils in mapping are a few small areas of Darbonne and Mahan soils. Darbonne soils are on narrow, convex ridgetops and have a loamy subsoil. Mahan soils are on upper side slopes and do not have ironstone layers in the subsoil. The included soils make up about 15 percent of the map unit.

These Darley and Sacul soils are used mainly as woodland. In a few areas, they are used as pastureland.

These soils are moderately well suited to use as woodland. The potential for production of loblolly pine is moderately high. The main concerns in producing and harvesting timber are moderate equipment use limitations and a moderate erosion hazard caused by steepness of slope and the clayey subsoil. Management that minimizes the risk of erosion should be used in harvesting. Roads and landings can be protected from erosion by constructing diversions and by seeding cuts and fills. In places, conventional methods of harvesting are difficult to use because of the steepness of slope. Logging should be done during the drier periods to reduce soil compaction.

These soils generally are not suited to cultivated crops. The slopes are too steep and the hazard of erosion is too severe for this use.

These soils are poorly suited to pasture. Erosion is a severe hazard and equipment use limitations are severe because of the moderately steep slopes. Common bermudagrass and bahiagrass can be grown. Native grasses are best suited to the more steeply sloping areas where seedbed preparation is difficult. Fertilizer and lime are needed for optimum production of forage.

These soils are poorly suited to urban development. The moderately steep slopes are the main limitation. The high shrink-swell potential and slow permeability in the Sacul soil and the ironstone layers and moderately slow permeability in the Darley soil are additional limitations. Excavation for roads and buildings increases the hazard of erosion; therefore, disturbed areas around construction sites should be revegetated as soon as possible.

These soils are poorly suited to most intensive recreational uses because of the severe hazard of erosion and the moderately steep slopes. Paths and trails should be on the contour or across the slope to prevent erosion.

These Darley and Sacul soils are in capability subclass VIe. The woodland ordination symbol is 8R.

Ea—Eastwood very fine sandy loam, 1 to 5 percent slopes. This soil is gently sloping and moderately well drained. It is on narrow or broad ridgetops on uplands. The areas of this soil range from about 20 to 200 acres.

Typically, this Eastwood soil has a dark yellowish brown, strongly acid very fine sandy loam surface layer about 9 inches thick. The subsoil to a depth of about 60 inches is red, mottled, very strongly acid silty clay in the upper part and mottled red, light gray and yellowish brown, very strongly acid silty clay and clay loam in the lower part. The substratum to a depth of about 75 inches is mottled light gray, red, and yellowish brown, very strongly acid clay loam. In places, the upper part of the subsoil contains less clay.

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to most crops. Water and air move through this soil at a very slow rate. In some years, plants are damaged by lack of water during dry periods in summer and fall. Water runs off the surface at a medium rate. The shrink-swell potential is very high.

Included with this soil in mapping are a few small areas of Angie, Bowie, and Wolfpen soils. Angie soils are on ridgetops and have a brownish subsoil. Bowie and Wolfpen soils are on ridgetops at a higher elevation than the Eastwood soil. Bowie soils have a loamy subsoil, and Wolfpen soils have sandy surface and subsurface layers more than 20 inches thick. The included soils make up about 15 percent of the map unit.

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

This soil is well suited to use as woodland. The potential for production of loblolly pine is high. The main concern in producing and harvesting timber is the equipment use limitation because of the clayey subsoil. Proper site preparation controls initial plant competition, and spraying controls subsequent growth. Conventional methods of harvesting timber generally are suitable, but this soil can compact if it is wet and heavy equipment is used.

This soil is moderately well suited to cultivated crops. The main limitations are low fertility and potentially toxic levels of exchangeable aluminum in the root zone. Erosion is a hazard. The main suitable crops are cotton, wheat, and corn. Conservation tillage, terraces, and grassed waterways help to control erosion. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. 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 well suited to pasture; however, low fertility is a limitation. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, crimson clover, and ryegrass. Seedbed preparation should be on the contour or across the slope where practical. Fertilizer and lime are needed for optimum production of forage.

This soil is poorly suited to urban development because of very slow permeability, the clayey subsoil, very high shrink-swell potential, and low strength for roads. Revegetating disturbed areas around construction sites as soon as possible helps to control erosion. Where septic tanks are installed, the limitation of very slow permeability can be partly overcome by increasing the size of the absorption field. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. Roads need to be designed to offset the limited ability of the soil to support a load.

This soil is poorly suited to most intensive recreational uses mainly because of the very slow permeability. Plant cover can be maintained by adding fertilizer and by controlling traffic.

The Eastwood soil is in capability subclass IIIe. The woodland ordination symbol is 10C.

Ed—Eastwood very fine sandy loam, 5 to 12 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 50 to 350 acres.

Typically, this Eastwood soil has a dark grayish brown, strongly acid very fine sandy loam surface layer about 4 inches thick. The subsoil to a depth of about 48 inches is red, strongly acid silty clay in the upper part; red and mottled red, gray, and brown, strongly acid silty clay in the middle part; and gray, mottled, strongly acid sandy clay in the lower part. The substratum to a depth of about 65 inches is gray, strongly acid sandy clay loam. In places, the subsoil is not as thick as that of the typical pedon.

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to most crops. Water and air move through this soil at a very slow rate. In most years, plants are damaged by lack of water during dry periods in summer and fall. Water runs off the surface at a rapid rate. The shrink-swell potential is very high in the subsoil.

Included with this soil in mapping are a few small areas of Darbonne and Darley soils. Darbonne and Darley soils are on higher convex ridgetops. Darbonne soils have a loamy subsoil, and Darley soils have ironstone layers within the subsoil. The included soils make up about 10 percent of the map unit.

This Eastwood soil is used mainly as woodland. In a few small areas, it is used as pastureland or hayland.

This soil is moderately well suited to use as woodland. The potential for production of loblolly pine is high. The main concerns in producing and harvesting timber are moderate equipment use limitations and a moderate hazard of erosion. Soil compaction is also a hazard if logging is done when the soil is moist. Management that minimizes the risk of erosion should be used in harvesting. Competing vegetation can be controlled by proper site preparation and by spraying, cutting, or girdling to eliminate unwanted weeds, brush, or trees. Conventional methods of harvesting trees generally can be used, but equipment use is limited during wet periods.

This soil is not suited to cultivated crops. The hazard of erosion is generally too severe for this use. The main soil limitations are low fertility and potentially toxic levels of exchangeable aluminum in the root zone.

This soil is moderately well suited to pasture. Steepness of slope and low fertility are the main limitations. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, crimson clover, and ryegrass. Seedbed preparation should be on the contour or across the slope where practical. Fertilizer and lime are needed for optimum production of forage.

This soil is poorly suited to most urban development because of very slow permeability, the clayey subsoil, very high shrink-swell potential, and steepness of slope. Preserving the existing plant cover during construction helps to control erosion. Septic tank absorption fields should be installed on the contour. The limitation of very slow permeability can be partly overcome by increasing the size of the absorption field. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential.

This soil is poorly suited to most intensive recreational uses mainly because of the very slow permeability and steepness of slope. Cuts and fills should be seeded and mulched. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining adequate plant cover. The cover can be maintained by adding fertilizer and by controlling traffic.

This Eastwood soil is in capability subclass VIe. The woodland ordination symbol is 9C.

Fe—Flo loamy fine sand, 1 to 5 percent slopes. This soil is gently sloping and somewhat excessively drained. It is on ridgetops on uplands. The areas of this soil range from about 10 to 150 acres.

Typically, this Flo soil has a dark brown, strongly acid loamy fine sand surface layer about 6 inches thick. The subsurface layer to a depth of about 34 inches is brown and yellowish brown, medium acid loamy fine sand. The subsoil is light yellowish brown, medium acid loamy fine sand to a depth of about 62 inches. To a depth of about 80 inches, it is pale brown and yellowish red, medium acid loamy fine sand. The lower part of the subsoil to a depth of about 95 inches is yellowish red and pale brown, medium acid loamy fine sand and fine sand.

This soil has low fertility and moderately high levels of exchangeable aluminum that are potentially toxic to some crops. Water and air move through this soil at a rapid rate. Water runs off the surface at a very slow rate. This soil dries quickly after heavy rains. It has low to moderate available water capacity. In most years, most plants are damaged by lack of water during summer and fall. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of the Larue, McLaurin, and Wolfpen soils. These soils are well drained and have a loamy subsoil. The included soils make up about 10 percent of the map unit.

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

This soil is moderately well suited to crops and pasture. Low fertility, limited choice of plants, and soil droughtiness are unfavorable features for these uses. In addition, the soil contains potentially toxic levels of exchangeable aluminum in the root zone. This soil is well suited to specialty crops, such as watermelons and peanuts. Suitable pasture plants include improved bermudagrass, bahiagrass, weeping lovegrass, and crimson clover. This soil is friable and easy to keep in good tilth. It is easy to work when moist, but traction is poor when the surface layer is dry. Proper management of crop residue helps maintain content of organic matter, improve tilth, and conserve moisture. The response to fertilizer is fair. Lime generally is needed.

This soil is moderately well suited to use as woodland. The potential for production of loblolly pine is moderately high. The surface layer provides poor traction if it is dry, and seedling mortality is moderate because of soil droughtiness. Seedlings should not be planted during dry periods.

This soil is moderately well suited to urban development. Cutbanks are subject to caving if shallow excavations are made. Seepage is too excessive for most sanitary facilities. If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage. Mulching, fertilizing, and irrigation are needed to establish lawn grasses and other small-seeded plants.

This soil is moderately well suited to intensive recreational uses. The sandy surface layer becomes loose when dry and provides poor traction. Irrigation generally is needed for golf course fairways and in other areas where landscape plants and lawn grasses are planted.

This Flo soil is in capability subclass IIIs. The woodland ordination symbol is 8S.

Fo—Flo 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 range from about 10 to 150 acres.

Typically, this Flo soil has a dark grayish brown, strongly acid loamy fine sand surface layer about 5 inches thick. The subsurface layer to a depth of about 20 inches is brown, strongly acid loamy fine sand. The subsoil to a depth of about 62 inches is light yellowish brown and yellowish red, strongly acid loamy fine sand.

This soil has low fertility and moderately high levels of exchangeable aluminum that are potentially toxic to some crops. Water and air move through this soil at a rapid rate. Water runs off the surface at a very slow rate. This soil dries out quickly after heavy rains. It has low to moderate available water capacity. In most years, most plants are damaged by lack of water late in summer and early in fall. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Larue, McLaurin, Smithdale, and Wolfpen soils. Larue, McLaurin, and Wolfpen soils are on ridgetops. Smithdale soils are on side slopes in positions similar to those of the Flo soil. All of these soils have a loamy subsoil. The included soils make up about 10 percent of the map unit.

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

This soil is somewhat poorly suited to crops and pasture. The hazard of erosion, low soil fertility, limited choice of plants, and soil droughtiness are unfavorable features for these uses. In addition, the soil contains potentially toxic levels of exchangeable aluminum in the root zone. Short-season crops, such as small grains, are better suited than most row crops. The main suitable pasture plants are improved bermudagrass, bahiagrass, weeping lovegrass, and crimson clover. Crop residue left on the surface helps to conserve moisture, maintain tilth, and control erosion. Additions of fertilizer and lime are needed.

This soil is moderately well suited to use as woodland. The potential for production of loblolly pine is moderately high. The surface layer provides poor traction if it is dry, and seedling mortality is moderate because of soil droughtiness. Planting seedlings only during wet periods can reduce seedling mortality.

This soil is moderately well suited to urban development. Steepness of slope and rapid permeability are the main limitations. In addition, cutbanks are subject to caving if shallow excavations are made, and seepage is a problem if the soil is used for sanitary facilities. If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

This soil is moderately well suited to intensive recreational uses. The sandy surface layer becomes loose when dry and provides poor traction. In addition, steepness of slope is a severe limitation for playgrounds. Grasses and landscape plants are difficult to establish unless irrigation is provided.

This Flo soil is in capability subclass VIe. The woodland ordination symbol is 8S.

Gn—Guyton silt loam. This soil is level and is poorly drained. It is on broad flats and in depressional areas on stream terraces. The areas of this soil range from about 20 to 200 acres. Slopes are dominantly less than 1 percent.

Typically, this Guyton soil has a dark grayish brown, very strongly acid silt loam surface layer about 4 inches thick. The subsurface layer to a depth of about 20 inches is light brownish gray and grayish brown, mottled, extremely acid silt loam. The next layer to a depth of about 51 inches is light brownish gray and grayish brown, mottled, extremely acid silt loam and silty clay loam. The subsoil to a depth of about 75 inches is grayish brown, mottled, extremely acid silt loam. In a few small areas, the subsoil contains less clay and more sand.

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to most 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 fluctuates between a depth of about 1.5 feet and the soil surface from December to May. The surface layer of this soil remains wet for long periods after heavy rains. In a few small to large areas, this soil is subject to rare flooding for short periods. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Cahaba and Harleston soils. These soils are on ridges at a higher elevation than the Guyton soil. Cahaba soils are well drained and have a reddish subsoil. Harleston soils are moderately well drained and have a brownish 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.

This soil is moderately well suited to use as woodland. The potential for production of loblolly pine is high. The main concerns in producing and harvesting timber are severe equipment use limitations and seedling mortality caused by wetness. Only trees that can tolerate seasonal wetness should be planted. Bedding and surface drainage are necessary to ensure pine seedling survival. Natural regeneration of pines is difficult in years when the soil remains wet. Conventional methods of harvesting timber generally are suitable, but this soil can compact if it is wet and heavy equipment is used.

This soil is moderately well suited to cultivated crops. The main limitations are wetness, low fertility, and potentially toxic levels of exchangeable aluminum in the root zone. The main suitable crops are soybeans and corn. Surface crusting is a problem. The surface layer of this soil remains wet for long periods after heavy rains. A drainage system is needed for most cultivated crops and pasture plants. Crusting of the surface and compacting of the soil can be reduced by returning crop residue to the soil. In most years, plants are damaged by lack of water during dry periods in summer and fall. 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 moderately well suited to pasture. Wetness limits the choice of plants and the period of grazing. The main suitable pasture plants are bahiagrass, common bermudagrass, white clover, vetch, winter peas, and tall fescue. Grazing when the soil is wet results in compaction of the surface layer and damage to the plant community. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is poorly suited to most urban and recreational uses. Wetness, slow permeability, and low strength for roads are the main limitations. Excess water can be removed by using shallow ditches and providing the proper grade. Septic tank absorption fields do not function properly during rainy periods because of wetness and slow permeability. 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 Guyton soil is in capability subclass IIIw. The woodland ordination symbol is 9W.

Go—Guyton-Ouachita silt loams, frequently flooded. These soils are nearly level and are on the flood plains of major streams. The Guyton soil is poorly drained and is in level and depressional areas. The Ouachita soil is well drained and is on low ridges or natural levees that are 2 to 6 feet high and 25 to 150 feet wide. Slopes range from 0 to 2 percent. The areas of these soils range from 40 to 2,000 acres. They are about 50 percent Guyton soil and 25 percent Ouachita soil. These soils are subject to frequent flooding mainly during winter. The soils of this map unit are too intricately intermingled to be mapped separately at the selected scale.

Typically, this Guyton soil has a dark brown, strongly acid silt loam surface layer about 6 inches thick. The subsurface layer to a depth of about 23 inches is light brownish gray, mottled, very strongly acid silt loam and very fine sandy loam. The subsoil to a depth of about 41 inches is grayish brown silty clay loam and light brownish gray, mottled, very strongly acid silt loam. To a depth of about 65 inches, it is grayish brown, mottled, strongly acid silty clay loam.

This Guyton soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to most crops. Water and air move through this soil at a slow rate. Water runs off the surface at a slow rate and stands in low places for long periods. A seasonal high water table fluctuates between depths of about 1.5 feet and the soil surface from December to May. Flooding occurs more often than twice in 5 years in winter and spring. It occurs less often during the cropping season. Depth of flood water ranges from 1 to 8 feet. This soil dries slowly after heavy rains. The shrink-swell potential is low.

Typically, this Ouachita soil has a brown, strongly acid silt loam surface layer about 6 inches thick. The next layer to a depth of about 17 inches is brown, mottled, strongly acid silt loam. The subsoil is dark yellowish brown and yellowish brown, mottled, very strongly acid silt loam and silty clay loam. The substratum to a depth of about 80 inches is yellowish brown, mottled, very strongly acid fine sandy loam.

This Ouachita soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to most crops. Water and air move through this soil at a moderately slow rate. Water runs off the surface at a slow rate. Flooding occurs more often than twice in 5 years in winter and spring. It occurs less often during the cropping season. This soil dries quickly after rains. The shrink swell potential is low.

Included with the Guyton and Ouachita soils in mapping are a few small areas of Cahaba and Harleston soils and many small areas of Dela and Iuka soils. Also included are small to large areas of Guyton soils that have a thin to thick overwash of brown, loamy sediment on the surface. Cahaba and Harleston soils are at a higher elevation on stream terraces or on remnants of stream terraces that appear as islands within the flood plains. Iuka and Dela soils are in positions similar to those of the Ouachita soil. Cahaba soils are well drained and have a reddish, well developed subsoil. Dela, Harleston, and Iuka soils contain more sand throughout the profile than the Guyton and Ouachita soils. In addition, Harleston soils are moderately well drained and have a well developed subsoil. The included soils make up about 25 percent of the map unit.

The Guyton and Ouachita soils are used mainly as woodland. In a few areas, they are used as pastureland or cropland.

These soils are moderately well suited to use as woodland. The potential for production of loblolly pine is high to very high. Wetness limits the use of equipment. Seedling mortality is moderate to high because of wetness from flooding and the seasonal high water table. Trees should be water-tolerant, and they should be planted or harvested during dry periods. Conventional methods of harvesting timber can be used except sometimes during rainy periods, generally from December to May. Logging should be done in the drier periods to prevent excessive rutting and compaction of the soils.

These soils are somewhat poorly suited to pasture. Pasture grasses are difficult to establish because of flooding, wetness, and low soil fertility. Wetness also limits the choice of plants and the period of grazing. The main suitable pasture plants are common bermudagrass, singletary peas, and vetch. Native grasses can also provide adequate forage for grazing cattle. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition.

The Guyton and Ouachita soils are somewhat poorly suited to cultivated crops. The main limitations are wetness, low fertility, and potentially toxic levels of exchangeable aluminum in the root zone. In addition, flooding is a hazard. Planting is delayed and crops are damaged by floods in some years. Late-planted crops, such as soybeans and grain sorghum, can be grown in most years. Major structures, such as levees, are needed to adequately control flooding.

These soils are poorly suited to local roads and streets and most sanitary facilities. They are not suitable for building sites. Wetness is the main limitation, and flooding is a hazard. Roads and streets should be located above the expected flood level. Major flood control structures along with extensive local drainage systems are needed to control flooding and to remove excess water.

These soils are poorly suited to recreational uses because of wetness and flooding. Protection from flooding is needed for most uses.

The Guyton and Ouachita soils are in capability subclass IVw. The woodland ordination symbol is 9W for the Guyton soil and 11W for the Ouachita soil.

Ha—Harleston fine sandy loam, 1 to 3 percent slopes. This soil is very gently sloping and moderately well drained. It is on low stream terraces. The areas of this soil are narrow or irregular in shape and range from 20 to 150 acres.

Typically, this Harleston soil has a dark brown, very strongly acid fine sandy loam surface layer about 4 inches thick. The subsurface layer to a depth of about 13 inches is yellowish brown, extremely acid fine sandy loam. The next layer to a depth of about 19 inches is yellowish brown extremely acid fine sandy loam. The subsoil to a depth of about 39 inches is yellowish brown, mottled, extremely acid sandy loam. To a depth of about 81 inches, it is mottled brownish, reddish, and grayish, extremely acid sandy loam and sandy clay loam.

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to most crops. Water and air move through the soil at a moderate rate. Water runs off the surface at a medium rate. A seasonal high water table is 2 to 3 feet below the surface from November to March. This soil dries quickly after rains. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Cahaba and Guyton soils. Cahaba soils are in slightly higher positions than those of the Harleston soil. They are well drained and have a reddish subsoil. Guyton soils are in broad depressional areas and in shallow drainageways. They are poorly drained and are grayish throughout the profile. The included soils make up about 10 percent of the map unit.

This Harleston soil is used mainly as woodland. Small acreages are used as pastureland or cropland.

This soil is well suited to use as woodland. The potential for production of loblolly pine is high. This soil has few limitations for use and management; however, logging during the drier periods helps to prevent rutting and soil compaction. Proper site preparation controls initial plant competition, and spraying controls subsequent growth. Suitable trees to plant are loblolly pine and southern red oak.

This soil is well suited to cultivated crops; however, low fertility and potentially toxic levels of exchangeable aluminum in the root zone are limitations. Erosion is a slight hazard. Suitable crops are cotton, corn, and wheat. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. A sprinkler irrigation system works well on this soil. Excessive cultivation can result in the formation of a tillage pan. This pan can be broken by subsoiling when the soil is dry. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Crops respond well to lime and fertilizer, which help to overcome the low fertility and reduce the high levels of exchangeable aluminum. Early fall seeding, conservation tillage, terraces, diversions, and grassed waterways help to control erosion.

This soil is well suited to pasture and has few limitations for this use. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, crimson clover, and ryegrass. Proper grazing, weed control, and fertilizers are needed for maximum quality of forage.

This Harleston soil is moderately well suited to urban development. Wetness is the main limitation, and erosion is a slight hazard. Preserving the existing plant cover during construction helps to control erosion. Establishing and maintaining plant cover can be achieved through proper fertilizing, seeding, mulching, and shaping of the slopes. Drainage should be provided around buildings.

This soil is moderately well suited to recreational uses. Wetness is the main limitation, and steepness of slope is a limitation for playgrounds. Drainage should be provided for most intensive recreational uses. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining adequate plant cover. The cover can be maintained by adding fertilizer and by controlling traffic.

This Harleston soil is in capability subclass IIe. The woodland ordination symbol is 9W.

Io—Iuka-Dela complex, frequently flooded. These soils are level and nearly level and are moderately well drained. They are on flood plains of major streams. The Iuka soil is level and is on flats and in low positions on natural levees. The Dela soil is nearly level and is on ridges or natural levees that are 1 to 6 feet high and 50 to 200 feet wide. Slopes range from 0 to 2 percent. The areas of these soils range from 20 to 2,000 acres. They are about 55 percent Iuka soil and 25 percent Dela soil. These soils are subject to frequent flooding from stream overflow. The soils of this map unit are too intricately intermingled to be mapped separately at the selected scale.

Typically, this Iuka soil has a dark yellowish brown, medium acid fine sandy loam surface layer about 7 inches thick. The next layer to a depth of about 15 inches is yellowish brown, strongly acid loam. The underlying material to a depth of about 70 inches is yellowish brown, mottled, strongly acid loam in the upper part; grayish brown, mottled, very strongly acid fine sandy loam and light brownish gray, very strongly acid loam in the middle part; and grayish brown, mottled, very strongly acid silt loam in the lower part.

This Iuka soil has low fertility and moderately high levels of exchangeable aluminum that are potentially toxic to some crops. Water and air move through this soil at a moderate rate. A seasonal high water table is 1 to 3 feet below the soil surface from December to April. Water runs off the surface at a slow rate and stands in low places for long periods after heavy rains. This soil is flooded for very brief periods mainly in winter and early in spring. Flooding occurs more often than twice each 5 years. It occurs less often during the cropping season. The shrink-swell potential is low.

Typically, this Dela soil has a dark brown, medium acid loamy fine sand surface layer about 4 inches thick. The underlying material to a depth of about 16 inches is strong brown and brown, slightly acid fine sandy loam. Between depths of 16 and 60 inches, it is stratified strong brown or brown fine sandy loam and sandy loam.

This Dela soil is low in natural fertility. Water and air move through this soil at a moderately rapid rate. Water runs off the surface at a slow rate. A seasonal high water table fluctuates between about 3 and 5 feet below the surface during December through April. This soil is flooded for very brief periods mainly in winter and early in spring. Flooding occurs more often than twice each 5 years. It occurs less often during the cropping season. The shrink-swell potential is low.

Included with these soils in mapping are a few small areas of Cahaba, Guyton, Harleston, and Ouachita soils. In places are small to large areas of Iuka soils that are underlain at a moderate depth by profiles of the Guyton soils. Cahaba and Harleston soils are at a higher elevation on stream terraces or on remnants of stream terraces that appear as islands on the flood plain. These soils have a strongly developed subsoil. Guyton soils are in slightly lower positions than the Iuka soil. They are poorly drained and are grayish throughout the profile. Ouachita soils are in positions similar to those of the Dela soil. They are well drained and have less sand and more clay in the underlying material than either the Iuka or Dela soil. The included soils make up about 20 percent of the map unit.

These Iuka and Dela soils are used mainly as woodland. Small acreages are used as pastureland or cropland.

These soils are moderately well suited to use as woodland. The potential for production of hardwoods and loblolly pine is very high. The main concerns in producing and harvesting timber are moderate equipment use limitations and seedling mortality caused by wetness and flooding. Suitable trees to plant are loblolly pine and southern red oak. Competing vegetation can be controlled by proper site preparation and by spraying, cutting, or girdling to eliminate unwanted weeds, brush, or trees. Conventional methods of harvesting timber generally are suitable, but the soil can be compacted if it is wet and heavy equipment is used.

These soils are moderately well suited to cultivated crops. The main limitations are the hazard of frequent flooding, the low soil fertility, and the potentially toxic levels of exchangeable aluminum in the root zone. Levees are needed to adequately control flooding. Unless flooding is controlled and drainage is provided, late-planted crops, such as grain sorghum and soybeans, are better suited than other crops. Properly aligning rows with the slope and constructing field ditches and vegetated outlets can remove excess surface water. Land grading and smoothing also help to remove excess water. 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. Crops respond well to lime and fertilizer, which help to overcome the low fertility and reduce the high levels of exchangeable aluminum.

These soils are moderately well suited to pasture. The main limitations are wetness, low natural fertility, and the hazard of overflow. The main suitable pasture plants are bahiagrass, common bermudagrass, improved bermudagrass, tall fescue, singletary peas, and vetch. Puddles form and plants are damaged if the soil is grazed when wet. A properly designed drainage system can remove excess water. Proper grazing, weed control, and fertilizer are needed for maximum quality of forage.

These soils are poorly suited to most urban and recreational uses. They are generally not suited to use for dwellings because of the hazard of flooding. Roads and streets should be located above the expected flood level. Major flood control structures are needed.

The Iuka and Dela soils are in capability subclass IIw. The woodland ordination symbol is 9W for the Iuka soil and 4A for the Dela soil.

La—Larue loamy fine sand, 1 to 5 percent slopes. This soil is gently sloping and well drained. It is on convex ridgetops on uplands. The areas of this soil range from about 10 to 250 acres.

Typically, this Larue soil has a dark brown, strongly acid loamy fine sand surface layer about 4 inches thick. The subsurface layer to a depth of about 24 inches is light yellowish brown and pale brown, medium acid loamy fine sand. The subsoil to a depth of about 62 inches is yellowish red and red, strongly acid and medium acid sandy clay loam. To a depth of about 86 inches, it is yellowish red, medium acid fine sandy loam.

This soil has low fertility and moderately high levels of exchangeable aluminum that are potentially toxic to some crops. Water and air move through this soil at a moderate rate. Water runs off the surface at a slow rate. This soil dries out quickly and has low to moderate available water capacity. In most years, most plants are damaged by lack of water during summer and fall. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Flo, McLaurin, and Wolfpen soils. These soils are on ridgetops in positions similar to those of the Larue soils. Flo soils are also on side slopes and are sandy throughout the profile. McLaurin soils have sandy surface and subsurface layers that together are less than 20 inches thick. Wolfpen soils have a brownish subsoil and a seasonal high water table. The included soils make up about 15 percent of the map unit.

This Larue soil is used mainly as woodland. Small acreages are used as pastureland or cropland.

This soil is moderately well suited to use as woodland. The potential for production of loblolly pine is moderately high. Poor traction can restrict equipment use during dry periods. Seedling mortality is generally moderate because of soil droughtiness.

This soil is moderately well suited to crops and pasture. Erosion is a hazard, and droughtiness limits the choice of crops and pasture plants. In addition, the soil contains potentially toxic levels of aluminum in the root zone. The main suitable crops are peanuts and watermelons. Cotton and corn can be grown, but production is low, especially in years of less than normal rainfall. The main suitable pasture plants are improved bermudagrass, bahiagrass, weeping lovegrass, and crimson clover. This soil is friable and easy to keep in good tilth. It is easy to work when moist, but traction is poor when the soil is dry. Conservation practices, such as returning all crop residue to the soil, help to conserve moisture and improve soil fertility and content of organic matter. Crops respond well to fertilizer and lime, which help to overcome the low soil fertility and reduce the moderately high levels of exchangeable aluminum.

This soil is moderately well suited to urban development. Seepage is a problem if this soil is used for sanitary facilities. Cutbanks cave easily where shallow excavations are constructed.

This soil is moderately well suited to intensive recreational uses. The sandy surface layer becomes loose when dry and provides poor traction. Steepness of slope is a limitation for playgrounds. Supplemental irrigation is needed to maintain a good plant cover.

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

Ma—Mahan fine sandy loam, 1 to 5 percent slopes. This soil is gently sloping and well drained. It is on ridgetops on uplands. The areas of this soil are irregular in shape and range from 20 to 250 acres.

Typically, this Mahan soil has a yellowish red, strongly acid fine sandy loam surface layer about 5 inches thick. The subsoil to a depth of about 59 inches is red, strongly acid sandy clay and sandy clay loam. The substratum to a depth of about 82 inches is stratified yellowish red sandy clay loam and yellowish brown sandy loam. In a few small areas, the subsoil contains less clay.

This soil has medium fertility and high levels of exchangeable aluminum that are potentially toxic to most crops. Water and air move through this soil at a moderate rate. In some years, plants are damaged by lack of water during dry periods in summer and fall. Water runs off the surface at a medium rate. This soil dries quickly after rains. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Bowie, Darley, Darbonne, Ruple, and Sacul soils. These soils are in positions similar to those of the Mahan soil. Bowie soils have a brownish, loamy subsoil. Darbonne, Darley, and Ruple soils have more ironstone fragments in the surface, subsurface, and subsoil layers than the Mahan soil. 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 use as woodland and has few limitations for use and management. The potential for production of loblolly pine is high. Proper site preparation controls initial plant competition, and spraying controls subsequent growth. Logging should be done in the drier periods to prevent rutting and soil compaction.

This soil is moderately well suited to cultivated crops. The main limitations are the medium soil fertility and the potentially toxic levels of exchangeable aluminum in the root zone. Erosion is a hazard. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. Cotton, corn, and wheat are the main crops grown. Maintaining crop residue 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 help to overcome the medium soil fertility and reduce the high levels of exchangeable aluminum. Conservation tillage, terraces, diversions, and grassed waterways help to control erosion.

This Mahan soil is well suited to pasture and has few limitations for this use. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, crimson clover, and ryegrass. Grasses and legumes grow well if adequate fertilizer is provided. Rotation grazing helps to maintain the quality of forage.

This soil is well suited to urban development; however, it has slight to moderate limitations for dwellings and for sanitary facilities. Steepness of slope 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 can be designed to offset the limited ability of the soil to support a load.

This soil is well suited to recreational development. 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 on the soil. 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.

Mn—Mahan fine sandy loam, 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 are irregular in shape and range from 40 to 300 acres.

Typically, this Mahan soil has a brown, strongly acid fine sandy loam surface layer about 3 inches thick. The subsurface layer to a depth of about 5 inches is yellowish brown, strongly acid fine sandy loam. The subsoil to a depth of about 58 inches is very strongly acid sandy clay that is red in the upper and middle parts and yellowish red in the lower part. The middle and lower parts have mottles. The substratum to a depth of about 75 inches is yellowish brown, mottled, very strongly acid sandy clay loam.

This soil has medium fertility and high levels of exchangeable aluminum that are potentially toxic to most crops. Water and air move through this soil at a moderate rate. In some years, plants are damaged by lack of water during dry periods in summer and fall. Water runs off the surface at a rapid rate. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Darley and Sacul soils. Darley soils are on upper side slopes and have ironstone layers in the subsoil. Sacul soils are on lower side slopes 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 use as woodland and has few limitations for use and management. The potential for production of loblolly pine is high. Proper site preparation controls initial plant competition, and spraying controls subsequent growth. Management that minimizes the risk of erosion should be used in harvesting timber. Roads and landings can be protected from erosion by constructing diversions and by seeding cuts and fills. Logging should be done during the drier periods to prevent rutting and soil compaction.

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.

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

This soil is moderately well suited to urban development. The main limitations are the clayey subsoil, steepness of slope, 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.

This soil is moderately well suited to recreational uses. It is limited mainly by the steepness of slope. Cuts and fills should be seeded or mulched. 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.

Mr—McLaurin loamy fine sand, 1 to 3 percent slopes. This soil is very gently sloping and is well drained. It is on convex ridgetops on uplands. The areas of this soil are irregular in shape and range from 20 to 150 acres.

Typically, this McLaurin soil has a dark brown, strongly acid loamy fine sand surface layer about 4 inches thick. The subsurface layer to a depth of about 9 inches is yellowish brown, strongly acid loamy fine sand. The next layer to a depth of about 15 inches is strong brown, strongly acid sandy loam. The subsoil to a depth of about 64 inches is yellowish red, strongly acid fine sandy loam and sandy loam in the upper and middle parts and yellowish red, very strongly acid loamy fine sand and sandy loam in the lower part.

This soil has low fertility and moderately high levels of exchangeable aluminum that are potentially toxic to some crops. Water and air move through this soil at a moderate rate. In most years, plants are damaged by lack of water during dry periods in summer and fall. Water runs off the surface at a slow rate. This soil dries quickly after rains. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Flo, Larue, and Wolfpen soils. Flo and Larue soils are in positions similar to those of the McLaurin soil. Wolfpen soils are on broad ridgetops. Flo soils are sandy throughout. Larue and Wolfpen soils have sandy surface and subsurface layers more than 20 inches thick. The included soils make up about 15 percent of the map unit.

This McLaurin soil is used mainly as woodland. Small acreages are used as cropland or pastureland.

This soil is well suited to use as woodland. The potential for production of loblolly pine is moderately high. This soil has few limitations for use and management; however, the sandy surface layer provides poor traction when the soil is dry.

This soil is well suited to cultivated crops; however, low fertility, low to moderate available water capacity, and potentially toxic levels of exchangeable aluminum in the root zone are concerns in management. Erosion is a slight hazard. Suitable crops are corn, cotton, watermelons, sweet potatoes, and wheat. 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 help to overcome the low fertility and reduce the moderately high levels of exchangeable aluminum.

This soil is well suited to pasture and has few limitations for this use. The main pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, crimson clover, and wheat. Proper grazing, weed control, and fertilizer are needed for maximum quality of forage.

This soil is well suited to urban development, and it has few limitations for this use. 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.

This soil is well suited to recreational uses; however, a good plant cover in intensively used areas, such as playgrounds, helps to control erosion. The cover can be maintained by adding fertilizer and by controlling traffic.

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

Re—Ruple gravelly loam, 1 to 5 percent slopes. This soil is gently sloping and well drained. It is on ridgetops on uplands. The areas of this soil are irregular in shape and range from 300 to 400 acres.

Typically, this Ruple soil has a dark reddish brown, slightly acid gravelly loam surface layer about 5 inches thick. The subsoil to a depth of about 16 inches is dark reddish brown, slightly acid gravelly clay loam in the upper part and dark red, medium acid gravelly clay in the lower part. Alternating layers of fractured ironstone and dark red, medium acid and strongly acid clay extend to a depth of about 60 inches.

This soil has medium fertility. Water and air move through this soil at a moderately slow rate. In some years, plants are damaged by lack of water during dry periods in summer and fall. The fragments of ironstone reduce the available water capacity. Water runs off the surface at a medium rate. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Mahan and Sacul soils. Mahan soils are on side slopes and do not have large amounts of ironstone fragments in the subsoil. Sacul soils are on lower side slopes. These soils are moderately well drained and have gray mottles in the upper part of the subsoil. In addition, Sacul soils do not have layers of ironstone in the subsoil. The included soils make up about 15 percent of the map unit.

This Ruple soil is used mainly as woodland. Small acreages are used as cropland or pastureland. Many areas of this soil are mined or previously were mined for ironstone gravel for use on roadbeds and oil well construction sites.

This soil is well suited to use as woodland. The potential for production of loblolly pine is high. This soil has few limitations for use and management; however, the ironstone layers restrict root growth and increase the hazard of windthrow. Proper site preparation controls initial plant competition, and spraying controls subsequent growth.

This soil is moderately well suited to cultivated crops. Erosion is a hazard if this soil is used for crops. In addition, root growth is restricted by the layers of ironstone. Suitable crops are cotton, corn, and wheat. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content; however, where ironstone fragments on the soil surface are too numerous, seedbed preparation can be difficult and seed germination is reduced. Sprinkler irrigation systems work well on this soil. 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. Most crops respond well to fertilizer. Constructing terraces reduces runoff and the risk of erosion and helps to conserve moisture.

This soil is well suited to pasture and has few limitations for this use. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, crimson clover, and ryegrass. Seedbed preparation should be on the contour or across the slope where practical. Proper grazing, weed control, and fertilizer are needed for maximum quality of forage.

This soil is moderately well suited to urban development. The main limitations are moderately slow permeability, the clayey subsoil, small stones on the soil surface, and layers of ironstone in the subsoil. Moderately slow permeability and the layers of ironstone in the subsoil are severe limitations where this soil is used as septic tank absorption fields. These limitations can be overcome by increasing the size of the absorption field. Excavations are difficult because of the layers of ironstone in the subsoil.

This soil is moderately well suited to recreational uses. The main limitations are small stones on the soil surface and moderately slow permeability. Steepness of slope is an additional limitation for playgrounds. Cuts and fills should be seeded or mulched. Plant cover should be maintained to prevent erosion. Covering the soil surface with a thin layer of loamy fill helps to overcome the limitation of the small stones on the surface.

This Ruple soil is in capability subclass IIIe. The woodland ordination symbol is 8F.

Rp—Ruple gravelly loam, 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 are irregular in shape and range from 40 to 300 acres.

Typically, this Ruple soil has a dark reddish brown, slightly acid gravelly loam surface layer about 7 inches thick. The next layer to a depth of about 11 inches is dark red, slightly acid gravelly loam. The subsoil to a depth of about 25 inches is dark red, medium acid gravelly sandy clay. To a depth of about 60 inches, it is alternating layers of fractured ironstone and dark red, medium acid clay.

This soil has medium fertility. Water and air move through this soil at a moderately slow rate. In some years, plants are damaged by lack of water during dry periods in summer and fall. The coarse fragments in the soil reduce the available water capacity. Water runs off the surface at a rapid rate. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Mahan and Sacul soils. These soils typically are on the lower parts of side slopes. Mahan soils do not contain layers of ironstone or large amounts of ironstone fragments. 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 Ruple soil is used mainly as woodland. A small acreage is used as pastureland.

This soil is well suited to use as woodland. The potential for production of loblolly pine is high. This soil has few limitations for producing and harvesting timber; however, the ironstone layers restrict root growth somewhat and increase the hazard of windthrow. Roads and landings can be protected from erosion by constructing diversions and by seeding cuts and fills. Proper site preparation controls initial plant competition, and spraying controls subsequent growth.

This soil generally is not suited to cultivated crops. The hazard of erosion is generally too severe for this use; however, if this soil is adequately protected from erosion, the less sloping areas can be used for small grains. Conservation tillage, terraces, and grassed waterways help to control erosion.

This soil is moderately well suited to pasture. The main limitation is the short, irregular slopes, and in addition, erosion is a hazard. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, crimson clover, and ryegrass. Seedbed preparation should be on the contour or across the slope where practical. Proper grazing, weed control, and fertilizer are needed for maximum quality of forage.

This soil is moderately well suited to urban development. The moderately slow permeability, steepness of slope, and the layers of ironstone in the subsoil are slight to moderate limitations for dwellings and moderate to severe limitations for sanitary facilities. Erosion is the main hazard. Only the part of the site that is used for construction should be disturbed. Plants are difficult to establish in areas where the surface layer has been removed, exposing the subsoil and ironstone layers. Mulching and fertilizing cut areas help to establish plants. If septic tanks are installed, the size of the absorption field should be increased to compensate for the moderately slow permeability of the subsoil. Self-contained disposal units can be used to dispose of sewage properly.

This soil is moderately well suited to recreational uses. The main limitations are steepness of slope, small stones on the surface, and moderately slow permeability. Erosion is the main hazard. Cuts and fills should be seeded or mulched. Plant cover can be maintained by adding fertilizer and by controlling traffic.

This Ruple soil is in capability subclass VIe. The woodland ordination symbol is 8F.

Sa—Sacul very 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 range from 20 to 500 acres.

Typically, this Sacul soil has a brown, very strongly acid very fine sandy loam surface layer about 2 inches thick. The subsurface layer to a depth of about 7 inches is light yellowish brown, very strongly acid very fine sandy loam. The subsoil to a depth of about 17 inches is red, very strongly acid clay. To a depth of about 33 inches, it is red, mottled, very strongly acid sandy clay. The subsoil to a depth of about 57 inches is mottled light brownish gray, red, and yellowish brown, very strongly acid and extremely acid sandy clay, clay, and sandy clay loam. The substratum to a depth of about 80 inches is stratified light brownish gray clay loam and sandy clay and yellowish brown sandy loam.

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to most crops. Water and air move through this soil at a slow rate. Water runs off the surface at a medium rate. Although gray mottles in the subsoil typically indicate wetness, a seasonal high water table has not been observed in this soil. In some years, plants are damaged by lack of water during dry periods in summer and fall. The shrink-swell potential is high.

Included with this soil in mapping are a few small areas of Angie, Darbonne, Darley, Mahan, and Ruple soils. Angie soils are on broad ridgetops at a slightly lower elevation than the Sacul soil. The subsoil of the Angie soils is brownish and has less than 15 percent ironstone fragments. Darbonne, Darley, Mahan, and Ruple soils are in positions similar to those of the Sacul soil. Darbonne soils have a loamy subsoil, and Darley and Ruple soils have layers of ironstone in the subsoil. 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 or pastureland. A small acreage is used as cropland.

This soil is somewhat poorly suited to cultivated crops because of the low fertility and the potentially toxic levels of exchangeable aluminum in the root zone. In addition, erosion is a hazard. Suitable crops are cotton, soybeans, and corn. This soil is friable and easy to keep in good tilth. Stripcropping, contour farming, terracing, and managing crop residue can reduce soil loss by erosion. Most crops respond well to lime and fertilizer, which help to overcome the low fertility and the high levels of exchangeable aluminum.

This soil is well suited to pasture; however, low fertility is a limitation. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, crimson clover, and ryegrass. Fertilizer and lime are needed for optimum production of forage.

This Sacul soil is well suited to use as woodland. The potential for production of loblolly pine is moderately high. The main concerns in management are the hazard of soil compaction and a moderate hazard of erosion. Roads, landings, and cut-and-fill slopes can be protected from erosion by constructing diversions and by seeding cuts and fills. Logging during the drier seasons minimizes rutting and soil compaction. Plant competition can be controlled by proper site preparation and by spraying, cutting, or girdling to eliminate unwanted weeds, brush, or trees.

This soil is poorly suited to urban development mainly because of the clayey subsoil, slow permeability, high shrink-swell potential, and low strength for roads. Slow permeability is a severe limitation if this soil is used as septic tank absorption fields. Sewage 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 can be designed to overcome the limited ability of the soil to support loads.

This soil is moderately well suited to intensive recreational uses. Steepness of slope is a limitation for playgrounds, and slow permeability is a limitation for most recreational uses. Plant cover on the soil can reduce runoff and control erosion.

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

Sc—Sacul very fine sandy loam, 5 to 12 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.

Typically, this Sacul soil has a brown, strongly acid very fine sandy loam surface layer about 3 inches thick. The subsurface layer to a depth of about 8 inches is yellowish brown, strongly acid very fine sandy loam. The subsoil extends to a depth of about 50 inches. It is red, very strongly acid clay in the upper part and red, mottled, very strongly acid clay in the middle part. The lower part is clay loam mottled in shades of red, brown, and gray. The substratum to a depth of about 65 inches is mottled red and gray clay loam.

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to most crops. Water and air move through this soil at a slow rate. In some years, plants are damaged by lack of water during dry periods in summer and fall. Water runs off the surface at a rapid rate. Although gray mottles in the subsoil typically indicate wetness, a seasonal high water table has not been observed in this soil. This soil dries quickly after rains. The shrink-swell potential is high.

Included with this soil in mapping are a few small areas of Darbonne, Darley, Mahan, and Ruple soils. Darbonne soils are on convex ridgetops and have a loamy subsoil. Darley, Mahan, and Ruple soils are on narrow ridgetops and the upper part of the side slopes. Darley and Ruple soils have ironstone layers in the subsoil. 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 well suited to use as woodland. The potential for production of loblolly pine is moderately high. The main concerns in producing and harvesting timber are soil compaction and the hazard of erosion. Roads and landings can be protected from erosion by constructing diversions and by seeding cuts and fills.

Conventional methods of harvesting generally can be used; however, logging should be done during the drier periods 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 generally is not suited to cultivated crops. The hazard of erosion is too severe for this use.

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

This soil is poorly suited to urban development because of the slow permeability, steepness of slope, 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. If septic tanks are installed, the size of the absorption field should be increased to compensate for the slow permeability of the subsoil. 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 recreational uses. It is limited mainly by slow permeability and steepness of slope. Cuts and fills should be seeded or mulched. 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.

Sg—Sacul gravelly fine sandy loam, 1 to 5 percent slopes. This soil is gently sloping and moderately well drained. It is on ridgetops on uplands. The areas of this soil are irregular in shape and range from 20 to 350 acres.

Typically, this Sacul soil has a dark brown, very strongly acid gravelly fine sandy loam surface layer about 2 inches thick. The subsurface layer to a depth of about 8 inches is brown, very strongly acid gravelly fine sandy loam. The subsoil to a depth of about 60 inches is yellowish red, very strongly acid clay in the upper part; yellowish red, mottled, very strongly acid sandy clay in the middle part; and mottled red and light brownish gray, very strongly acid clay loam in the lower part.

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to most crops. Water and air move through this soil at a slow rate. In some years, plants are damaged by lack of water during dry periods in summer and fall. Water runs off the surface at a medium rate. Although gray mottles in the subsoil typically indicate wetness, a seasonal high water table has not been observed in this soil. The many small to large fragments of ironstone in the surface layer reduce the available water capacity. The shrink-swell potential is high.

Included with this soil in mapping are a few small areas of Angie, Darbonne, Darley, Mahan, and Ruple soils. Angie soils are on broad ridgetops and have a brownish subsoil. Darbonne, Darley, Mahan, and Ruple soils are in positions similar to those of the Sacul soil. Darbonne soils have a loamy subsoil. Darley and Ruple soils have layers of ironstone in the subsoil. 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. Small acreages are used as cropland or pastureland.

This soil is well suited to use as woodland. The potential for production of loblolly pine is moderately high. The main concerns in producing and harvesting timber are soil compaction and a moderate hazard of erosion. Proper site preparation controls initial plant competition, and spraying controls subsequent growth. Roads and landings can be protected from erosion by constructing diversions and by seeding cuts and fills. Using low-pressure ground equipment or logging only in dry periods can reduce damage to the soil from rutting and compaction and can help to maintain productivity.

This soil is somewhat poorly suited to cultivated crops because of the low fertility, potentially toxic levels of exchangeable aluminum in the root zone, and the hazard of erosion. In addition, the many ironstone gravels in the surface layer can make seedbed preparation difficult and reduce seed germination. 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. Crops respond well to lime and fertilizer, which help to overcome the low fertility and reduce the high levels of exchangeable aluminum. Conservation tillage, terraces, diversions, and grassed waterways help to control erosion.

The soil is well suited to pasture; however, low natural fertility is a limitation and erosion is a hazard.

Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, crimson clover, and ryegrass. Seedbed preparation should be on the contour or across the slope where practical. Proper grazing, weed control, and fertilizer are needed for maximum quality of forage.

The soil is poorly suited to urban development because of the slow permeability, high shrink-swell potential, clayey subsoil, and low strength for roads. Revegetating disturbed areas around construction sites as soon as possible helps to control soil erosion. Roads should be designed to offset the limited ability of the soil to support a load. Septic tank absorption fields do not function properly during rainy periods because of slow permeability. Using sandy backfill for the trench and along absorption lines helps to compensate for the slow permeability. 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 of the soil.

This soil is moderately well suited to recreational uses. It is limited mainly by slow permeability and steepness of slope. Plant cover can be maintained by adding fertilizer and by controlling traffic.

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

Sk—Sacul gravelly fine sandy loam, 5 to 12 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 400 acres.

Typically, this Sacul soil has a dark brown, strongly acid gravelly fine sandy loam surface layer about 3 inches thick. The subsurface layer to a depth of about 8 inches is brown, strongly acid gravelly fine sandy loam. The subsoil to a depth of about 72 inches is red, very strongly acid clay in the upper part; red, mottled, very strongly acid clay in the middle part; and mottled red and light brownish gray, very strongly acid clay loam and sandy clay loam in the lower part.

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to most crops. Water and air move through this soil at a slow rate. In some years, plants are damaged by lack of water during dry periods in summer and fall. The ironstone gravel in the surface layer somewhat reduces the available water capacity. Water runs off the surface at a rapid rate. Although gray mottles in the subsoil typically indicate wetness, a seasonal high water table has not been observed in this soil. This soil dries quickly after rains. The shrink-swell potential is high.

Included with this soil in mapping are a few small areas of Darbonne, Darley, Mahan, and Ruple soils. Darbonne soils are on convex ridgetops and have a loamy subsoil. Darley and Ruple soils are on upper side slopes and have ironstone layers in the subsoil. Mahan soils are on convex ridgetops and do not have gray mottles in the lower part of the subsoil. Also included are a few small areas of Sacul very fine sandy loam. 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 use as woodland. The potential for production of loblolly pine is moderately high. The main concerns in producing and harvesting timber are soil compaction and a moderate hazard of erosion. Management that minimizes the risk of erosion is essential in harvesting timber. Roads and landings can be protected from erosion by constructing diversions and by seeding cuts and fills. Competing vegetation can be controlled by proper site preparation and by spraying, cutting, or girdling to eliminate unwanted weeds, brush, or trees. Rutting and soil compaction can be reduced by logging during the drier periods.

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

The soil is moderately well suited to pasture. Low soil fertility is the main limitation, and erosion is a hazard. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, and crimson clover. 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 is poorly suited to urban development mainly because of slow permeability, steepness of slope, 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. If septic tanks are installed, the size of the absorption field should be increased to compensate for the slow permeability of the subsoil. 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 recreational uses. It is limited mainly by slow permeability and steepness of slope. Cuts and fills can be seeded or mulched to prevent soil 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.

Sm—Smithdale fine sandy loam, 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 150 acres.

Typically, this Smithdale soil has a dark brown, medium acid fine sandy loam surface layer about 9 inches thick. The subsurface layer to a depth of about 18 inches is yellowish brown, strongly acid fine sandy loam. The next layer to a depth of about 23 inches is yellowish red, strongly acid sandy loam. The subsoil to a depth of about 47 inches is yellowish red, strongly acid sandy clay loam. To a depth of about 75 inches, it is yellowish red, mottled, strongly acid sandy loam.

This soil has low fertility and moderately high levels of exchangeable aluminum that are potentially toxic to some crops. Water and air move through this soil at a moderate rate. Water runs off the surface at a rapid rate. In most years, plants are damaged by lack of water during dry periods in summer and fall. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Flo and McLaurin soils. Flo soils are on upper side slopes and are sandy throughout the profile. McLaurin soils are on ridgetops and contain less clay in the subsoil than the Smithdale soil. The included soils make up about 15 percent of the map unit.

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

This soil is poorly suited to crops mainly because of the severe hazard of erosion, low fertility, and potentially toxic levels of exchangeable aluminum in the root zone. Erosion can be reduced if fall grains or winter pasture grasses are seeded early, if conservation tillage is used, and if tillage and seeding are on the contour or across the slope. Also, waterways should be shaped and seeded to perennial grasses. Crops respond well to fertilizer and lime, which help to overcome the low fertility and reduce the moderately high levels of exchangeable aluminum.

This soil is moderately well suited to pasture. The main limitation is low fertility, and erosion is a hazard. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, and crimson clover. The response to fertilizer is good. Lime is generally needed.

This soil is well suited to use as woodland and has few limitations for producing and harvesting timber. The potential for production of loblolly pine is moderately high. Roads and landings can be protected from erosion by constructing diversions and by seeding cuts and fills. Sloping skid trails and firebreaks are subject to rilling and gullying unless they are provided with adequate water bars or protected by plant cover, or both.

This soil is moderately well suited to urban development. Steepness of slope is a limitation for most uses. Disturbed areas around construction sites should be revegetated as soon as possible to control soil erosion. Septic tank absorption lines can be installed on the contour to prevent seepage of effluent on side slopes.

This soil is moderately well suited to intensive recreational uses. The main limitation is steepness of slope. Maintaining a plant cover in recreation areas reduces runoff and helps to control soil erosion.

This Smithdale soil is in capability subclass IVe. The woodland ordination symbol is 8A.

Wp—Wolfpen loamy sand, 1 to 3 percent slopes. This soil is very gently sloping and is well drained. It is on broad ridgetops on uplands. The areas of this soil are irregular in shape and range from 30 to 350 acres.

Typically, this Wolfpen soil has a brown, strongly acid loamy sand surface layer about 6 inches thick. The subsurface layer to a depth of about 26 inches is pale brown, strongly acid loamy sand. The next layer to a depth of about 38 inches is strong brown, mottled, strongly acid sandy clay loam and pale brown sandy loam. The subsoil to a depth of about 78 inches is yellowish brown, mottled, strongly acid sandy clay loam in the upper part; strong brown, mottled, very strongly acid sandy loam in the middle part; and mottled very strong brown, yellowish red, brownish yellow, and red, very strongly acid sandy clay loam in the lower part.

This soil has low fertility and moderately high levels of exchangeable aluminum that are potentially toxic to some crops. Water and air move through this soil at a moderate rate. In some years, plants are damaged by lack of water during dry periods in summer and fall. Water runs off the surface at a slow rate. A seasonal high water table is about 4 to 6 feet below the surface from December to May. This soil dries quickly after rains. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Angie, Bowie, Eastwood, Flo, Larue, and McLaurin soils. Angie and Eastwood soils are at a lower elevation than the Wolfpen soil and have a clayey subsoil. Bowie, Flo, Larue, and McLaurin soils are either in positions similar to those of the Wolfpen soil or they are on the narrow and more convex parts of the ridgetops. Bowie soils are loamy throughout the profile, and Flo soils are sandy throughout. Larue soils have a reddish subsoil, and McLaurin soils have a reddish loamy subsoil. The included soils make up about 15 percent of the map unit.

This Wolfpen soil is used mainly as woodland. Small acreages are used as cropland or pastureland.

This soil is well suited to use as woodland. The potential for production of loblolly pine is high. The main concern in managing timber on this soil is moderate seedling mortality caused by soil droughtiness.

This soil is moderately well suited to cultivated crops. The main limitations are moderate soil droughtiness, low fertility, and moderately high levels of exchangeable aluminum in the root zone. Suitable crops are cotton, corn, watermelons, sweet potatoes, and wheat. This soil is very friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. Sprinkler irrigation systems work well on this soil. Irrigation can prevent damage to crops during dry periods of most years. Crops 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 pasture; however, moderate soil droughtiness and low fertility are limitations for this use. The main suitable pasture plants are weeping lovegrass, improved bermudagrass, bahiagrass, crimson clover, and ryegrass. Fertilizer and lime are needed for optimum production of forage. Periodic mowing and clipping help to maintain uniform growth, discourage selective grazing, and reduce clumpy growth.

This soil is moderately well suited to urban development. The main limitation is wetness. In addition, cutbanks are not stable and are subject to slumping. Seepage can be a problem in sewage lagoons and sanitary landfills. Revegetating disturbed areas around construction sites as soon as possible helps to control erosion.

This soil is moderately well suited to recreational uses. The sandy surface layer is the main limitation. Steepness of slope is an additional limitation for playgrounds. Plant cover can be established by mulching, fertilizing, and irrigating.

This Wolfpen soil is in capability subclass IIIs. The woodland ordination symbol is 9S.

Prime Farmland

In this section, prime farmland is defined and discussed, and the prime farmland soils in Claiborne Parish are listed.

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

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

Prime farmland soils may presently be in use as cropland, pasture, or woodland, or they may be in other uses. They are used for producing food or fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more 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 get an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not subject to frequent flooding during the growing season. The slope ranges mainly from 0 to 5 percent.

The following map units, or soils, make up prime farmland in Claiborne 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.

Soils that have limitations, such as a high water table or flooding, may qualify as prime farmland if these limitations are overcome by such measures as drainage or flood control. Only those soils are listed, however, that have few limitations and need no additional improvements to qualify as prime farmland.

An	Angie very fine sandy loam, 1 to 3 percent slopes
Bw	Bowie fine sandy loam, 1 to 5 percent slopes
Ca	Cahaba fine sandy loam, 1 to 3 percent slopes
Db	Darbonne loamy fine sand, 1 to 5 percent slopes
De	Darley gravelly loamy fine sand, 1 to 5 percent slopes
Gn	Guyton silt loam
Ha	Harleston fine sandy loam, 1 to 3 percent slopes
Ma	Mahan fine sandy loam, 1 to 5 percent slopes
Mr	McLaurin loamy fine sand, 1 to 3 percent slopes
Re	Ruple gravelly loam, 1 to 5 percent slopes
Sa	Sacul very fine sandy loam, 1 to 5 percent slopes
Sg	Sacul gravelly 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 potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

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

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the 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 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 cemented ironstone, wetness, or very firm soil layers can cause difficulty in excavation.

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

Crops and Pasture

Richard C. Aycock, conservation agronomist, Soil Conservation Service, helped prepare this section.

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

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific recommendations for fertilizers, crop varieties, and seeding mixtures are not given. These change from time to time as more complete information is obtained. For more detailed information, consult the local staff of the Soil Conservation Service, the Extension Service, or the Louisiana Agricultural Experiment Station.

About 45,274 acres in Claiborne Parish was used for crops and pasture in 1982, according to the United States Census of Agriculture. About 11,541 acres was used for crops, mainly small grains and cotton, and more than 33,733 acres was used for pasture.

Differences in crop suitability and management needs result from differences in soil characteristics, such as fertility levels, erodibility, organic matter content, availability of water for plants, drainage, and the hazard of flooding. Cropping systems and soil tillage 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 Claiborne Parish.

Perennial grasses or legumes. Grasses, legumes, or mixtures of these are grown for pasture and hay. 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.

Figure 3.—This pasture of improved bermudagrass is on Angie very fine sandy loam, 1 to 3 percent slopes.

Common and improved bermudagrass and Pensacola bahiagrass are the summer perennials most commonly grown (fig. 3). Most of these grasses produce good quality forage. Tall fescue, the main winter perennial grass, grows well only on soils that have a favorable moisture content. All of these grasses respond well to fertilizers, particularly nitrogen.

White clover, crimson clover, vetch, and winterpeas 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.

Forage production can be increased by grazing the understory native plants in woodland. Forage volume varies with the woodland site, the condition of the 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 Claiborne Parish range from extremely acid to slightly acid in the upper 20 inches of the profile. The more acid soils may require lime. 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 laboratory analysis of soil samples from each field. A soil sample for laboratory testing should consist of a single soil phase and should represent no more than 10 acres. 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 crop growth. It also increases the rate of water intake, reduces surface crusting and soil loss by erosion, and improves tilth. Most of the cultivated soils in Claiborne 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. Preparing seedbeds, cultivating, and harvesting can damage soil structure. Excessive tillage should be avoided. Some of the clayey soils in the parish become cloddy if they are plowed, and 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 plowpan, 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 Guyton soils; however, major flood control structures are needed to protect the Dela, Iuka, and Ouachita soils from stream overflow.

Water for plant growth. The available water capacity of the soils in the parish ranges from low to 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 the 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 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 than the cropping system used on cash-crop farms. In some areas, cotton is grown continuously. Grass or legume cover crops can be grown during the fall and winter.

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

Control of erosion. Erosion is a hazard on the uplands in Claiborne Parish. It is not a serious problem on soils of the flood plains, mainly because the topography is level or nearly level. Sheet erosion is moderately severe in all fallow-plowed fields. Some gully erosion occurs mainly in areas of the more sloping soils. Sheet, rill, and gully erosion can be reduced by maintaining a cover of vegetation or plant residue, farming on the contour, stripcropping, using conservation tillage, and controlling weeds using methods other than fallow plowing. Disturbed areas around construction sites should be seeded and mulched immediately after construction. Water control structures to control gully erosion should be placed in drainageways and ditches.

Yields Per Acre

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

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

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

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

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

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

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

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

Class I soils have few limitations that restrict their use.

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 limitation is risk of erosion unless a close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); and *s* shows that the soil is limited mainly because it is shallow, droughty, or stony.

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

The acreage of soils in each capability class and subclass is shown in table 7. The capability classification of each map unit is given in the section "Detailed Soil Map Units."

Woodland Management and Productivity

Alan Holditch, forester, Soil Conservation Service, helped prepare this section.

This section has 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 Claiborne Parish. This section also includes soils interpretations that can be used in planning.

Soils vary in their ability to produce trees. Depth, fertility, texture, and the available water capacity influence tree growth. Elevation, aspect, and climate determine the kinds of trees that can grow on a site.

Available water capacity and depth of the root zone are major influences of tree growth.

Woodland Resources

Claiborne Parish was once totally wooded. From the early 1900's through 1950, over 100,000 acres of woodland was cleared to make way for agricultural crops and pastures. During the 1950's, the major land use changed back to southern pine woodlands. Today, the uplands are, again, almost totally wooded, and only a few scattered areas are devoted to crops, pastures, small villages, and homesteads. The woodland in Claiborne Parish is managed primarily for pine, although some small stream bottoms produce limited quantities of hardwood.

Claiborne Parish has about 394,700 acres of commercial woodland. Commercial woodland is defined as that producing or capable of producing crops of industrial wood and not withdrawn from timber use. The area in commercial forest increased by about 3 percent between 1964 and 1974 and by 4 percent between 1974 and 1980. This increase was mainly the result of the conversion of pastureland and cropland to pine forests. The acreage in forest land in Claiborne Parish will probably stabilize at the present level.

About 25,000 acres of the commercial woodland is owned by forest industry, 349,440 acres by private farms, 19,960 acres is National Forest, and 300 acres is other public forest land.

The parish is entirely within the Western Coastal Plain Major Land Resource Area (MLRA). Dominant trees in this MLRA are loblolly and shortleaf pines and associated sweetgum, red oak, and white oak.

Commercial woodland may be further divided into forest types *(30)*. 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 *loblolly-shortleaf pine* forest type makes up about 200,800 acres of the forest land in Claiborne Parish. Loblolly pine generally is dominant except on drier sites. Scattered hardwoods, such as sweetgum, blackgum, southern red oak, post 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 107,100 acres of the forest land in the parish. About 50 to 75 percent of the stocking is hardwoods, generally upland oaks, and 25 to 50 percent is softwoods that do not include cypress. The species that make up the oak-pine forest type are primarily the result of soil, slope, and aspect. On the higher, drier sites the hardwood components tend to be the upland oaks, such as post oak, southern red oak, and blackjack oak. Blackgum, winged elm, red maple, and various hickories are associated with the oak-pine forest type on both of these broad site classifications.

The *oak-hickory* forest type makes up about 40,100 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 include elm and maple.

The *oak-gum-cypress* forest type makes up about 46,900 acres of the forest land in Claiborne Parish. This forest type is on the bottom lands of major streams. Dominant trees are blackgum, sweetgum, oak, and baldcypress. Associated trees include black willow, ash, hackberry, maple, and elm.

The forest land in Claiborne Parish, by physiographic class, is 83 percent pine and 17 percent bottom land hardwood.

The marketable timber volume is about 72 percent pine and 28 percent hardwood. About 60 percent of the forest acreage is in sawtimber (fig. 4), 35 percent is in pole timber, and 5 percent is saplings and seedlings.

The productivity of forest land is the amount of wood produced per acre per year measured in cubic feet. In Claiborne Parish about 6,700 acres produces 165 cubic feet or more of wood per acre, 100,400 acres produces 120 to 165 cubic feet per acre, 214,200 acres produces 85 to 120 cubic feet per acre, and 73,600 acres produces 50 to 85 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 private landowners. Most of these tracts are producing well below potential and would benefit if stands were improved by thinning out mature trees and undesirable species. Protection from overgrazing, fire, insects, and diseases; tree planting; and timber stand improvement are needed to improve stands. Forest land owned by forest industries and forest land within the Kisatchie National Forest generally are well managed.

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

Figure 4.—Loblolly pine saw logs are loaded onto transport trucks and hauled to nearby sawmills. The trees are on Sacul very fine sandy loam, 1 to 5 percent slopes.

Environmental Impact

Woodland is valuable for wildlife habitat, recreation, natural beauty, and conservation of soil and water. The commercial forest land of Claiborne 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, and provide shade from the sun's hot rays.

Production of Forage in Woodland

The kind and amount of understory vegetation that can be produced in an area is related to the soils, climate, and amount of tree overstory. In many pine woodlands, cattle grazing can be a compatible secondary use. Grazing is not recommended on hardwood woodland. Grasses, legumes, forbs, and many woody browse species in the understory are grazeable if properly managed to supplement a woodland enterprise without damage to the wood crop. In fact, on most pine woodland, grazing is beneficial to the woodland program because it reduces the accumulation of heavy "rough," thus reducing the hazard of wildfires. Grazing also helps to suppress undesirable woody plants.

The success of a combined woodland and livestock program depends primarily on the degree and time of grazing of the forage plants. Intensity of grazing should maintain adequate cover for soil protection and maintain or improve the quantity and quality of trees and forage vegetation.

Forage production varies according to the type of woodland and the amount of sunlight that reaches the understory vegetation during the growing season. Soils that have about the same potential to produce trees also have similar potential for producing about the same kind and amount of understory vegetation. The vegetative community on these soils will reproduce itself as long as the environment does not change.

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

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

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 fertilization than others, and some are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special efforts to reforest. In the section "Detailed Soil Map Units," each map unit in the survey area suitable for producing timber presents information about productivity, limitations for harvesting timber, and management concerns for producing timber. Table 8 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate*, and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

The first tree listed for each soil under the column "Common trees" 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.

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

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation for use and management. The letter *R* indicates a soil that has a significant limitation because of steepness of slope. 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 soil. The letter *S* indicates a dry, sandy soil. The letter *F* indicates a soil that has a large amount of coarse fragments in the soil profile. The letter *A* indicates a soil that has no significant restrictions or limitations for forest use and management. If a soil has more than one limitation, the priority is as follows: R, W, C, S, and F.

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

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

Ratings of *seedling mortality* refer to the probability of 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 and duration of the water table, rock fragments in the surface layer, rooting depth, and the aspect of the slope. Mortality generally is greatest 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 surface drainage, or providing artificial shade for seedlings. Reinforcement planting is often needed if the risk is *moderate* or *severe*.

Ratings of *plant competition* indicate the likelihood of the growth or invasion of undesirable plants. *Plant competition* becomes 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 reduces adequate natural or artificial reforestation but does not necessitate intensive site preparation and maintenance. The risk is *moderate* if competition from undesirable plants reduces natural or artificial reforestation to the extent that intensive site preparation and maintenance are needed. The risk is *severe* if competition from undesirable plants prevents adequate natural or artificial reforestation unless the site is intensively prepared and maintained. A *moderate* or *severe* rating indicates the need for site preparation to ensure the development of an adequately stocked stand. Managers must plan site preparation measures to ensure reforestation without delays.

The potential productivity of *common trees* on a soil is expressed as a *site index*. Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate.

The soils that are commonly used to produce timber have the yield predicted in cubic meters and board feet. The yield is predicted at the point where mean annual increment culminates. The productivity of the soils in this survey is mainly 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 *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands. The procedure and technique for determining site index are given in the site index tables used for the Claiborne Parish soil survey *(5, 6, 7, 8, 9, 20)*.

The *productivity class* represents an expected volume produced by the most important trees, expressed in cubic meters per hectare per year. Cubic meters per hectare can be converted to cubic feet per acre by multiplying by 14.3. It can be converted to board feet by multiplying by a factor of about 71. For example, a productivity class of 8 means the soil can be expected to produce 114 cubic feet per acre per year at the point where mean annual increment culminates, or about 568 board feet per acre per year.

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

Recreation

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

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

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

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones 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. If grading is needed, the depth of the soil over layers of cemented ironstone or a hardpan should be considered.

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

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

The upland forests of mixed pine and hardwood, bottom land forests of hardwood, and the many scattered open areas of pastureland in Claiborne Parish provide habitat for a large and varied population of wildlife. The acreage of cropland in the parish is small and insignificant as habitat for wildlife.

About 33,733 acres of pastureland is in the parish. Pasture grasses include common bermudagrass, bahiagrass, and improved bermudagrass. The cover and seed production provided by these areas offer limited habitat to mourning dove, bobwhite quail, rabbit, white-tailed deer, and many other nongame birds and animals. The primary value of pastures to wildlife is the contrasting "edge effect" provided by these small open areas in an otherwise forested environment.

The 327,601 acres of upland pine forests is managed primarily for loblolly pine. Woodland management practices, such as periodic thinning and prescribed burning, are beneficial to wildlife, especially white-tailed deer, bobwhite quail, and wild turkey. Even-aged management utilizing "block clearcutting" is practiced on forest land owned by forest industry and the U.S. Forest Service. This practice is beneficial to deer, bobwhite quail, and turkey if the clearcuts are kept relatively small.

The upland forests consist of pine or mixed pine-hardwood. Common trees are loblolly pine, shortleaf pine, white oak, southern red oak, overcup oak, sweetgum, elm, persimmon, water oak, and several species of hickory. The forests of mixed pine and hardwood generally support larger populations of woodland wildlife than forests of pure pine.

The hardwood forests along creek bottoms provide the primary habitat for squirrel, deer, and wild turkey. These forests cover about 78,158 acres in the parish. Middlefork Creek (Middle Fork of Bayou D'Arbonne) is a typical example of this habitat type. Dominant trees include beech, magnolia, cherrybark oak, white oak, swamp chestnut oak, water oak, shagbark hickory, and elm. The hardwood forest areas offer excellent deer and squirrel hunting.

About 19,960 acres of forest land in the parish is owned by the U.S. Forest Service. This forest land is managed for multiple use of the resources. Designated campgrounds are available, and the area offers some excellent public hunting.

The many ponds, lakes, and creeks of the parish support low to high populations of largemouth bass, white bass, striped bass, white and black crappie, bluegill, warmouth, bowfin, buffalo, gar, carp, shad, pickerel, and several species of shiners and minnows. Lake Claiborne, a manmade lake, offers some of the best fishing in the parish. Most of the farm ponds in the parish have been stocked with bluegill, redear sunfish, and largemouth bass. Some have been stocked with channel catfish.

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

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

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

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

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

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

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

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

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

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

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, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, 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 layers of ironstone, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are waterfowl feeding areas and ponds.

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

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

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

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, 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. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data in the "Soil Properties" section.

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

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

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

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

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

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

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

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to a cemented pan or a very firm dense layer, soil texture, and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

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

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to a cemented pan, 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, depth to a cemented pan, and the available water capacity in the upper 40 inches affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

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

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

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

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, depth to a cemented pan, flooding, and content of organic matter.

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

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a cemented pan, depth to a water table, slope, and flooding affect both types of landfill. Texture, stones, and soil reaction affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

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

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

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

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

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

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

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

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

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

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

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

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

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

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

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

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

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

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

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

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

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

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

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of rock fragments. 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 a cemented pan or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; and susceptibility to flooding. Excavating and grading and the stability of ditchbanks are affected by depth to a cemented pan, the slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as sodium or aluminum. Availability of drainage outlets is not considered in the ratings.

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

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce water erosion and conserve moisture by intercepting runoff. Slope, wetness, and depth to a cemented pan 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, slope, and depth to a cemented pan affect the construction of grassed waterways. The 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 characterize key soils.

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

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

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

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

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

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

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

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

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

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

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

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

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

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

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

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

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

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

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

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

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

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

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

In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

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

The four hydrologic soil groups are:

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

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

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

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

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

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional*, or *frequent*. *None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (there is a near 0 to 5 percent chance of flooding in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (there is a 5 to 50 percent chance of flooding in any year). *Frequent* means that flooding occurs often under normal weather conditions (there is more than a 50 percent chance of flooding in any year). *Common* is used when classification as occasional or frequent does not affect interpretations. 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. November-May, for example, means that flooding can occur during the period November through May. 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 absence of distinctive horizons, which are characteristic of soils that are not subject to flooding.

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

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table, that is, *perched* or *apparent;* and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 17.

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

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

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

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

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

Soil Fertility Levels

Dr. M.C. Amacher and Dr. R.J. Miller, Department of Agronomy, Louisiana Agricultural Experiment Station, Louisiana State University, helped prepare this section.

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

Factors Affecting Crop Production

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

- Particle-size distribution—texture
- Structure
- Surface area
- Bulk density
- Water retention and flow
- Aeration

Soil factors—chemical properties and soil fertility:

- Quantity factor. This factor is the amount of an element in the soil that is readily available for uptake by plants. The quantity factor is often referred to as the available supply of an element. To determine the quantity factor, the available supply is removed from the soil using a suitable extractant and is analyzed.
- Intensity factor. This factor is related to the concentration of an element species in the soil water. It is a measure of the availability of an element for uptake by plant roots. Two soils that have identical quantities of an element's available supply but have different element intensity factors will differ in element availability to the plant.

• Relative intensity factor. This factor is the effect that the availability of one element has on the availability of another.

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

• Replenishment factor. This factor is the rate of replenishment of the available supply and intensity factors by weathering reactions, fertilizer additions, and transport by mass flow and diffusion.

These factors are interdependent. The magnitude of the factors and the interactions among them 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 measure only one soil factor, the available supply of one or more nutrients in the plow layer. 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 Analyses 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 18. More detailed information on chemical analyses of soils is available *(1, 4, 10, 13, 15, 19, 21, 25, 26, 32, 34)*. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods *(32)*.

Reaction (pH)—1:1 soil/water solution (8C1a).

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

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

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

Exchangeable aluminum and hydrogen—1 molar potassium chloride.

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

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

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

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

Exchangeable sodium percentage—exchangeable sodium/sum cation-exchange capacity.

Aluminum saturation—exchangeable aluminum/effective cation-exchange capacity.

Characteristics of Soil Fertility

In general, four major types of nutrient distribution in soils of Louisiana can be identified. The first type includes soils that have relatively high levels of available nutrients throughout the profile. This type reflects the relatively high fertility status of the parent material from which soils developed and a relatively young age or a less intense degree of weathering of the soil profile.

The second type includes soils that have relatively low levels of available nutrients in the surface layer, but these levels generally increase with depth through the soil profile. These soils have relatively fertile parent material but are older soils that have been subjected 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 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 fertilizing agricultural soils or biocycling in undisturbed soils.

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. These soils have not accumulated nutrients in the surface layer as a result of fertilizing or biocycling.

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

Nitrogen. Generally, 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. Nitrogen fertilizer recommendations are nearly always based on the nitrogen requirement of the crop rather than nitrogen soil test levels, since no reliable nitrogen soil tests are available.

Despite the lack of an adequate nitrogen soil test, the amount of readily available ammonium and nitrate nitrogen in soils, the amount of organic nitrogen, the rate of mineralization of organic nitrogen to available forms of nitrogen, and the rate of conversion of fixed ammonium nitrogen to available forms of nitrogen provide information on the fertility status of a soil with respect to nitrogen. Unfortunately, since the amounts and rates of transformation of the various forms of nitrogen in the soils of Claiborne Parish are unknown, no assessment of the nitrogen fertility status for these soils can be given.

Phosphorus. Phosphorus exists in soils 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. Because most of the phosphorus is unavailable for plant uptake, the availability of phosphorus in the soil is a factor in controlling phosphorus uptake by plants.

The Bray 2 extractant tends to extract more phosphorus than the more commonly used Bray 1, Mehlich 1, and Olsen extractants. The Bray 2 extractant provides an estimate of the plant-available supply of phosphorus in soils. The Bray 2 extractable phosphorus content of most of the soils in Claiborne 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 three major forms in soils: exchangeable potassium associated with negatively charged sites on clay mineral surfaces, nonexchangeable potassium trapped between clay mineral interlayers, and structural potassium within the crystal lattice of minerals. Exchangeable potassium in soils can be replaced by other cations and is generally readily available for plant uptake. To become available to plants, nonexchangeable potassium and structural potassium need to 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 Claiborne Parish is low throughout the soil profile, but it can increase slightly with depth as the clay content increases. This indicates 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 Claiborne Parish that have a sandier texture 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 soils as exchangeable magnesium associated with negatively charged sites on clay mineral surfaces and as structural magnesium in mineral crystal lattices. Exchangeable magnesium is generally readily available for plant uptake while structural magnesium must be converted to exchangeable magnesium during mineral weathering reactions.

According to soil test interpretation guidelines, the exchangeable magnesium content of the soils of Claiborne Parish is low, medium, or high, depending upon soil texture. Low exchangeable magnesium levels are throughout most of the soil profile in such soils as Flo loamy fine sand. Larue loamy fine sand has 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 Sacul very fine sandy loam, and medium to high levels are throughout the soil profile in Darbonne loamy fine sand. 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 Claiborne 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 as exchangeable calcium associated with negatively charged sites on clay mineral surfaces and as structural calcium in mineral crystal lattices. Exchangeable calcium generally is available for plant uptake while structural calcium is not.

According to soil test interpretation guidelines, the exchangeable calcium levels in the soils of Claiborne Parish are low, medium, or high, depending upon soil texture. Calcium deficiencies in plants are extremely rare. Calcium is normally added to soils from liming materials used to correct problems associated with soil acidity.

Calcium is normally the most abundant exchangeable cation in soils; however, the exchangeable magnesium levels in the subsoil of the Angie, Bowie, Sacul, and Eastwood 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.

The soils in Claiborne Parish have medium to high levels of exchangeable calcium throughout the profile, medium to high levels in the upper part of the profile and low levels in the lower part, low levels in the upper part of the profile and medium to high levels in the lower part, or 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.

Organic matter. The organic matter content of a soil greatly influences other soil properties. High organic matter content in mineral soils is desirable, and low organic matter content can lead to many problems. Increasing the organic matter content can greatly improve 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 temperatures increase microbial activity. The rate of organic matter breakdown 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 the soils of Claiborne 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 cultural practices that make maintenance of organic matter difficult at higher levels.

Sodium. Sodium exists in soils as exchangeable sodium associated with negatively charged sites on clay mineral surfaces and as structural sodium in mineral crystal lattices. Because sodium is readily soluble and is generally not strongly retained by soils, well drained soils subjected to a moderate or more intense degree of weathering from 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 to substantial amounts of sodium. High levels of exchangeable sodium in soils are associated with undesirable physical properties, such as poor structure, slow permeability, and restricted drainage.

Although some soils in Claiborne Parish have more exchangeable sodium than exchangeable potassium, none of the soils have excessive levels of exchangeable sodium. 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. High levels of exchangeable sodium (greater 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 adsorption-desorption reactions at the surfaces of soil minerals and organic matter. The pH also affects microbial activity.

Aluminum exists in soils as exchangeable monomeric hydrolysis species, nonexchangeable polymeric hydrolysis species, aluminum oxides, and aluminosilicate minerals. Exchangeable aluminum in soils is determined by extraction with neutral salts, such as potassium chloride 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. This 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 chlorides, 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 determined up to a given pH. All sources of soil acidity, including hydrolysis of monomeric and polymeric aluminum species and hydrogen from pH-dependent exchange sites on metal oxides, layer silicates, and organic matter, contribute to the total potential acidity. Total potential acidity in soils is determined by titration with base or incubation with lime; extraction with a buffered extractant followed by titration of the buffered extractant (pH 8.2, barium chloride-triethanolamine method); or equilabration with buffers followed by estimation of acidity from changes in buffer pH.

Most soils of Claiborne Parish have a low pH, contain significant quantities of exchangeable aluminum, and have high levels of total acidity in many of the soil horizons. 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 represents the available supply of nutrient and non-nutrient cations in the soil. It is the amount of cations on permanent and pH-dependent negatively charged sites on the soil surface. 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 (calcium, magnesium, potassium, sodium) determined by extraction with pH 7, 1 molar ammonium acetate plus the sum of neutral salt exchangeable aluminum and hydrogen (exchangeable acidity). The sum cation-exchange capacity is the sum of exchangeable bases plus the total acidity determined by extraction with pH 8.2, barium chloride-triethanolamine. The effective-cation exchange capacity is generally less than the sum cation-exchange capacity 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 Claiborne Parish. Since the pH-dependent 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.

Characterization of the Soils

Dr. Bobby J. Miller, Department of Agronomy, Louisiana Agricultural Experiment Station, Louisiana State University, helped prepare this section.

The physical, chemical, and mineralogical characteristics of soils together with other properties are used to distinguish and identify soils in different series and to make interpretations about their potential use and management. During the course of the survey, selected pedons of nine soils mapped in the parish were sampled and then characterized in the laboratory. The methods of analyses used for characterization and the results of the analyses are in this section. The parentheses enclosures with a number and letter combination, such as (4B1c), identify methods used by the National Soil Survey Laboratory *(32)*. The results of analyses performed by the Louisiana Agricultural Experiment Station are in tables 19, 20, and 21.

All values in tables 19 and 20 are expressed on the basis of the ovendry soil (2A1). The percent of fragments greater than 2 millimeters was measured by sieving (3B1). The percent of sand, silt, and clay in the soil fraction less than 2 millimeters in size was determined by pipette and sieves (3A1). Soil water retention at ⅓ and 15 bar was measured by pressure plate extraction at the appropriate pressures (4B1c, 4B2). The 15 bar water content was subtracted from the ⅓ bar water content to obtain water retention difference (4C1). Soil bulk density values were obtained on intact saran-coated soil clods at field moist (4A3a), air dry (4A1b), and ovendry (4A1h) conditions. Soil pH was determined in 1:1 suspensions of distilled water (8C1a), 0.01 molar calcium chloride (8C1e), and 1 N potassium chloride (8C1c). Organic matter was determined by a potassium dichromate-sulfuric acid wet digestion method (6A1a). The two measurements of phosphorus were carried out using the Bray 1 and Bray 2 extraction reagents. Iron oxides were determined by extraction with sodium dithionite solution (6C1). Neutral normal ammonium acetate was used to obtain extractable calcium (6N2e), magnesium (6O2d), potassium (6Q2b), and sodium (6P2b). Extractable acidity at pH 8.2 was determined by extraction with barium chloride-triethanolamine solution (6H2b). Extractable aluminum and hydrogen were measured in 1 N potassium chloride soil extract (6G2). The sum of cations was obtained by summation of the neutral normal ammonium acetate extractable calcium, magnesium, potassium, and sodium plus the barium chloride-triethanolamine extractable acidity (5A3a). The neutral normal ammonium acetate cation-exchange capacity is obtained by determining the amount of ammonium ion retained by the soil at pH 7.0 (5ABA). The cation-exchange capacity per gram of clay was calculated by dividing the neutral normal ammonium acetate cation-exchange capacity by the percent clay (8D1). The cation-exchange capacity per 15-bar water was calculated by dividing the neutral normal ammonium acetate cation-exchange capacity by the 15-bar water content.

The percent aluminum saturation was calculated on the basis of the sum of neutral normal ammonium acetate extractable calcium, magnesium, potassium, and sodium plus 1 N potassium chloride extractable aluminum and hydrogen. Base saturation values, calculated by sum of cations (5C3) and by ammonium acetate (5C1), express the percentage of the appropriate cation-exchange capacity occupied by the sum of the neutral normal ammonium acetate extractable calcium, magnesium, potassium, and sodium.

The mineral composition of the clay-size fraction was determined using x-ray diffraction (7A2b) and differential thermal (7A3) techniques. Mineral composition of the coarser than clay-size fraction was determined by optical microscopy techniques (7B1A).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(31, 35, 36)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 22 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is 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 is on river flood plains 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. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-loamy, siliceous, nonacid, 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 Dela series, which is a member of the coarse-loamy, siliceous, nonacid, 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 (29)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (31)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

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

Angie Series

The Angie series consists of moderately well drained, slowly permeable soils that formed in loamy and clayey sediment of Tertiary age. These soils are on ridgetops on uplands. Slopes range from 1 to 3 percent. Soils of the Angie series are clayey, mixed, thermic Aquic Paleudults.

Angie soils commonly are near Bowie, Eastwood, and Sacul soils. Bowie soils are on ridgetops at a slightly higher elevation than the Angie soils and are fine-loamy. Eastwood and Sacul soils have a clayey subsoil that is reddish in the upper part. These soils are on side slopes and in positions similar to those of the Angie soils.

Typical pedon of Angie very fine sandy loam, 1 to 3 percent slopes; 900 feet north and 280 feet west of the southeast corner of sec. 33, T. 21 N., R. 4 W.

Ap—0 to 8 inches; yellowish brown (10YR 5/4) very fine sandy loam; weak fine granular structure; very friable; common fine and few medium roots; few iron concretions 2 to 4 millimeters in diameter; slightly acid; clear smooth boundary.

E—8 to 16 inches; light yellowish brown (10YR 6/4) very fine sandy loam; weak medium subangular blocky structure; very friable; few fine and medium roots; few medium and fine tubular pores; medium acid; gradual wavy boundary.

Bt1—16 to 24 inches; strong brown (7.5YR 5/6) silty clay loam; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few coarse and medium roots; few fine tubular pores; common distinct thick continuous clay films on surfaces of peds; medium acid; clear smooth boundary.

Bt2—24 to 36 inches; yellowish brown (10YR 5/6) silty clay; common medium prominent yellowish red (5YR 4/6) mottles and few fine distinct light yellowish brown (10YR 6/4) and light brownish gray (10YR 6/2) mottles; moderate coarse subangular blocky structure parting to moderate fine subangular blocky; firm; few fine roots; few medium pores; common continuous distinct thick clay films on surfaces of peds; strongly acid; clear smooth boundary.

Bt3—36 to 51 inches; yellowish brown (10YR 5/6) silty clay; few fine distinct gray (10YR 6/1) mottles and common medium prominent red (2.5YR 4/8) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; firm; few medium roots; few medium pores; common distinct thick clay films on surfaces of peds; very strongly acid; clear wavy boundary.

Btg—51 to 62 inches; gray (10YR 6/1) silty clay; many medium prominent red (2.5YR 4/8) mottles and common medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; firm; few patchy faint thin clay films on vertical faces of peds; very strongly acid; clear wavy boundary.

BCg—62 to 77 inches; gray (10YR 6/1) clay loam; many medium prominent red (2.5YR 4/8) mottles and few fine distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; firm; few small pockets of brownish yellow (10YR 6/6) sandy loam; very strongly acid.

The solum is more than 60 inches thick. Reaction ranges from very strongly acid to slightly acid in the A horizon and from extremely acid to medium acid in the Bt and BCg horizons. The effective cation-exchange capacity of this soil is 50 percent or more saturated with exchangeable aluminum within a depth of 30 inches.

The A horizon has value of 3 to 6 and chroma of 2 to 4. It is 3 to 9 inches thick.

The E horizon has value of 4 to 6 and chroma of 2 to 5. Texture is very fine sandy loam, fine sandy loam, or silt loam. This horizon is 3 to 8 inches thick.

Some pedons have a BE horizon that has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 6. Texture is fine sandy loam, very fine sandy loam, or sandy clay loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. In some pedons, the lower part of this horizon has hue of 2.5Y. Grayish mottles range from few to many within a depth of 30 inches, and mottles in shades of yellow and red range from common to many in the lower part of the horizon. Texture is silty clay loam, clay, silty clay, or clay loam.

The Btg and BCg horizons are gray or mottled in shades of gray, brown, or red. Texture is clay loam, silty clay loam, clay, or silty clay.

Bowie Series

The Bowie series consists of moderately well drained, moderately slowly permeable soils that formed in loamy sediment of Tertiary age. These soils are on ridgetops 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 Angie, Darbonne, Eastwood, Larue, Mahan, Sacul, and Wolfpen soils. Angie and Eastwood soils are at slightly lower elevations than the Bowie soils, and they have a clayey subsoil. Darbonne, Larue, Mahan, Sacul, and Wolfpen soils are in positions similar to those of the Bowie soils. Darbonne soils have a reddish subsoil that contains many fragments of ironstone. Larue and Wolfpen soils have thick, sandy surface and subsurface layers. Mahan and Sacul soils have a reddish clayey subsoil.

Typical pedon of Bowie fine sandy loam, 1 to 5 percent slopes; 50 feet north and 200 feet east of the southwest corner of sec. 26, T. 22 N., R. 8 W.

Ap—0 to 7 inches; brown (10YR 5/3) fine sandy loam; weak fine granular structure; very friable; common fine and few medium roots; strongly acid; clear smooth boundary.

E—7 to 13 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak medium subangular blocky structure; friable; common fine and few medium roots; common medium tubular pores; strongly acid; gradual smooth boundary.

Bt—13 to 25 inches; strong brown (7.5YR 5/8) sandy clay loam; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; common fine and few medium roots; many fine tubular pores; common discontinuous distinct thick clay films on surfaces of peds; strongly acid; clear smooth boundary.

Btv1—25 to 35 inches; yellowish brown (10YR 5/8) sandy clay loam; common medium prominent red (2.5YR 4/8) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few medium roots; common medium tubular pores; common discontinuous distinct thick clay films on surfaces of peds; 2 percent, by volume, plinthite nodules less than 10 millimeters in diameter; 10 percent, by volume, slightly brittle red mottles; strongly acid; clear wavy boundary.

Btv2—35 to 63 inches; yellowish brown (10YR 5/8) sandy clay loam; many medium prominent red (2.5YR 4/8) mottles and common medium distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; common medium tubular pores; few discontinuous faint thin clay films on surfaces of peds; 8 percent, by volume, plinthite nodules; 25 percent, by volume, brittle red mottles; strongly acid; clear wavy boundary.

Btv3—63 to 75 inches; mottled light brownish gray (10YR 6/2), red (2.5YR 4/6), and yellowish brown (10YR 5/6) clay loam; weak medium subangular blocky structure; firm; 8 percent, by volume, plinthite nodules; 20 percent, by volume, brittle bodies; strongly acid.

The solum is 60 to more than 80 inches thick. Depth to horizons that contain more than 5 percent plinthite ranges from 25 to 50 inches. The effective cation-exchange capacity of this soil is 50 percent or more saturated with exchangeable aluminum within a depth of 30 inches.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. It is 2 to 8 inches thick. Reaction ranges from very strongly acid to slightly acid.

The E horizon has value of 5 or 6 and chroma of 2 to 4. Texture is loamy fine sand or fine sandy loam. Reaction ranges from strongly acid to slightly acid.

The Bt and Btv horizons have value of 5 or 6 and chroma of 4 to 8. Few to many slightly brittle or brittle mottles of red and yellowish red are in most pedons. Mottles in shades of gray and brown are in the lower part of the Btv horizon. Texture of the Bt and Btv horizons is sandy clay loam, fine sandy loam, or clay loam. The Btv horizon contains 5 to 15 percent plinthite. Slightly brittle or brittle bodies make up 10 to 40 percent of the volume of the Btv horizon. Reaction in the Bt and Btv horizons is very strongly acid or strongly acid.

Cahaba Series

The Cahaba series consists of well drained, moderately permeable soils that formed in loamy 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 are similar to McLaurin and Smithdale soils and commonly are near Guyton, Harleston, luka, Dela, and Ouachita soils. Guyton soils are in lower positions on the landscape than the Cahaba soils and are grayish throughout the profile. Harleston soils are at a slightly lower elevation and are coarse-loamy and have a brownish subsoil. McLaurin and Smithdale soils are on the uplands. McLaurin soils are coarse-loamy, and Smithdale soils have thicker sola. luka, Dela, and Ouachita soils are on flood plains and do not have a well developed subsoil.

Typical pedon of Cahaba fine sandy loam, 1 to 3 percent slopes; 700 feet north and 650 feet east of the southwest corner of sec. 1, T. 21 N., R. 5 W.

Ap—0 to 8 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium subangular blocky structure parting to weak fine granular; very friable; common medium roots and many fine roots; medium acid; clear smooth boundary.

A/B—8 to 15 inches; yellowish brown (10YR 5/4) fine sandy loam (A); yellowish red (5YR 5/6) sandy loam (B); weak medium subangular blocky structure; friable; common fine and few medium roots; many fine tubular pores; strongly acid; clear smooth boundary.

Bt1—15 to 25 inches; yellowish red (5YR 4/6) sandy clay loam; weak coarse prismatic structure parting to moderate medium subangular blocky; friable; many fine and common medium roots; common medium tubular pores; common discontinuous distinct thick clay films on surfaces of peds; strongly acid; clear wavy boundary.

Bt2—25 to 42 inches; yellowish red (5YR 4/8) sandy clay loam; weak medium subangular blocky structure; friable; few medium roots; common fine tubular pores; common discontinuous distinct clay films on surfaces of peds; very strongly acid; clear wavy boundary.

BC—42 to 59 inches; yellowish red (5YR 5/8) sandy loam; few medium prominent brownish yellow (10YR 6/6) mottles; weak fine subangular blocky structure; friable; few patchy faint thin clay films on surfaces of some peds; very strongly acid; gradual wavy boundary.

C—59 to 70 inches; yellowish red (5YR 5/6) sandy loam; massive; very friable; few small pockets of uncoated pale brown (10YR 6/3) sand grains; thin bedding planes; very strongly acid.

The solum is 36 to 60 inches thick. Reaction ranges from very strongly acid to medium acid. The effective cation-exchange capacity of this soil is 20 to 50 percent saturated with exchangeable aluminum within a depth of 30 inches.

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

Some pedons have an E horizon that has hue of 10YR, value of 5 or 6, and chroma of 2 to 4.

The Bt horizon has hue of 5YR or 2.5YR and value of 4 or 5. Texture is sandy clay loam or clay loam.

The BC horizon generally has colors similar to those of the Bt horizon, but in some pedons, it is mottled in shades of yellow and brown. Texture is fine sandy loam or sandy loam.

The C horizon has hue of 2.5YR, 5YR, 7.5YR, and 10YR, value of 4 or 5, and chroma of 4 to 8. Texture generally is sandy loam or fine sandy loam. Some pedons are stratified with sand or loamy sand. Few to common flakes of mica are in this horizon in some pedons.

Darbonne Series

The Darbonne series consists of well drained, moderately slowly permeable soils that formed in iron-rich, loamy, marine sediment of Tertiary age. These soils are on ridgetops on uplands. Slopes range from 1 to 5 percent. Soils of the Darbonne series are fine-loamy, siliceous, thermic Typic Paleudalfs.

Darbonne soils commonly are near Bowie, Darley, Eastwood, Larue, Mahan, and Sacul soils. All of these soils except the Eastwood soils are in landscape positions similar to those of the Darbonne soils. Eastwood soils are on ridgetops and side slopes at a lower elevation than the Darbonne soils. Darley, Mahan, and Sacul soils are also on side slopes. None of these soils, except the Darley soils, contain layers and fragments of ironstone that make up 15 percent of the control section. Bowie soils have a brownish loamy subsoil. Darley, Eastwood, Mahan, and Sacul soils have a clayey subsoil. Larue soils have thick sandy surface and subsurface layers.

Typical pedon of Darbonne loamy fine sand, 1 to 5 percent slopes; 3 miles east and 2 miles south of Lisbon, 475 feet north and 200 feet east of the southwest corner of sec. 28, T. 21 N., R. 4 W.

A—0 to 5 inches; dark grayish brown (10YR 4/2) loamy fine sand; weak fine granular structure; very friable; many fine and medium roots and few coarse roots; about 10 percent, by volume, small angular flattened and slightly rounded fragments of ironstone; about 10 percent of fragments larger than ¾ inch in diameter; slightly acid; clear smooth boundary.

BE—5 to 13 inches; yellowish red (5YR 5/6) loamy fine sand; weak medium subangular blocky structure; very friable; common fine and medium roots and few coarse roots; A material in some root channels; about 5 percent, by volume, small angular flattened and slightly rounded fragments of ironstone; about 10 percent of fragments larger than ¾ inch in diameter; slightly acid; clear wavy boundary.

Bt1—13 to 23 inches; red (2.5YR 5/8) fine sandy loam; weak medium subangular blocky structure; friable; common fine and medium roots; A and E material in a few root channels; few thin patchy clay films on vertical faces of peds; about 10 percent, by volume, angular flattened and slightly rounded fragments of ironstone; about 10 percent of fragments larger than

¾ inch in diameter; medium acid; clear wavy boundary.

Bt2—23 to 35 inches; red (2.5YR 4/6) gravelly sandy clay loam; moderate medium and fine subangular blocky structure; firm; few fine roots; common thick continuous clay films on faces of peds; about 25 percent, by volume, angular and flattened ironstone fragments, ¼ inch to 8 inches thick and ½ inch to 3 inches long; about 40 percent of angular fragments larger than ¾ inch in diameter; thick clay coatings on surfaces of some fragments; strongly acid; clear smooth boundary.

Bt3—35 to 45 inches; red (2.5YR 4/8) gravelly sandy clay loam; moderate medium subangular blocky structure; friable; few fine roots; thin patchy clay films on faces of peds; about 30 percent, by volume, flattened and angular ironstone fragments, ¼ inch to 4 inches thick and 1 to 8 inches long; some fragments lie end-to-end appearing as a discontinuous layer; few pockets and common thick coatings of yellowish brown (10YR 5/6) fine sandy loam on fragments; strongly acid; clear smooth boundary.

B/C1—45 to 57 inches; B part about 80 percent and C part about 20 percent, by volume; yellowish red (5YR 5/6) sandy clay loam (Bt) and yellowish brown (10YR 5/8) fine sandy loam (C); weak coarse and medium subangular blocky structure; firm sandy clay loam (Bt) and slightly hard and slightly brittle fine sandy loam (C); less than 5 percent, by volume, flattened and angular fragments of ironstone; few fine and medium pockets and horizontal seams of light brownish gray (10YR 6/2) clay; few vertical and horizontal seams and ped coatings of red (2.5YR 4/8) clay; strongly acid; gradual wavy boundary.

B/C2—57 to 70 inches; B part about 70 percent and C part about 30 percent, by volume; red (2.5YR 5/6) and yellowish red (5YR 5/6) sandy clay loam (Bt) and small pockets and strata of yellowish brown (10YR 5/8) weakly cemented sandstone (C); weak coarse and medium subangular blocky structure, firm consistence (Bt); hard and brittle, easily cut with a spade (C); about 30 percent, by volume, few fine roots concentrated in the Bt material; thick coatings of red (2.5YR 4/8) clay on some vertical faces of peds; common medium pockets of light brownish gray (10YR 6/2) clay; strongly acid.

The solum is 50 to 80 inches thick. The base saturation is more than 50 percent in the upper part of the solum and decreases with depth. Typically, fragments of ironstone are scattered throughout the solum, and at least one subhorizon of the argillic horizon has fragments making up from 15 to 60 percent of the volume. Fragments of ironstone make up from 5 to 35 percent of the volume of the particle-size control section. The volume of coarse fragments decreases with depth in most pedons. The clay content of the control section averages 18 to 35 percent.

The A horizon has value of 4 or 5 and chroma of 2 or 3. Reaction ranges from very strongly acid to slightly acid. This horizon is 3 to 7 inches thick.

The BE horizon has hue of 2.5YR, 5YR, 7.5YR, or 10YR, value of 4 to 6, and chroma of 3 to 8. Texture is fine sandy loam, loamy fine sand, or their gravelly or very gravelly counterparts. Reaction ranges from very strongly acid to slightly acid.

Some pedons have an E horizon that has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 2 to 4. Texture is loamy fine sand, fine sandy loam, or their gravelly or very gravelly counterparts. Reaction ranges from very strongly acid to slightly acid. This horizon is 4 to 17 inches thick.

The Bt horizon has hue of 2.5YR or 5YR and chroma of 4 to 8. Texture is fine sandy loam, loam, sandy clay loam, clay loam, or their gravelly or very gravelly counterparts. Individual subhorizons contain fragments of ironstone that make up as little as 1 percent of the volume or as much as 60 percent. One or more discontinuous to nearly continuous layers of fractured ironstone are in the Bt horizon of some pedons. These layers are ¼ inch to 8 inches thick. The lateral distance between fractures in the layers ranges from 2 to 10 inches, averaging 2 to 4 inches. Pockets and streaks of grayish or whitish clay and yellowish loamy or sandy material range from none to common. Reaction ranges from very strongly acid to medium acid.

The B/C1 horizon consists of reddish loamy material (Bt) and yellowish loamy or sandy material (C). The Bt part has colors similar to those of the Bt horizon and includes hue of 10R. Texture is fine sandy loam, loam, sandy clay loam, or clay loam. The consistence of the Bt part typically is friable or firm; it is slightly brittle in some pedons The C part has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. It makes up 20 to 40 percent of the horizon. Texture is loamy fine sand, loamy sand, fine sandy loam, or sandy loam. Consistence of the C part typically is slightly hard or hard and slightly brittle or brittle; it is friable to loose in some pedons. Small to large pockets, streaks, and strata of grayish or whitish clay range from few to common. Fragments of ironstone make up from less than 1 percent of the horizon to as much as 5 percent.

Reaction of the B/C1 horizon ranges from very strongly acid to medium acid.

The B/C2 horizon is similar in color and texture to the B/C1 horizon except that the C part of the B/C2 horizon has more weakly cemented sandstone that makes up from 30 to 50 percent of the volume. The C part is hard and brittle but can be easily cut with a spade. It is in small to large pockets and strata. Few to common fine and medium roots are concentrated in the Bt material. The Bt part is mainly narrow to wide, vertically oriented clay flows. Thin or thick clay films are on some ped faces of the Bt material. Small to large pockets and streaks of grayish or whitish clay range from few to common. Reaction ranges from very strongly acid to medium acid.

Darley Series

The Darley series consists of well drained, moderately slowly permeable soils that contain layers of fractured ironstone. These soils formed in iron-rich, clayey sediment of Tertiary age. They are on ridgetops and side slopes on uplands. Slopes range from 1 to 30 percent. Soils of the Darley series are clayey, kaolinitic, thermic Typic Hapludults.

Darley soils are similar to Ruple soils and commonly are near Darbonne, Mahan, and Sacul soils. All of these soils are in landscape positions similar to those of the Darley soils on ridgetops. Mahan, Ruple, and Sacul soils are also on side slopes. Mahan soils do not have ironstone layers in the subsoil. Ruple soils have color value of less than 4 throughout the argillic horizon and have oxidic mineralogy. Sacul soils have a clayey subsoil. Darbonne soils have less than 15 percent, by volume, ironstone fragments in the surface layer.

Typical pedon of Darley gravelly loamy fine sand, 1 to 5 percent slopes; 4 miles southeast of Lisbon, 790 feet north and 520 feet west of the southeast corner of sec. 32, T. 21 N., R. 4 W.

Ap—0 to 4 inches; dark brown (7.5YR 4/4) gravelly loamy fine sand; weak fine granular structure; very friable; many fine roots and common medium roots; about 20 percent, by volume, angular fragments of ironstone, ⅛ inch to 2 inches in diameter; about 50 percent of fragments larger than ¾ inch in diameter; strongly acid; clear smooth boundary.

E—4 to 14 inches; yellowish red (5YR 5/8) gravelly fine sandy loam; weak medium subangular blocky structure; very friable; few medium and common fine roots; common fine pores; about 20 percent, by volume, angular fragments of ironstone, ⅛ inch to 5 inches in diameter; about 50 percent of fragments larger than ¾ inch; strongly acid; clear wavy boundary.

Bt1—14 to 24 inches; red (2.5YR 4/8) clay; moderate medium subangular blocky structure; friable; few fine and medium roots; about 5 percent, by volume, angular fragments of ironstone, ⅛ to 1 inch in diameter; thick discontinuous clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt2—24 to 35 inches; red (2.5YR 4/6) clay; weak medium subangular blocky structure; few fine and medium roots; few fine pores; thin discontinuous clay films on faces of peds; common yellowish brown (10YR 5/6) sandy loam pockets ¼ to 1 inch in diameter; pockets of gray (10YR 6/1) clay less than ⅛ inch in diameter in sandy loam pockets; exterior of sandy loam pockets surrounded by iron-rich red (10R 4/6) rind 1/16 to ⅛ inch thick; few small angular fragments of ironstone; very strongly acid; abrupt smooth boundary.

Bt/Bsm—35 to 60 inches; alternating layers of yellowish red (5YR 5/6) and strong brown (7.5YR 5/6) clay loam (Bt) and nearly continuous layers of fractured ironstone (Bsm); Bt part has weak medium subangular blocky structure and is friable; Bsm part is three ironstone layers, 2, 6, and 4 inches thick, separated by clay loam material; average lateral distance between fractures is about 4 to 8 inches; few fine pores in Bt material; thick patchy clay films on vertical faces of peds; many small pockets of gray (10YR 6/1) clay (kaolin) embedded in Bt material; very strongly acid; abrupt smooth boundary.

BC—60 to 81 inches; strong brown (7.5YR 5/8) fine sandy loam; weak coarse and medium subangular blocky structure; very friable; few fine pores; few thin patchy clay films on faces of peds; few peds weakly cemented, hard, and brittle; many red (2.5YR 5/6) sandy clay loam pockets ½ inch to 2 inches in diameter; common discontinuous gray (10YR 6/1) and red (10YR 4/6) clay seams ¼ inch to 2 inches in diameter; few iron-rich bands less than 1 millimeter thick around and along old root channels; very strongly acid.

The solum is more than 60 inches thick. Depth to ironstone layers typically ranges from 20 to 40 inches and can range from 10 to 40 inches. Angular and flattened fragments of ironstone make up from 15 to 35 percent of the volume in the A and E horizons. The number of fractured, nearly continuous ironstone layers typically ranges from 1 to 4 within the solum. Thickness of ironstone layers ranges from ½ inch to 12 inches. The lateral distance between fractures in the ironstone ranges from 2 to 20 inches and averages from 4 to 8 inches. The content of clay in the textural control section averages 40 to 60 percent. The effective cation-exchange capacity of this soil is 50 percent or more saturated with exchangeable aluminum within a depth of 30 inches.

The Ap horizon has hue of 5YR, 7.5YR, or 10YR, value of 4 or 5, and chroma of 3 to 8. Texture is gravelly loamy fine sand or gravelly fine sandy loam. Reaction ranges from strongly acid to slightly acid. This horizon is 2 to 8 inches thick.

The E horizon has hue of 5YR or 7.5YR, value of 5 or 6, and chroma of 3 to 8. Texture is gravelly fine sandy loam, gravelly sandy loam, gravelly loamy fine sand, or gravelly loamy sand. Reaction ranges from very strongly acid to medium acid. This horizon is 2 to 12 inches thick.

The Bt horizon above the ironstone layers has hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 3 to 8. Texture is sandy clay loam, clay loam, sandy clay, clay, or their gravelly counterparts. Content of clay ranges from 34 to 60 percent. Fragments of ironstone make up from less than 1 percent to 20 percent of the volume. Reaction is very strongly acid or strongly acid.

The Bt/Bsm horizon is alternating layers of ironstone and clay loam, sandy clay, or clay. Ironstone fragments, including fragments that make up the ironstone layers, make up from 20 to 60 percent of the volume of this horizon. The ironstone layers are fractured and are from ½ inch to 12 inches thick. The lateral distance between fractures ranges from 2 to 20 inches and averages 4 to 8 inches. Typically, the ironstone layers are continuous for several feet; but in some pedons they are intermittent and extend only a few feet horizontally. In some pedons, the layers are parts of large spheroidal configurations that are separated from one another by vertical flows of red clay, sandy clay, or clay loam. The less than 2 millimeter fraction has hue of 5YR, 2.5YR, or 7.5YR, value of 3 to 5, and chroma of 4 to 8. Few to many small pockets and strata of whitish or grayish kaolinite are in most pedons. Pockets and strata of loamy or sandy material range from none to common. Reaction is very strongly acid or strongly acid.

The BC horizon has hue of 2.5YR, 5YR, 7.5YR, or 10YR, value of 4 to 6, and chroma of 4 to 8. Texture is fine sandy loam, sandy loam, or sandy clay loam. Peds that are firm and brittle range from none to common and make up as much as 20 percent of the matrix. Reaction is very strongly acid or strongly acid.

Dela Series

The Dela series consists of moderately well drained, moderately rapidly permeable soils that formed in loamy and sandy alluvium. These soils are on flood plains of perennial streams. Slopes range from 0 to 2 percent. Soils of the Dela series are coarse-loamy, siliceous, nonacid, thermic Typic Udifluvents.

The Dela soils in Claiborne Parish are taxadjuncts to the Dela series because they are very strongly acid in the lower part of the C horizon. Typically, Dela soils are strongly acid to neutral throughout. This difference, however, does not significantly affect the use and management of the soils.

Dela soils commonly are near Cahaba, Guyton, Harleston, luka, and Ouachita soils. Cahaba and Harleston soils are at a higher elevation on stream terraces or remnants of stream terraces and have a well developed argillic horizon. Guyton soils are in lower positions than those of the Dela soils, are grayish throughout the profile, and are fine-silty. luka soils are in slightly lower positions on the flood plain and have grayish mottles with chroma of 2 or less within 20 inches of the soil surface. Ouachita soils are in positions similar to those of the Dela soils and are fine-silty and brownish throughout the profile.

Typical pedon of Dela loamy fine sand, in an area of luka-Dela complex, frequently flooded; 1,925 feet north and 180 feet west of the southeast corner of sec. 22, T. 19 N., R. 5 W.

Ap—0 to 4 inches; dark brown (7.5YR 4/4) loamy fine sand; weak fine and medium subangular blocky structure; very friable; many fine roots and common medium roots; common fine and medium irregular pores; medium acid; abrupt smooth boundary.

C1—4 to 10 inches; strong brown (7.5YR 5/4) fine sandy loam; weak medium subangular blocky structure parting to weak fine subangular blocky; friable; many fine roots; common fine and medium tubular pores; discontinuous thin bedding planes; slightly acid; clear smooth boundary.

C2—10 to 16 inches; brown (7.5YR 4/4) fine sandy loam; weak medium subangular blocky structure parting to weak fine subangular blocky; friable; many medium and fine roots; common fine and medium tubular pores; discontinuous bedding planes; slightly acid; clear smooth boundary.

C3—16 to 25 inches; stratified strong brown (7.5YR 5/4) fine sandy loam and reddish yellow (7.5YR 6/6) sandy loam; fine sandy loam strata 3 to 4 centimeters thick and sandy loam strata 5 to 20 millimeters thick; massive; very friable; many fine roots; common medium and fine tubular pores; medium acid; abrupt smooth boundary.

C4—25 to 32 inches; brown (7.5YR 4/4) fine sandy loam; weak medium subangular blocky structure parting to weak fine subangular blocky; friable; common fine roots; common medium and fine tubular pores; medium acid; clear smooth boundary.

C5—32 to 60 inches; strong brown (7.5YR 5/4) fine sandy loam; massive; very friable; common fine roots; very strongly acid.

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

The C horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 6. Some pedons have mottles in shades of brown, yellow, and gray below a depth of 20 inches. Strata within the C horizon range from loamy sand to silty clay loam, but the 10- to 40-inch control section generally is sandy loam, fine sandy loam, or loam. Reaction ranges from very strongly acid to slightly acid.

Eastwood Series

The Eastwood series consists of moderately well drained, very slowly permeable soils that formed in clayey and loamy sediment of Tertiary age. These soils are on ridgetops and side slopes on uplands. Slopes range from 1 to 12 percent. Soils of the Eastwood series are fine, montmorillonitic, thermic Vertic Hapludalfs.

Eastwood soils are similar to Sacul soils and commonly are near Angie, Bowie, Darley, Darbonne, and Wolfpen soils. Angie soils are on broad, very gently sloping ridgetops and have a seasonal high water table. Bowie and Darbonne soils are on convex ridgetops at a higher elevation and are fine-loamy. Darley, Wolfpen, and Sacul soils are at a higher elevation than the Eastwood soils. Darley soils have layers and many fragments of ironstone. Wolfpen soils have a thick sandy epipedon and a seasonal high water table. Sacul soils have a base saturation of less than 35 percent.

Typical pedon of Eastwood very fine sandy loam, 1 to 5 percent slopes; 750 feet north and 1,900 feet east of the southwest corner of sec. 17, T. 23 N., R. 8 W.

Ap—0 to 9 inches; dark yellowish brown (10YR 4/4) very fine sandy loam; weak fine granular structure; very friable; few fine and medium roots; strongly acid; abrupt smooth boundary.

Bt1—9 to 19 inches; red (2.5YR 4/6) silty clay; few fine prominent light gray (10YR 6/1) mottles; weak coarse subangular blocky structure parting to weak medium subangular blocky; very firm, plastic; common fine roots and few medium roots; many distinct discontinuous thick clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt2—19 to 35 inches; red (2.5YR 4/8) silty clay; common medium prominent yellowish brown (10YR 5/6) mottles and many fine distinct light gray (10YR 6/1) mottles; weak coarse subangular blocky structure; very firm, plastic; few fine roots; common distinct discontinuous thick clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt3—35 to 47 inches; mottled red (2.5YR 4/8), light gray (10YR 6/1), and yellowish brown (10YR 5/4) silty clay; weak medium subangular blocky structure; very firm, plastic; common faint thin patchy clay films on vertical faces of peds; very strongly acid; gradual wavy boundary.

Bt4—47 to 60 inches; mottled light gray (10YR 6/1), red (10YR 4/8), and yellowish brown (10YR 5/6) clay loam; weak medium subangular blocky structure; very firm, slightly plastic; few faint thin patchy clay films on vertical faces of peds; very strongly acid; gradual wavy boundary.

C—60 to 75 inches; mottled light gray (10YR 6/1), red (10YR 4/6), and yellowish brown (10YR 5/6) clay loam; massive; firm, slightly plastic; very strongly acid.

The solum is 40 to 60 inches thick. The soil cracks when dry. Cracks are ½ inch or more wide at a depth of 20 inches and are at least 12 inches long. The effective cation-exchange capacity of this soil is 20 to 50 percent saturated with exchangeable aluminum within a depth of 30 inches.

The A horizon has value of 3 to 5 and chroma of 2 to 4. Reaction ranges from very strongly acid to medium acid. This horizon is 4 to 9 inches thick.

Some pedons have an E horizon that has hue of 10YR, value of 5, and chroma of 3 or 4. Reaction ranges from very strongly acid to medium acid.

The upper part of the Bt horizon has hue of 10R, value of 4, and chroma of 6; or it has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8. Mottles in shades of brown and gray range from few to many. The lower part of the Bt horizon has matrix colors similar to those in the upper part, or it is mottled in shades of red, gray, and yellow. Texture is silty clay or clay in the upper part of the Bt horizon and clay, sandy clay, clay loam, or sandy clay loam in the lower part. Reaction ranges from extremely acid to strongly acid in the Bt1, Bt2, and Bt3 horizons and from extremely acid to medium acid in the Bt4 horizon.

The C horizon is mottled in shades of gray, yellow, brown, or olive. Texture is sandy loam, sandy clay loam, or clay loam. Some pedons are stratified with thin shaly clay. Reaction ranges from extremely acid to medium acid.

Flo Series

The Flo series consists of somewhat excessively drained, rapidly permeable soils that formed in sandy sediment of Tertiary age. These soils are on ridgetops and side slopes on uplands. Slopes range from 1 to 12 percent. Soils of the Flo series are sandy, siliceous, thermic Psammentic Paleudalfs.

Flo soils commonly are near Larue, McLaurin, Smithdale, and Wolfpen soils. Larue and McLaurin soils are on ridgetops in positions similar to those of the Flo soils. Larue soils have a loamy subsoil, and McLaurin soils are coarse-loamy. Smithdale soils are on convex side slopes and are fine-loamy. Wolfpen soils are on broad ridgetops and have a loamy subsoil and a seasonal high water table.

Typical pedon of Flo loamy fine sand, 1 to 5 percent slopes; 2,500 feet north and 3,200 feet east of the southwest corner of sec. 3, T. 23 N., R. 4 W.

A—0 to 6 inches; dark brown (10YR 4/3) loamy fine sand; weak fine granular structure; very friable; common fine and medium roots; strongly acid; clear smooth boundary.

E1—6 to 20 inches; brown (10YR 5/3) loamy fine sand; single grained; very friable; common fine and medium roots; common medium pockets of pale brown (10YR 6/3); medium acid; gradual smooth boundary.

E2—20 to 34 inches; yellowish brown (10YR 5/4) loamy fine sand; single grained; very friable; few fine and medium roots; common medium pockets of pale brown (10YR 6/3); medium acid; gradual wavy boundary.

Bw—34 to 62 inches; light yellowish brown (10YR 6/4) loamy fine sand; few small spots and streaks of yellowish red (5YR 5/8); single grained; very friable; few fine and medium roots; medium acid; clear wavy boundary.

Bt1—62 to 75 inches; pale brown (10YR 6/3) loamy fine sand; common yellowish red (5YR 5/6) lamellae, 5 to 10 millimeters thick, evenly distributed throughout horizon; weak very coarse and coarse subangular blocky structure; very friable; coated sand grains and clay bridging in lamellae; medium acid; gradual smooth boundary.

Bt2—75 to 80 inches; pale brown (10YR 6/3) loamy fine sand; common yellowish red (5YR 5/6) lamellae, 5 to 10 millimeters thick, spaced 2 or 3 inches apart; very coarse subangular blocky structure; very friable; thickly coated sand grains and clay bridging in lamellae; medium acid; gradual smooth boundary.

B/E1—80 to 85 inches; Bt part 60 percent and E part 40 percent, by volume; yellowish red (5YR 5/6) loamy fine sand (Bt) and many small and medium spots and seams of pale brown (10YR 6/3) fine sand (E); single grained; very friable; coatings on sand grains and clay bridging throughout most of Bt part; medium acid; gradual smooth boundary.

B/E2—85 to 95 inches; Bt part 70 percent and E part 30 percent, by volume; yellowish red (5YR 5/6) loamy fine sand (Bt) and common seams and pockets of pale brown (10YR 6/3) fine sand (E); single grained; coatings on sand grains and clay bridging throughout Bt part; very friable; medium acid.

The solum is 60 to 100 inches or more thick. Reaction ranges from very strongly acid to medium acid, but the surface layer can be slightly acid if lime has been added to the soil. Texture of the family textural control section is loamy fine sand or fine sand. The effective cation-exchange capacity of this soil is 20 to 50 percent saturated with exchangeable aluminum within a depth of 30 inches.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. It is 4 to 21 inches thick.

The E horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 or 4. Texture is loamy fine sand or fine sand. This horizon is 11 to 40 inches thick.

The Bw horizon has hue of 7.5 YR or 10YR, value of 5 or 6, and chroma of 4 to 8. Spots or pockets and streaks of uncoated sand grains range from few to many.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 3 to 6. Texture is loamy fine sand that has a noticeable clay increase compared to the overlying horizons. The horizon contains few or common reddish lamellae.

The Bt part of the B/E horizon has hue of 5YR, 7.5YR, or 10YR, value of 4 or 5, and chroma of 6 or 8. The E part has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 3 or 4. The lamellae are loamy fine sand or fine sandy loam. Typically, a clay increase is noticeable throughout the Bt part. In some pedons, the clay accumulations occur only as lamellae.

Guyton Series

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

Guyton soils commonly are near Cahaba, Dela, Harleston, Iuka, and Ouachita soils. Cahaba and Harleston soils are in higher positions on low stream terraces than the Guyton soils. Cahaba soils are fine-loamy and have a reddish subsoil. Harleston soils are coarse-loamy and have a brownish subsoil. Dela, Iuka, and Ouachita soils are in higher positions on flood plains. Dela and Iuka soils are coarse-loamy. Ouachita soils are brownish throughout the profile.

Typical pedon of Guyton silt loam; 3,600 feet north and 3,800 feet east of the southwest corner of sec. 14, T. 22 N., R. 4 W.

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

Eg1—4 to 12 inches; light brownish gray (10YR 6/2) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; very friable; few coarse and common medium roots; common medium and fine tubular pores; few spots of organic stains; extremely acid; clear wavy boundary.

Bg2—12 to 20 inches; grayish brown (10YR 5/2) silt loam; few fine distinct strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few coarse roots; common medium tubular pores; few spots of organic stains; extremely acid; gradual irregular boundary.

E/B—20 to 30 inches; E part about 60 percent and B part about 40 percent, by volume; light brownish gray (10YR 6/2) and grayish brown (10YR 5/2) silt loam (E) and grayish brown (10YR 5/2) silty clay loam (Bt); common medium distinct strong brown (7.5YR 5/6) mottles; weak medium and coarse subangular blocky structure; friable silt loam (E) and firm silty clay loam (Bt); common medium tubular pores; few patchy faint thin clay films on surfaces of peds; extremely acid; clear irregular boundary.

B/E1—30 to 40 inches; B and E parts about equal in volume; grayish brown (10YR 5/2) silty clay loam (Bt) and light brownish gray (10YR 6/2) silt loam (E); E material mainly in wide vertical seams; common medium distinct strong brown (7.5YR 5/6) mottles; weak medium and coarse subangular blocky structure; firm silty clay loam and friable silt loam; common fine roots; common medium tubular pores; common discontinuous distinct thick clay films on surfaces of some peds; common fine organic stains; extremely acid; clear wavy boundary.

B/E2—40 to 51 inches; B part about 60 percent and E part about 40 percent, by volume; grayish brown (10YR 5/2) silty clay loam (Bt) and light brownish gray (10YR 6/2) silt loam (E); few fine distinct yellowish brown (10YR 5/6) mottles and common fine distinct dark grayish brown (10YR 4/2) mottles; weak coarse subangular blocky structure; firm and slightly brittle silty clay loam (Bt) and friable silt loam (E); common fine roots; few dark grayish brown (10YR 4/2) coatings on vertical faces of peds; extremely acid; clear wavy boundary.

Btg—51 to 75 inches; grayish brown (2.5YR 5/2) silt loam; few medium distinct strong brown (7.5YR 5/6) mottles and many fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; common discontinuous distinct thick clay films on surfaces of some peds; few slightly brittle peds; few vertical seams 1 to 3 inches wide of light brownish gray (10YR 6/2) silt loam; few dark grayish brown (10YR 4/2) coatings on vertical faces of some peds; extremely acid.

The solum is 55 to 80 inches thick. Reaction ranges from extremely acid to medium acid. The effective cation-exchange capacity of this soil is 50 percent or more saturated with exchangeable aluminum within a depth of 30 inches.

The A horizon has hue of 10YR, value of 4 to 6, and chroma of 2 or 3. It is 2 to 8 inches thick.

The Eg horizon has hue of 10YR, value of 5 to 7, and chroma of 2. Mottles in shades of brown range from few to many. Texture is silt loam, loam, or very fine sandy loam. This horizon is 12 to 24 inches thick.

The E and Bt parts of the E/B and B/E horizons have colors and textures similar to those of the Eg and Bt horizons respectively. Mottles in shades of brown or gray range from few to many in the E/B and B/E horizons. Some pedons do not have an E/B horizon.

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

Harleston Series

The Harleston series consists of moderately well drained, moderately permeable soils that formed in sandy and loamy alluvium. These soils are on stream terraces. Slopes range from 1 to 3 percent. Soils of the Harleston series are coarse-loamy, siliceous, thermic Aquic Paleudults.

The Harleston soils commonly are near Cahaba, Guyton, Iuka, Dela, and Ouachita soils. Cahaba soils are in slightly higher positions on the landscape than those of the Harleston soils and are fine-loamy and have a reddish subsoil. Guyton soils are in lower positions and are fine-silty and grayish throughout the profile. Dela, Iuka, and Ouachita soils are on flood plains of streams and do not have a well developed subsoil.

Typical pedon of Harleston fine sandy loam, 1 to 3 percent slopes; 900 feet north and 3,000 feet east of the southwest corner of sec. 11, T. 22 N., R. 4 W.

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

E—4 to 13 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine granular structure; very friable; few fine roots; few medium discontinuous random tubular pores; extremely acid; clear smooth boundary.

BE—13 to 19 inches; yellowish brown (10YR 5/6) fine sandy loam; weak fine subangular blocky structure; very friable; few medium roots; few medium discontinuous random tubular pores; extremely acid; clear wavy boundary.

Bt1—19 to 29 inches; yellowish brown (10YR 5/6) sandy loam; common fine faint yellowish brown (10YR 5/4) and light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable; few medium roots; few medium discontinuous random tubular pores; few patchy faint thin clay films on surfaces of some peds; few nodules of plinthite; extremely acid; clear wavy boundary.

Bt2—29 to 39 inches; yellowish brown (10YR 5/6) sandy loam; common medium distinct light brownish gray (10YR 6/2) mottles and few fine prominent yellowish red (5YR 4/6) mottles; weak medium subangular blocky structure; friable; few medium roots; few medium discontinuous random tubular pores; few patchy faint thin clay films on surfaces of some peds; extremely acid; clear wavy boundary.

Bt3—39 to 47 inches; mottled light yellowish brown (10YR 6/4), light brownish gray (10YR 6/2), and strong brown (7.5YR 5/6) sandy loam; weak medium subangular blocky structure; friable; few patchy faint thin clay films on surfaces of some peds; extremely acid; clear wavy boundary.

Bt4—47 to 81 inches; mottled gray (10YR 5/1), strong brown (7.5YR 5/8), and red (2.5YR 4/8) sandy clay loam; weak medium subangular blocky structure; few light gray (10YR 7/1) coatings on faces of some peds; few patchy faint thin clay films on surfaces of some peds; extremely acid.

The solum is more than 60 inches thick. Reaction ranges from extremely acid to strongly acid. The effective cation-exchange capacity of this soil is 50 percent or more saturated with exchangeable aluminum within a depth of 30 inches.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 3. It is 2 to 5 inches thick.

The E horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. Texture is loamy fine sand or fine sandy loam. This horizon is 3 to 10 inches thick.

The BE horizon has hue of 10YR, value of 5, and chroma of 4 to 6. Texture is fine sandy loam or loam.

The upper part of the Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. Mottles in shades of brown or red range from few to many. In addition, mottles that have chroma of 2 or less are within 30 inches of the soil surface and range from few to many. Texture is sandy loam or loam. The lower part of the Bt horizon has matrix colors similar to those of the upper part, or it is mottled in shades of gray, brown, or red. Texture is sandy loam, loam, or sandy clay loam. Some pedons have 1 to 5 percent plinthite. Some pedons have few to many, fine to medium concretions of iron.

Iuka Series

The Iuka series consists of moderately well drained, moderately permeable soils that formed in stratified loamy alluvium. These soils are on flood plains of perennial streams. Slopes are less than 1 percent. Soils of the Iuka series are coarse-loamy, siliceous, acid, thermic Aquic Udifluvents.

Iuka soils commonly are near Dela, Guyton, and Ouachita soils. Dela soils are on natural levees in higher positions than the Iuka soils and do not have mottles of 2 chroma or less within 20 inches of the soil surface. Guyton soils are in lower positions and are fine-silty and grayish throughout the profile. Ouachita soils are in slightly higher positions and are fine-silty. Iuka soils are also near Cahaba and Harleston soils, which are at a higher elevation on the stream terraces and have a well developed argillic horizon.

Typical pedon of Iuka fine sandy loam, in an area of Iuka-Dela complex, frequently flooded; 2,900 feet north and 2,750 feet east of the southwest corner of sec. 14, T. 21 N., R. 7 W.

Ap—0 to 7 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable; common medium and fine roots; common medium tubular pores; common dark brown (7.5YR 4/4) and very dark grayish brown (10YR 3/2) organic stains on surfaces of peds, in root channels, and in worm burrows; medium acid; clear smooth boundary.

A—7 to 15 inches; yellowish brown (10YR 5/4) loam; weak medium subangular blocky structure; friable; common fine roots; many medium irregular pores; common dark brown (7.5YR 4/4) organic stains on surfaces of peds and in root channels; strongly acid; clear wavy boundary.

C1—15 to 27 inches; yellowish brown (10YR 5/4) loam; few fine distinct light brownish gray (10YR 6/2) mottles and common medium distinct strong brown (7.5YR 5/6) mottles; massive; friable; many fine and few medium roots; common medium irregular pores; common dark brown (7.5YR 4/4) stains on surfaces of peds, in pores, and in root channels; common fine black specks of organic-like material; strongly acid; clear irregular boundary.

Cg2—27 to 34 inches; grayish brown (10YR 5/2) fine sandy loam; common medium distinct strong brown (7.5YR 5/6) mottles and few medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; few fine roots; common medium irregular pores; very strongly acid; clear wavy boundary.

Cg3—34 to 48 inches; light brownish gray (2.5Y 6/2) loam; common medium prominent strong brown (7.5YR 5/6) mottles and few fine distinct yellowish brown (10YR 5/6) mottles; massive; friable; few medium and fine roots; common medium irregular pores; common dark brown concretions, about 3 to 10 millimeters in diameter, with black interiors; very strongly acid; clear wavy boundary.

Cg4—48 to 70 inches; grayish brown (10YR 5/2) silt loam; many coarse distinct brownish yellow (10YR 6/6) mottles and common fine distinct strong brown (7.5YR 5/6) mottles; massive; friable; very strongly acid.

Reaction of the Iuka soil is strongly acid or medium acid in the surface layer and very strongly acid or strongly acid in the underlying material. Thin bedding planes of contrasting textures are in some pedons. The effective cation-exchange capacity of this soil is 20 to 50 percent saturated with exchangeable aluminum within a depth of 30 inches.

The Ap and A horizons have hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 or 4; or they have hue of 10YR or 7.5YR, value of 4, and chroma of 2. Texture is fine sandy loam, sandy loam, loamy sand, silt loam, or loam.

The C1 horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 3 to 6; or it has hue of 10YR or 7.5YR, value of 4, and chroma of 2. Mottles that have chroma of 2 or less are within 20 inches of the surface. Texture is sandy loam, fine sandy loam, loam, or silt loam.

The Cg horizon has colors similar to those of the C1 horizon; or it is mottled in shades of gray, brown, or red; or it can be dominantly gray with many brown, red, and yellow mottles. Texture is sandy loam, fine sandy loam, loam, silt loam, or loamy sand. Some pedons have thin sandy strata, or they have texture of sandy clay loam or clay loam at a depth of more than 40 inches. Some pedons have buried A horizons below a depth of 20 inches.

Larue Series

The Larue series consists of well drained, moderately permeable soils that formed in sandy and loamy sediments of Tertiary age. These soils are on ridgetops on uplands. Slopes range from 1 to 5 percent. Soils of the Larue series are loamy, siliceous, thermic Arenic Paleudalfs.

Larue soils commonly are near Bowie, Flo, McLaurin, and Wolfpen soils. Bowie, Flo, and McLaurin soils are in positions similar to those of the Larue soils. Bowie soils are loamy throughout the profile, Flo soils are sandy throughout the profile, and McLaurin soils have a coarse-loamy control section. Wolfpen soils are on broad ridgetops and have a brownish subsoil and a seasonal high water table.

Typical pedon of Larue loamy fine sand, 1 to 5 percent slopes; 1,920 feet north and 1,000 feet east of the southwest corner of sec. 34, T. 23 N., R. 7 W.

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

E1—4 to 14 inches; light yellowish brown (10YR 6/4) loamy fine sand; weak fine granular structure; very friable; common fine roots; few fine bits of charcoal; medium acid; gradual wavy boundary.

E2—14 to 24 inches; pale brown (10YR 6/3) loamy fine sand; weak fine granular structure; very friable; common fine roots; medium acid; clear smooth boundary.

Bt1—24 to 36 inches; yellowish red (5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; firm; few fine roots; few medium discontinuous random tubular pores; common discontinuous distinct thick clay films on surfaces of peds; strongly acid; clear smooth boundary.

Bt2—36 to 51 inches; red (2.5YR 4/6) sandy clay loam; common medium distinct light yellowish brown (10YR 6/4) mottles and few fine distinct pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; firm; few fine roots; few discontinuous distinct thick clay films on surfaces of some peds; strongly acid; clear smooth boundary.

Bt3—51 to 62 inches; yellowish red (5YR 5/8) sandy clay loam; weak fine subangular blocky structure; firm; few patchy faint thin clay films on surfaces of some peds; light yellowish brown (10YR 6/4) and pale brown (10YR 6/3) loamy fine sand pockets 2 to 3 centimeters in diameter; medium acid; clear wavy boundary.

BC—62 to 86 inches; yellowish red (5YR 5/6) fine sandy loam; weak fine subangular blocky structure; friable; few patchy faint thin clay films on surfaces of some peds; medium acid.

The solum is more than 65 inches thick. The effective cation-exchange capacity of this soil is 20 to 50 percent saturated with exchangeable aluminum within a depth of 30 inches.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4. Reaction ranges from strongly acid to slightly acid. This horizon is 4 to 10 inches thick.

The E horizon has hue of 7.5YR or 10YR and value of 5 or 6. Reaction ranges from strongly acid to slightly acid. This horizon is 16 to 30 inches thick.

Texture of the Bt horizon is loam, sandy clay loam, or clay loam. The BC horizon has the same range in texture as the Bt horizon and also includes fine sandy loam. Reaction of the Bt and BC horizons ranges from strongly acid to slightly acid.

Mahan Series

The Mahan series consists of well drained, moderately permeable soils that formed in clayey marine sediment of Tertiary age. These soils are on uplands. Slopes range from 1 to 12 percent. Soils of the Mahan series are clayey, kaolinitic, thermic Typic Hapludults.

Mahan soils commonly are near Bowie, Darbonne, Darley, Ruple, and Sacul soils. All of these soils are in landscape positions similar to those of the Mahan soils. Bowie soils are fine-loamy and have a brownish subsoil. Darbonne soils are fine-loamy, and Darley soils are clayey. Darbonne and Darley soils contain more fragments or layers of ironstone than Mahan soils. Ruple soils have color value less than 4 throughout the subsoil and have oxidic mineralogy. Sacul soils have gray mottles in the upper part of the subsoil and have mixed mineralogy.

Typical pedon of Mahan fine sandy loam, 1 to 5 percent slopes; 875 feet north and 2,620 feet east of the southwest corner of sec. 1, T. 19 N., R. 8 W.

Ap—0 to 5 inches; yellowish red (5YR 4/6) fine sandy loam; weak fine subangular blocky structure; friable; many medium and fine roots and common coarse roots; about 12 percent, by volume, ironstone gravel; strongly acid; clear smooth boundary.

Bt1—5 to 21 inches; red (2.5YR 5/6) sandy clay; moderate coarse subangular blocky structure; friable; common medium and fine roots; common fine tubular pores; about 2 percent, by volume, ironstone gravel; many thin continuous clay films on faces of peds; strongly acid; clear wavy boundary.

Bt2—21 to 35 inches; red (2.5YR 5/8) sandy clay loam; common medium faint yellowish red (5YR 4/6) mottles; moderate medium subangular blocky structure; friable; few medium and common fine roots; common medium and fine tubular pores; about 3 percent, by volume, ironstone gravel; common thin discontinuous clay films on faces of peds; strongly acid; clear smooth boundary.

Bt3—35 to 50 inches; red (2.5YR 4/6) sandy clay loam; weak medium subangular blocky structure; friable; few fine roots; common thick discontinuous clay films on faces of peds; about 7 percent, by volume, ironstone gravel; few ironstone fragments 3 to 10 inches across the long axis; many white (10YR 8/1) platy clay bodies up to 1 inch in diameter oriented along relict bedding planes; strongly acid; clear smooth boundary.

BC—50 to 59 inches; red (2.5YR 5/6) sandy clay loam; many coarse distinct yellowish red (5YR 5/8) mottles; weak medium blocky structure; friable; few slightly brittle peds; few fine roots; about 9 percent, by volume, ironstone gravel; few ironstone fragments 3 to 10 inches across the long axis; few thin discontinuous clay films on faces of peds; common fine white clay bodies; common fine strong brown (7.5YR 5/6) sandy loam pockets; strongly acid; clear smooth boundary.

C—59 to 82 inches; stratified yellowish red (5YR 5/8) sandy clay loam and yellowish brown (10YR 5/8) sandy loam; massive; friable; common prominent white (10YR 8/1) clay bodies; maximum thickness of alternating layers is 6 inches; very strongly acid.

The solum is 40 to more than 60 inches thick. Gravel-sized ironstone fragments make up from about 1 to 40 percent of the volume of the A horizon and from 0 to 15 percent of the Bt, BC, and C horizons. A few coarse ironstone fragments 3 to 20 inches across are in the A, Bt, and BC horizons of most pedons. The particle-size control section is 35 to 60 percent clay. The effective cation-exchange capacity of this soil is 50 percent or more saturated with exchangeable aluminum within a depth of 30 inches.

The A horizon has hue of 5YR, 7.5YR, or 10YR, value of 3 to 5, and chroma of 2 to 6. Reaction is strongly acid or medium acid except where lime has been added to the soil. This horizon is 3 to 8 inches thick.

Some pedons have an E horizon that has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6. Reaction is strongly acid or medium acid. Texture is loamy fine sand, sandy loam, or fine sandy loam.

The Bt horizon has hue of 2.5YR, 5YR, or 10R. Yellowish, reddish, and brownish mottles range from none to common. Texture is clay, sandy clay, sandy clay loam, clay loam, or loam. Silt content of the Bt horizon is less than 30 percent. Reaction ranges from very strongly acid to medium 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 and gray range from none to common. Texture is sandy loam, fine sandy loam, sandy clay loam, clay loam, or sandy clay. Reaction ranges from very strongly acid to medium acid.

The C horizon is stratified sandy clay loam, sandy loam, clay loam, or weakly cemented sandstone. The loamy material is reddish, yellowish, or brownish. The grayish material is clay. Reaction ranges from very strongly acid to medium acid.

McLaurin Series

The McLaurin series consists of well drained, moderately permeable soils that formed in loamy and sandy sediments of Tertiary age. These soils are on convex ridgetops on uplands. Slopes range from 1 to 3 percent. Soils of the McLaurin series are coarse-loamy, siliceous, thermic Typic Paleudults.

McLaurin soils commonly are near Flo, Larue, Smithdale, and Wolfpen soils. Flo and Larue soils are in landscape positions similar to those of the McLaurin soils. Flo soils are sandy throughout the profile. Larue soils have sandy surface and subsurface layers more than 20 inches thick. Smithdale soils are on side slopes and are fine-loamy. Wolfpen soils are on broad ridgetops and have thick, sandy surface and subsurface layers and a seasonal high water table.

Typical pedon of McLaurin loamy fine sand, 1 to 3 percent slopes; 2,500 feet north and 280 feet west of the southeast corner of sec. 27, T. 23 N., R. 6 W.

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

E—4 to 9 inches; yellowish brown (10YR 5/4) loamy fine sand; weak fine subangular blocky structure; very friable; common medium roots; few medium discontinuous random tubular pores; strongly acid; clear wavy boundary.

EB—9 to 15 inches; strong brown (7.5YR 5/6) sandy loam; weak fine subangular blocky structure; very friable; common fine roots; common fine discontinuous random tubular pores; strongly acid; clear wavy boundary.

Bt1—15 to 23 inches; yellowish red (5YR 5/6) fine sandy loam; weak medium subangular blocky structure; very friable; common fine roots; common fine discontinuous random tubular pores; clay bridging of sand grains and few patchy faint thin clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt2—23 to 35 inches; yellowish red (5YR 4/6) fine sandy loam; weak coarse subangular blocky structure; friable; few fine roots; common fine discontinuous random tubular pores; clay bridging of sand grains and few patchy faint thin clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt3—35 to 42 inches; yellowish red (5YR 4/6) sandy loam; weak medium subangular blocky structure; very friable; few fine roots; few fine discontinuous random tubular pores; clay bridging of sand grains; strongly acid; gradual wavy boundary.

B/E—42 to 53 inches; yellowish red (5YR 4/6) loamy fine sand (Bt); weak medium subangular blocky structure; very friable; few fine discontinuous random tubular pores; clay bridging of sand grains; common medium pale brown (10YR 6/3) pockets of uncoated sand grains (E); very strongly acid; gradual wavy boundary.

B't—53 to 64 inches; yellowish red (5YR 5/6) sandy loam; weak medium subangular blocky structure; very friable; sand grains coated and bridged with clay; very strongly acid.

The solum is 60 inches or more thick. In some pedons, ironstone fragments and gravel make up from 1 to 10 percent of the volume. Reaction is very strongly acid or strongly acid. The effective cation-exchange capacity of this soil is 20 to 50 percent saturated with exchangeable aluminum within a depth of 30 inches.

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

The E horizon has value of 4 or 5 and chroma of 2 to 6. Texture is sandy loam, fine sandy loam, loamy fine sand, or loamy sand. This horizon is 2 to 5 inches thick.

The EB horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. Texture is sandy loam, fine sandy loam, loamy sand, or loamy fine sand.

The Bt horizon has hue of 2.5YR or 5YR and chroma of 4 to 8. Texture is loam, sandy loam, or fine sandy loam.

The Bt part of the B/E horizon has colors similar to those of the Bt horizon. The E material is pale brown and makes up about 10 to 25 percent, by volume, of the horizon. Texture is loamy sand, loamy fine sand, sandy loam, or fine sandy loam.

The B't horizon has colors similar to those of the Bt horizon. Texture is sandy loam, loam, or sandy clay loam.

Ouachita Series

The Ouachita series consists of well drained, moderately slowly permeable soils that formed in loamy alluvium. These soils are on low ridges and natural levees of flood plains. Slopes range from 0 to 2 percent. Soils of the Ouachita series are fine-silty, siliceous, thermic Fluventic Dystrochrepts.

Ouachita soils commonly are near Cahaba, Dela, Guyton, Harleston, and Iuka soils. Cahaba and Harleston soils are at a higher elevation on stream terraces and have a well developed argillic horizon. Dela soils are in positions similar to those of the Ouachita soils and are coarse-loamy. Guyton soils are in lower positions and are grayish throughout the profile. Iuka soils are in positions similar to those of the Ouachita soils and have gray mottles within 20 inches of the soil surface.

Typical pedon of Ouachita silt loam, in an area of Guyton-Ouachita silt loams, frequently flooded; 775 feet north and 425 feet east of the southwest corner of sec. 22, T. 21 N., R. 8 W.

A1—0 to 6 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; common fine and few coarse roots; strongly acid; clear smooth boundary.

A2—6 to 17 inches; brown (10YR 4/3) silt loam; common medium distinct light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; very friable; common fine roots; many fine black specks of organic material; few worm casts; strongly acid; clear smooth boundary.

Bw1—17 to 32 inches; dark yellowish brown (10YR 4/4) silt loam; weak coarse subangular blocky structure parting to weak medium subangular blocky; friable; common medium roots; few medium tubular pores; few fine specks of black organic material; very strongly acid; clear smooth boundary.

Bw2—32 to 50 inches; dark yellowish brown (10YR 4/4) silty clay loam; few medium distinct light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; firm; few medium and common fine roots; few medium and fine tubular pores; very strongly acid; clear wavy boundary.

Bw3—50 to 71 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct light yellowish brown (10YR 6/4) mottles and few fine distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; firm; few fine roots; very strongly acid; clear wavy boundary.

C—71 to 80 inches; yellowish brown (10YR 5/4) fine sandy loam; common medium distinct gray (10YR 6/1) mottles and few fine distinct light yellowish brown (10YR 6/4) mottles; massive; friable; few fine roots; very strongly acid.

The solum is 40 to 80 inches thick. Reaction is very strongly acid or strongly acid except where lime has been added to the soil. The content of organic matter decreases irregularly with depth. The effective cation-exchange capacity of this soil is 50 percent or more saturated with exchangeable aluminum within a depth of 30 inches.

The A1 horizon has chroma of 2 or 3. It is 2 to 6 inches thick. The A2 horizon has value of 4 or 5 and chroma of 3 or 4. Texture is silt loam or loam. This horizon is 6 to 12 inches thick. The Bw horizon has value of 4 to 6 and chroma of 3 or value of 4 or 5 and chroma of 4. Some pedons have value of 5 and chroma of 8. Brownish mottles range from none to many. Gray mottles range from none to common in the lower part of the Bw horizon. Texture is silt loam, loam, silty clay loam, or clay loam. The C horizon has colors similar to those of the Bw horizon. Texture is silt loam, fine sandy loam, or loamy fine sand.

Ruple Series

The Ruple series consists of well drained, moderately slowly permeable soils that formed in iron-rich, clayey marine sediment of Tertiary age. These soils are on uplands. Slopes range from 1 to 12 percent. Soils of the Ruple series are clayey, oxidic, thermic Typic Rhodudults.

Ruple soils commonly are near Darley, Mahan, and Sacul soils. These soils are in landscape positions similar to those of the Ruple soils. Mahan and Sacul soils have a distinct brownish subsurface layer and fragments of ironstone that make up less than 15 percent of the volume of the control section. Darley soils have brownish surface and subsurface layers.

Typical pedon of Ruple gravelly loam, 1 to 5 percent slopes; 2,664 feet east of the southwest corner of sec. 5, T. 21 N., R. 8 W.

Ap—0 to 5 inches; dark reddish brown (2.5YR 3/4) gravelly loam; moderate medium subangular blocky structure; friable; many coarse and medium roots; about 18 percent, by volume, small angular and flattened ironstone fragments 1/8 inch to 3 inches in diameter; about 5 percent of fragments larger than 3/4 inch; slightly acid; abrupt smooth boundary.

Bt1—5 to 9 inches; dark reddish brown (2.5YR 3/4) gravelly clay loam; moderate coarse subangular blocky structure; friable; common medium and few coarse roots; few fine pores; thick discontinuous clay films on faces of peds; about 16 percent, by volume, flattened and angular ironstone fragments 1/8 inch to 3 inches in diameter; about 5 percent of fragments larger than 3/4 inch in diameter; slightly acid; clear smooth boundary.

Bt2—9 to 16 inches; dark red (2.5YR 3/6) gravelly clay; moderate coarse and medium subangular blocky structure; friable; many fine and common medium roots; few fine pores; thick continuous clay films on faces of peds; about 20 percent, by volume, angular and flattened ironstone fragments 1/8 inch to 3 inches in diameter; about 8 percent of fragments larger than 3/4 inch in diameter; medium acid; abrupt wavy boundary.

Bsm/Bt1—16 to 34 inches; alternating layers, about 1/4 inch to 5 inches thick, of fractured ironstone (Bsm) and dark red (2.5YR 3/6) clay (Bt); petroferric (ironstone) layers fracture into flattened fragments ranging in length from 1 to 8 inches; average lateral distance between fractures is about 4 to 6 inches; clay part (Bt) has weak coarse and medium subangular blocky structure; friable; thick patchy clay films on vertical faces of clayey peds; common pockets and layers of partly weathered loamy and sandy material enclosed within or sandwiched between rinds of ironstone; medium acid; clear wavy boundary.

Bsm/Bt2—34 to 60 inches; alternating layers, about 1/4 inch to 8 inches thick, of fractured ironstone (Bsm) and dark red (2.5YR 3/6) clay (Bt); petroferric (ironstone) layers fracture into flattened fragments ranging in length from 1 to 8 inches; average lateral distance between fractures is about 4 to 6 inches; clay part (Bt) has weak coarse and medium subangular blocky structure; friable; thick patchy clay films on vertical faces of clayey peds; common pockets and layers of partly weathered yellowish red (5YR 5/6) clay loam and loam; strongly acid.

The solum is 60 to 100 inches thick. Angular and flattened fragments of ironstone make up 15 to 35 percent of the volume of the A and E horizons and at least one subhorizon of the argillic horizon. The content of clay in the textural control section averages 45 to 70 percent. The depth to the first nearly continuous layer of ironstone ranges from about 20 to 40 inches.

The A or Ap horizon has hue of 10R or 2.5YR, value of 2 or 3, and chroma of 2 to 6. Reaction ranges from medium acid to neutral. This horizon is 3 to 8 inches thick.

The Bt horizon has hue of 10R or 2.5YR and chroma of 3 to 6. Texture is gravelly clay loam, gravelly sandy clay, and gravelly clay. Reaction ranges from strongly acid to slightly acid.

The Bsm/Bt horizon is alternating layers of clayey material and fractured ironstone. The clayey part has the same range in colors as that of the upper part of the Bt horizon. Texture is clay, sandy clay, or clay loam. The ironstone layers are fractured and are ¼ inch to 12 inches thick. The lateral distance between fractures ranges from 2 to 20 inches and averages 4 to 8 inches. Typically, the layers are continuous for many feet. In some pedons, the layers are intermittent and extend only a few feet horizontally. In other pedons, the layers are parts of large spheroidal configurations that are separated from one another by vertical flows of clay, sandy clay, or clay loam. The partly weathered loamy and sandy material, which is in pockets and layers, has hue of 5YR, 7.5YR, or 10YR, value of 4 or 5, and chroma of 4 to 8. Texture is fine sand, loamy fine sand, sandy loam, fine sandy loam, sandy clay loam, or clay loam that contains large amounts of siderite. Pockets and streaks of whitish or grayish kaolinite range from fine to medium and from few to common. Reaction ranges from very strongly acid to slightly acid.

Sacul Series

The Sacul series consists of moderately well drained, slowly permeable soils that formed in stratified loamy and clayey sediments of Tertiary age. These soils are on uplands. Slopes range from 1 to 30 percent. Soils of the Sacul series are clayey, mixed, thermic Aquic Hapludults.

Sacul soils commonly are near Angie, Darbonne, Darley, Eastwood, Mahan, and Ruple soils. Angie soils are on broad ridgetops and have a brownish subsoil that has a base saturation of more than 35 percent. Darley, Darbonne, Mahan, and Ruple soils are in positions similar to those of the Sacul soils, and they do not have gray mottles in the upper part of the subsoil. In addition, Darley, Darbonne, and Ruple soils have fragments and layers of ironstone that make up more than 15 percent of the textural control section. Eastwood soils are at a lower elevation than the Sacul soils and have a base saturation of more than 35 percent.

Typical pedon of Sacul very fine sandy loam, 1 to 5 percent slopes; 510 feet south and 105 feet west of the northeast corner of sec. 27, T. 21 N., R. 8 W.

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

E—2 to 7 inches; light yellowish brown (10YR 6/4) very fine sandy loam; few fine faint yellowish brown mottles; weak coarse platy structure parting to weak medium subangular blocky; very friable; common fine and few medium roots; few medium discontinuous random tubular-impeded pores; common medium concretions of iron and manganese 2 to 5 millimeters in diameter; very strongly acid; clear smooth boundary.

Bt1—7 to 17 inches; red (2.5YR 4/6) clay; strong medium prismatic structure parting to moderate medium subangular blocky; firm; many fine and few medium roots; common continuous distinct thick clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—17 to 23 inches; red (2.5YR 4/6) sandy clay; common fine prominent light brownish gray (10YR 6/2) mottles; moderate coarse subangular blocky structure parting to moderate medium subangular blocky; firm; common fine roots; few medium discontinuous random tubular-impeded pores; common continuous distinct thick clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt3—23 to 33 inches; red (2.5YR 5/6) sandy clay; many fine prominent light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; common fine roots; common continuous distinct thick clay films on faces of peds; few spots of iron-enriched material 5 to 10 millimeters in diameter; very strongly acid; clear smooth boundary.

Bt4—33 to 45 inches; mottled light brownish gray (10YR 6/2), red (2.5YR 3/6), and yellowish brown (10YR 5/6) sandy clay; weak medium subangular blocky structure; firm; common fine roots; few discontinuous distinct thick clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt5—45 to 52 inches; mottled light brownish gray (2.5Y 6/2), red (2.5YR 3/6), and yellowish brown (10YR 5/6) clay; weak fine subangular blocky structure; firm; few fine roots; few patchy faint thin clay films on vertical faces of peds; few spots of iron-enriched material 5 to 10 millimeters in diameter; extremely acid; clear wavy boundary.

BC—52 to 57 inches; mottled light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/6) sandy clay loam; few medium prominent yellowish red (5YR 4/6) mottles; weak coarse subangular blocky structure; firm; few fine roots; very strongly acid; clear wavy boundary.

C1—57 to 69 inches; stratified light brownish gray (2.5Y 6/2) clay loam and yellowish brown (10YR 5/6) sandy loam; few medium prominent yellowish red (5YR 4/6) mottles; weak coarse platy structure; friable; thin lenses of very fine sandy loam; few fine roots; extremely acid; clear wavy boundary.

C2—69 to 80 inches; stratified light brownish gray (2.5Y 6/2) sandy clay and yellowish brown (10YR 5/6) sandy loam; few medium prominent yellowish red (5YR 4/6) mottles; weak coarse platy structure; firm; thin lenses of very fine sandy loam; extremely acid.

The solum is 40 to 72 inches thick. Fragments of ironstone, ⅛ inch to 3 inches in diameter, range from 1 to 18 percent, by volume, in the surface layer. The effective cation-exchange capacity of this soil is 50 percent or more saturated with exchangeable aluminum within a depth of 30 inches.

The A horizon has value of 3 or 4 and chroma of 2 or 3. Texture is very fine sandy loam, gravelly fine sandy loam, or fine sandy loam. Reaction is very strongly acid or strongly acid. This horizon is 2 to 8 inches thick.

The E horizon has value of 4 to 6 and chroma of 3 or 4. Texture is very fine sandy loam, fine sandy loam, or sandy loam. Reaction is very strongly acid or strongly acid. This horizon is 4 to 10 inches thick.

The upper part of the Bt horizon has hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 6 to 8. Mottles in shades of gray are common. Texture is sandy clay or clay. The lower part of the Bt horizon and the BC horizon are mottled in shades of brown, red, and gray. Texture is silty clay loam, clay loam, sandy clay, or sandy clay loam.

The C horizon is mottled red, yellow, brown, and gray. It is stratified. Texture is sandy clay, clay loam, sandy clay loam, or sandy loam.

Smithdale Series

The Smithdale series consists of well drained, moderately permeable soils that formed in loamy sediment of Tertiary age. These soils are on side slopes on uplands. Slopes range from 5 to 12 percent. Soils of the Smithdale series are fine-loamy, siliceous, thermic Typic Hapludults.

Smithdale soils commonly are near Flo, Larue, and McLaurin soils, which are mainly on ridgetops. Flo soils are sandy throughout the profile. Larue soils have thick, sandy surface and subsurface layers. McLaurin soils are coarse-loamy.

Typical pedon of Smithdale fine sandy loam, 5 to 12 percent slopes; 280 feet south and 300 feet east of the northwest corner of sec. 1, T. 23 N., R. 4 W.

A—0 to 9 inches; dark brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable; many coarse and fine roots; medium acid; clear wavy boundary.

E—9 to 18 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine subangular blocky structure; very friable; common medium and fine roots; few medium tubular pores; strongly acid; clear wavy boundary.

BE—18 to 23 inches; yellowish red (5YR 5/6) sandy loam; common medium prominent light yellowish brown (10YR 6/4) mottles; weak coarse subangular blocky structure; very friable; common fine and few medium roots; many fine and medium tubular pores few distinct thin patchy clay films on faces of peds; strongly acid; clear smooth boundary.

Bt1—23 to 37 inches; yellowish red (5YR 4/8) sandy clay loam; weak coarse prismatic structure parting to moderate medium subangular blocky; friable; few fine and medium roots; common fine tubular pores; common discontinuous distinct thick clay films on faces of peds; strongly acid; clear wavy boundary.

Bt2—37 to 47 inches; yellowish red (5YR 5/8) sandy clay loam; few medium prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; common discontinuous distinct thick clay films on faces of peds; few pockets and streaks of light yellowish brown (10YR 6/4) sandy loam; strongly acid; clear wavy boundary.

Bt3—47 to 75 inches; yellowish red (5YR 5/8) sandy loam; common coarse prominent red (2.5YR 4/8) mottles and common medium prominent light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable; few fine roots; few distinct thick patchy clay films on faces of peds; strongly acid.

The solum is more than 60 inches thick. Reaction is strongly acid or very strongly acid except where lime has been added to the soil. The effective cation-exchange capacity of this soil is 20 to 50 percent saturated with exchangeable aluminum within a depth o 30 inches.

The A horizon has chroma of 2 or 3. It is 3 to 10 inches thick.

The E horizon has value of 5 or 6 and chroma of 2 to 4. Texture is fine sandy loam, sandy loam, or loamy sand.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. Texture is sandy clay loam or sandy loam in the upper part and loam or sandy loam in the lower part.

Wolfpen Series

The Wolfpen series consists of well drained, moderately permeable soils that formed in sandy and loamy sediments of Tertiary age. These soils are on ridgetops on uplands. Slopes range from 1 to 3 percent. Soils of the Wolfpen series are loamy, siliceous, thermic Arenic Paleudalfs.

Wolfpen soils commonly are near Angie, Bowie, Eastwood, Flo, and McLaurin soils. Angie and Eastwood soils are at a lower elevation than the Wolfpen soils and have a clayey subsoil. Bowie, Flo, and McLaurin soils are in positions similar to those of the Wolfpen soils. Bowie soils are fine-loamy. Flo soils are sandy throughout the profile. McLaurin soils are coarse-loamy.

Typical pedon of Wolfpen loamy sand, 1 to 3 percent slopes; 1,300 feet north and 3,700 feet east of the southwest corner of sec. 7, T. 23 N., R. 6 W.

Ap—0 to 6 inches; brown (10YR 5/3) loamy sand; weak fine granular structure; very friable; many fine and medium roots and few coarse roots; common dark brown (10YR 4/3) organic stains; strongly acid; clear smooth boundary.

E1—6 to 18 inches; pale brown (10YR 6/3) loamy sand; weak coarse subangular blocky structure parting to single grained; very friable; few fine and medium roots; few medium discontinuous tubular pores; strongly acid; clear smooth boundary.

E2—18 to 26 inches; pale brown (10YR 6/3) loamy sand; few medium faint yellowish brown (10YR 5/4) mottles; weak coarse subangular blocky structure parting to weak fine subangular blocky; very friable; few medium and coarse roots; few medium discontinuous tubular pores; strongly acid; clear smooth boundary.

B/E—26 to 38 inches; Bt part 70 percent and E part 30 percent, by volume; strong brown (7.5YR 5/6) sandy clay loam (Bt); few medium prominent yellowish red (5YR 5/6) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; friable; few fine and medium roots; common medium discontinuous tubular pores; common distinct thick discontinuous clay films on faces of peds; pale brown (10YR 6/3) sandy loam (E) coatings; strongly acid; gradual wavy boundary.

Bt1—38 to 53 inches; yellowish brown (10YR 5/6) sandy clay loam; many medium prominent red (2.5YR 4/6) mottles and few medium distinct light brownish gray (10YR 6/2) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; slightly brittle; common pale brown (10YR 6/3) seams 5 to 10 millimeters wide; few medium roots; common medium discontinuous tubular pores; common distinct thick discontinuous clay films on faces of peds; strongly acid; clear wavy boundary.

Bt2—53 to 69 inches; strong brown (7.5YR 5/6) sandy loam; many medium prominent red (2.5YR 4/6) mottles and common medium distinct light brownish gray (10YR 6/2) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; slightly brittle; few medium roots; common distinct discontinuous clay films on faces of peds; common light brownish gray (10YR 6/2) sandy seams 2 to 10 millimeters wide; common red (2.5YR 4/6) brittle bodies; very strongly acid; clear wavy boundary.

BC—69 to 78 inches; mottled strong brown (7.5YR 5/6), yellowish red (5YR 5/6), brownish yellow (10YR 6/6), and red (2.5YR 4/6) sandy loam; weak coarse subangular blocky structure; slightly brittle; common light brownish gray (10YR 6/2) clay seams 2 to 10 millimeters thick; very strongly acid.

The solum is 60 to more than 100 inches thick. In some pedons, plinthite makes up as much as 5 percent of the lower part of the Bt horizon. The effective cation-exchange capacity is 20 to 50 percent saturated with exchangeable aluminum within a depth of 30 inches.

The A horizon has value of 4 or 5 and chroma of 3 or 4. Reaction ranges from very strongly acid to slightly acid. This horizon is 6 to 12 inches thick.

The E horizon has value of 5 to 7 and chroma of 3 or 4. Texture is loamy sand or loamy fine sand. Reaction ranges from very strongly acid to slightly acid.

The Bt horizon has hue of 10YR, value of 5, and chroma of 3 to 8, or hue of 7.5YR, value of 5, and chroma of 6 to 8. Texture is sandy clay loam, clay loam, or sandy loam. Reaction ranges from extremely acid to medium acid. Mottles of red, yellowish red, and gray range from few to many. Gray mottles are mainly in the lower part of the Bt horizon.

The BC horizon has colors similar to those of the lower part of the Bt horizon. Gray is dominant in the lower part of the BC horizon in some pedons. Texture is sandy loam, sandy clay loam, clay loam, or loam. Pockets or vertical streaks of uncoated sand grains range from few to common. Reaction ranges from extremely acid to medium acid.

Formation of the Soils

Dr. Bobby J. Miller, Department of Agronomy, Louisiana Agricultural Experiment Station, Louisiana State University Agricultural Center, helped prepare this section.

In this section, the processes of soil formation are described and related to the soils in the survey area.

Processes of Soil Formation

The processes of soil formation influence the kind and degree of development of soil horizons. The factors of soil formation, climate, living organisms, relief, parent material, and time, determine the rate and relative effectiveness of different processes.

Soil-forming processes include those that result in addition of organic, mineral, and gaseous materials to the soil; the loss of these materials from the soil; the translocation of materials from one point to another within the soil; and the physical and chemical transformation of mineral and organic materials within the soil *(23)*.

Many processes take place simultaneously; for example, in the survey area, the accumulation of organic matter, development of soil structure, and leaching of bases from some soil horizons. The contribution of a particular process may change over a period of time. For example, construction of dams to form lakes or installation of drainage and water control systems can change the length of time some soils are flooded or saturated with water. Some soil-forming processes that apply to the soils in Claiborne Parish are described in the following paragraphs.

Organic matter accumulates, partly decomposes, and is incorporated into all the soils. Organic matter production is greatest in and above the surface layer; therefore, soils are formed in which the surface layer is higher in organic matter content than the deeper horizons. The decomposition, incorporation, and mixing of organic matter into the soil is accomplished largely by the activity of living organisms. Many of the more stable products of decomposition remain as finely divided materials that give dark color to the soil, increase water-holding and cation-exchange capacities, and increase granulation in the soil.

The addition of alluvial sediment on the surface has helped in forming several soils in the parish. Added sediment provides new parent material for soil formation; consequently, soils that have formed under these conditions may not have prominent horizons. For example, the Dela, Iuka, and Ouachita soils all formed in recent flood plain deposits and contain distinct depositional strata at a depth of 1 meter or less.

Plant roots and living organisms help rearrange soil materials into secondary aggregates. Decomposed products of organic residue and secretions of organisms help stabilize structural aggregates. Alternate wetting and drying as well as shrinking and swelling also help to develop structural aggregates, particularly in soils that have appreciable amounts of clay. None of the soils in Claiborne Parish are clayey throughout, but most have more clay in the subsoil than in the surface layer.

About a fourth of the soils in the parish have horizons in which reduction and segregation of iron and manganese compounds have taken place. Reducing conditions are present when soils are poorly aerated for long periods of time; consequently, the relatively soluble, reduced forms of iron and manganese are predominant over the less soluble, oxidized forms. Reduced compounds of these elements result in gray colors in the Bg and Cg horizons of the Guyton and Iuka soils. In the more soluble reduced form, iron and manganese can be removed from the soils or translocated from one position to another within the soil by water. The presence of browner mottles in predominantly gray horizons indicates segregation of the local concentration of oxidized iron compounds in the soil. The well drained and somewhat excessively drained soils do not have the gray colors associated with wetness and poor aeration and are not subject to reduction and segregation of iron and manganese compounds.

Loss of components from the soils is one process in their formation. Water moving through the soil has leached soluble bases and free carbonates from some horizons of the soils in the parish. The soils in Claiborne Parish are highly leached, have acid reactions (pH), and have low natural fertility levels.

The formation, translocation, and accumulation of clay are processes that helped develop most of the soils in Claiborne Parish. Silicon and aluminum released as a result of weathering of amphiboles and feldspars can recombine with water to form secondary clay minerals, such as kaolinite. Layered silicate minerals, such as biotite, glauconite, and montmorillonite, can also weather to form other clay minerals, such as vermiculite or kaolinite. Clay accumulates in horizons largely from translocation from upper to lower horizons. As water moves downward, it can carry small amounts of clay in suspension. This clay is deposited, and it accumulates at the depth of the water penetration or in horizons where it becomes flocculated or filtered out by fine pores in the soil. Over long periods, such processes can result in distinct horizons of clay accumulation. All the soils in Claiborne Parish, except Dela, Iuka, and Ouachita soils, have an accumulation of clay in the subsoil.

Secondary accumulations of ironstone are an important process in the formation of some soils in the parish. These accumulations are especially pronounced in the Darley, Mahan, Ruple, and Darbonne soils. The ironstone accumulates as a result of weathering of minerals, such as siderite, that contain reduced iron. Upon weathering of these minerals, much of the iron they contain forms iron oxides, which results in ironstone layers in some of the soils.

Factors of Soil Formation

Soils are natural, three-dimensional bodies that formed on the earth's surface and that have properties resulting from the integrated effect of climate and living matter acting on parent material, as conditioned by relief over periods of time.

The interaction of five main factors influences the processes of soil formation and results in differences among the soils. These factors are the physical and chemical composition of the parent material; the kind of plants and other organisms living in and on the soil; the relief of the land and its effect on runoff and soil temperature and moisture conditions; and the length of time it took the soil to form.

The effect of a factor can differ from place to place, but the interaction of all the factors determines the kind of soil that forms. Many of the differences in soils cannot be attributed to differences in only one factor. For example, the organic matter content in the soils of Claiborne Parish is influenced by several factors including relief, parent material, and living organisms. The following paragraphs describe the factors of soil formation as they relate to soils in the survey area.

Climate

Claiborne Parish is in a region characterized by a humid subtropical climate. Detailed information about climate is in the section "General Nature of the Parish."

The climate is relatively uniform throughout the parish. Local differences in the soils are not a result of great differences in atmospheric climate. The warm average temperatures and large amounts of precipitation favor a rapid rate of weathering of readily weatherable minerals in the soils. Ancient climates (Paleoclimates) in the area may have differed, and some of the differences between soils formed on old landscapes may be caused partly by climatic differences over thousands of years. The highly weathered and leached soils in Claiborne Parish are mostly a result of the large amounts of water available to percolate downward through the soils over very long periods of time.

In landscapes of comparable age, differences in weathering, leaching, and translocation of clay are caused chiefly by variations in factors other than atmospheric climate. Weathering processes involving the release and reduction of iron are indicated by the gray colors in the Bg or Cg horizon in some soils. Oxidation and segregation of iron, as a result of alternating oxidation and reduction, are indicated by mottled horizons and iron and manganese concretions in some of the soils.

Living Organisms

Living organisms are a major influence on the kind and extent of soil horizons that develop. Growth of plants and activity of other organisms disturb the soil, modify porosity, and influence the formation of structure and incorporation of organic matter. Photosynthesis, the use of energy from the sun to synthesize compounds necessary for plant growth, produces additional organic matter. Growth of plants and their eventual decomposition provide recycling of nutrients from the soil. Decomposition serves as a major source of organic residue. Incorporation of this organic matter into the soil by micro-organisms enhances the development of structure and generally increases the infiltration rate and available water capacity in soils.

Relatively stable organic compounds in soils generally have very high cation-exchange capacities, which increases the capability of the soil to absorb and store nutrients. The extent of these and other processes and the kind of organic matter produced can vary widely, depending upon the kinds of organisms living in and on the soil. For example, the organic matter content of soils formed under prairie vegetation is typically higher than in soils formed under forests *(14, 31)*.

The natural vegetation throughout Claiborne Parish was forest. The uplands were mostly covered with a pine forest. The soils that formed in recent stream flood plain deposits and in stream terrace deposits were covered mostly by mixed hardwoods and pines or by a hardwood forest.

Organic matter accumulation depends upon the type and number of micro-organisms present. Aerobic organisms use oxygen from the air to cause the rapid breakdown of organic residue. These organisms are the major decomposers of organic residue in soils and are predominant in the better drained and aerated soils.

In more poorly drained soils, anaerobic organisms are predominant for longer periods during the year. These organisms do not require oxygen and decompose organic residue very slowly. Differences in decomposition by micro-organisms can result in larger accumulations of organic matter in soils that have restricted drainage than in better-drained soils. In general, the organic matter content is higher where the soil is more poorly drained and is not well aerated.

Relief

Relief and other physiographic features influence soil formation processes by affecting internal soil drainage, runoff, erosion and deposition, and exposure to the sun and wind.

Claiborne Parish is in an area of highly dissected uplands with small stream flood plains and terraces. Local relief in the area is about 200 feet, and slopes range from nearly level to steep. The influence of relief on soils in Claiborne Parish is especially evident in the rates at which water runs off the surface, in the internal soil drainage, and in the depth and duration of a seasonal high water table in some of the soils.

Table 23 shows the relationship among topography, runoff, natural drainage, and depth and duration of a seasonal high water table for the soils in the parish.

Parent Material and Time

The parent material of mineral soils is the material from which the soils first formed. In the survey area the effects of parent material are particularly expressed in certain differences in soil color, texture, permeability, and depth and degree of leaching. Parent material has also had a major influence on mineralogy of the soils and is a significant factor in determining their susceptibility to erosion. The characteristics, distributions, and depositional sequence of the parent material are described in the section "Landforms and Surface Geology."

Parent material and time are independent factors of soil formation. For example, a particular kind of parent material may have been exposed to the processes of soil formation for periods ranging from a few years or less to more than a million years. The length of time of soil formation influences the kinds of soil horizons and their degree of development. Long periods of time are generally required for prominent horizons to form. In the survey area, possible differences in the time of soil formation amount to thousands of years for some of the soils.

The soils in the survey area have formed in parent material deposited during at least three different geologic time periods. Recent alluvial deposits are the parent material of the Dela, Iuka, and Ouachita soils, which are the youngest soils in the parish. The alluvium in which these soils formed is sediment eroded from the surrounding highly weathered uplands.

The Cahaba and Guyton soils are on terraces adjacent and generally parallel to the streams that drain the uplands. These soils formed in old alluvium of late Pleistocene or early Holocene age. This alluvium is derived from erosion of the surrounding uplands. The Cahaba soils formed in the sandiest sediment and are at the highest elevation on the stream terraces. They are loamy throughout and have a well developed argillic horizon. The Guyton soils formed in silty deposits with low sand content and are at an intermediate or low elevation on the stream terraces. These soils also have a well developed B horizon that is more clayey than the surface horizon.

Sediments deposited during the Tertiary Period are parent material of the upland soils in the parish. These sediments were deposited some 40 to 60 million years ago. They have not been continuously exposed to weathering and soil formation processes since the time of deposition. In some places, they may have been continuously exposed for periods of more than a million years. The soils formed in the Tertiary deposits are highly weathered and leached, and they have an acid reaction and low base status throughout. Most of these soils are Ultisols; a few are highly weathered Alfisols. The soils all have a well developed B horizon that is more clayey than the A horizon. The natural fertility level is low.

Major differences in the soils that formed in the Tertiary deposits are associated with differences in the texture and composition of the parent material. The Angie, Eastwood, Darley, Mahan, and Sacul soils formed in clayey deposits or stratified clayey and loamy deposits. These soils all have a B horizon that is more than 35 percent clay in the upper part. Soils that formed in loamy or sandy deposits make up a large part of the uplands. These soils have a B horizon that is less than 35 percent clay.

Several soils formed in Tertiary parent material that contains large amounts of siderite, an iron carbonate mineral *(12)*. Weathering of the siderite resulted in large accumulations of iron oxide in the soils that, in many areas, form continuous ironstone layers. Although some ironstone is common in many of the upland soils, its accumulation is most pronounced in the Darley, Mahan, Ruple, and Darbonne soils.

Landforms and Surface Geology

Dr. Bobby J. Miller, Department of Agronomy, Louisiana Agricultural Experiment Station, Louisiana State University, helped prepare this section.

In Claiborne Parish, 6,175 acres is covered by water, mostly manmade impoundments. Claiborne Lake (about 4,600 acres) and Corney Lake (about 1,500 acres) are the two largest impoundments. These lakes serve as major local recreation areas. The uplands and the flood plains and stream terraces are the two major physiographic units in the parish. The uplands, which make up about 84 percent of the parish, are hilly and well dissected. The flood plains and stream terraces are level and gently sloping. The area of stream terraces is small.

Uplands

The upland soils in Claiborne Parish formed entirely in Tertiary age sediment. These soils make up a part of the D'Arbonne structural platform. This platform has only a slight northeasterly regional dip; therefore, outcroppings of the Tertiary formation are nearly horizontal beds. Erosion and weathering of this platform have resulted in a dissected plateau with an overall northeastward regional slope. In this area, the valleys have strongly sloping and moderately steep side slopes and a relatively wide, flat bottom. The interfluves range from gently sloping, narrow and convex ridgetops to broad, very gently sloping ridgetops, depending upon the extent of dissection. Local relief of 100 to 250 feet is common. Claiborne Parish has some of the highest areas in the state. The elevation is highest in the southwestern part of the parish and generally decreases to the north and east. Maximum interfluve elevations are about 325 to 375 feet in the northwestern part of the parish and decrease to about 225 to 250 feet in the northeastern part *(12)*.

Sediment from three formations of the Claiborne Group was deposited during the Eocene Epoch of the Tertiary period *(24)*. Outcrops of these formations make up the entire upland area. The oldest of these formations, the Sparta, 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 *(12, 24)*. The outcrop area of the Sparta Formation is quite small. It is restricted to a circular area, about 5 miles in diameter, which is centered about 6 miles directly west of Homer. The Bowie, Darbonne, Darley, Mahan, and Sacul soils are in the Sparta outcrop area. No individual soil series or suite of soils is restricted to the Sparta outcrop.

The Cook Mountain is the next younger formation outcropping in Claiborne 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 occupies most of the uplands in the southwestern part of the parish *(24)*. Only small areas of the overlying Cockfield Formation remain on some of the highest interfluves. In the northeastern part of the parish, outcrops of the Cook Mountain Formation are restricted to lower slope positions below the younger Cockfield Formation, which is on the upper side slopes and interfluves.

The Cockfield Formation is the youngest of the Tertiary deposits exposed at the surface in Claiborne 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 *(12, 24)*.

Soils of the uplands are related only in a very general way to the particular geologic formation in which they formed. The differences between the soils are associated mostly with differences in the texture and composition of the parent material. Geologic strata containing appreciable amounts of clay and small amounts of siderite and glauconite are the parent materials of the Angie, Eastwood, and Sacul soils. These strata, or similar strata in which these soils formed, are in each of the Tertiary formations.

Strata consisting mostly of sideritic and glauconitic clays, silts, or sands are the parent material of the Darbonne, Darley, Mahan, and Ruple soils. Strata in which these soils formed are in the Lower Cockfield and Upper Cook Mountain Formations. The soils that formed in these strata contain large quantities of ironstone, which developed as a result of weathering of the siderite and glauconite in the parent material.

Strata containing large percentages of quartz sands are parent materials of the Flo, Larue, and Wolfpen soils. These strata are in the Sparta, Cook Mountain, and Cockfield Formations. The Smithdale, Bowie, and McLaurin soils formed in loamy or moderately sandy strata of the Sparta, Cook Mountain, or Cockfield Formations.

Flood Plains and Stream Terraces

No major streams flow through Claiborne Parish, which is drained almost entirely by streams that originate within its boundaries. Only Corney Bayou, which drains the northeasternmost part of the parish, originates outside the area. The eastern two-thirds of the parish is drained by northwest to southeast trending streams, and drainage patterns in the western part of the parish generally trend northeast to southwest.

Alluvial deposits on the flood plains and stream terraces make up about 16 percent of the parish. Major areas of these deposits correspond to the Guyton-Iuka-Ouachita map unit on the General Soil Map. The flood plains and terraces are not shown separately on the General Soil Map, but they can be distinguished on the detailed soil maps. The flood plains and terraces generally differ in the age of the sediment, the soils that formed in this sediment, and in their landscape position. Sediment of the flood plains and terraces consists of detrital material eroded from the surrounding uplands.

The flood plain deposits generally are the youngest in the parish. Many parts of the flood plains receive additional sediment annually from stream overflow. The Dela, Iuka, and Ouachita soils formed in this sediment in areas adjacent to the present and former channels of streams. These young soils have distinct depositional strata within one meter of the surface.

The sediment of stream terraces is older than most of the sediment of the flood plains. It is the parent material of the Cahaba, Guyton, and Harleston soils. These soils are relatively mature and are characterized by a distinct argillic horizon.

The Guyton soil is on stream terraces and on flood plains. It formed mainly in old alluvium; however, in many places on flood plains, this soil has a thin overwash of brownish loamy alluvium that was recently deposited by floodwater. Also, in places, the Guyton soil is buried deeply below the Iuka or Ouachita soils.

The Cahaba, Harleston, and some of the Guyton soils are in higher positions in the alluvial valley than soils on the associated flood plains. In some places, however, part or all of the older stream terraces are buried by the more recent deposits. In general, differences in elevation between the surface of the highest stream terrace and that of the lowest flood plain is less than 1 meter.

The absolute age has not been determined for either the stream terrace or flood plain deposits. Throughout the parish, recent flood plain soils, such as the Dela, Iuka, and Ouachita soils, and alluvial terrace soils, such as the Cahaba, Guyton, and Harleston soils, are mapped along the drainageways. The flood plain deposits are Holocene in age, and most are Late Holocene age; believed to be less than about 5,000 years old. The older stream terrace deposits are either Early Holocene or Late Pleistocene in age. Possibly both deposits are in some places on the terraces.

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Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bottom land. The normal flood plain of a stream, subject to flooding.

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.

Cemented pan (in tables). Thin to thick layers of indurated ironstone.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels, i.e., clay coating, clay skin.

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, 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.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

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 activities of man or other animals or of a catastrophe in nature, such as fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay are in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The movement of water into the soil is rapid.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fine textured soil. Sandy clay, silty clay, and clay.

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 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Green-manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are—

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

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). There is a 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.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind 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.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). An otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

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

[Data recorded in the period 1951-79 at Homer Experiment Station, Louisiana]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days *	Average	2 years in 10 will have-- less than--	2 years in 10 will have-- more than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January	55.7	34.0	44.9	78	11	89	4.59	2.23	6.63	7	1.0
February	60.2	36.9	48.6	79	15	115	4.31	2.38	6.01	6	.1
March	67.8	43.6	55.7	84	21	237	4.42	2.35	6.24	7	.1
April	76.4	52.5	64.5	88	33	435	5.23	2.77	7.38	6	.0
May	83.0	59.8	71.4	93	42	663	5.48	2.87	7.76	7	.0
June	89.5	66.7	78.1	98	52	843	3.72	.98	5.91	6	.0
July	92.6	70.0	81.3	101	59	970	4.73	2.26	6.87	7	.0
August	92.5	68.7	80.6	101	58	949	3.13	1.61	4.45	5	.0
September	86.9	63.4	75.2	98	45	756	4.17	1.43	6.42	5	.0
October	78.2	51.7	65.0	93	34	465	2.52	.66	4.02	4	.0
November	66.8	42.5	54.7	84	20	180	4.24	2.42	5.85	6	.0
December	58.4	36.2	47.3	79	14	77	4.69	2.59	6.53	7	.2
Yearly:											
Average	75.7	52.2	63.9	---	---	---	---	---	---	---	---
Extreme	---	---	---	103	9	---	---	---	---	---	---
Total	---	---	---	---	---	5,779	51.23	40.30	61.57	73	1.4

* 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

[Data recorded in the period 1951-79 at Homer Experiment Station, 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. 23	Mar. 27	Apr. 7
2 years in 10 later than--	Mar. 12	Mar. 21	Apr. 2
5 years in 10 later than--	Feb. 19	Mar. 7	Mar. 22
First freezing temperature in fall:			
1 year in 10 earlier than--	Nov. 13	Nov. 2	Oct. 28
2 years in 10 earlier than--	Nov. 20	Nov. 8	Nov. 1
5 years in 10 earlier than--	Dec. 2	Nov. 18	Nov. 9

TABLE 3.--GROWING SEASON

[Data recorded in the period 1951-79 at Homer Experiment Station, Louisiana]

Probability	Daily minimum temperature during growing season		
	Higher than 24°F	Higher than 28°F	Higher than 32°F
	Days	Days	Days
9 years in 10	249	226	212
8 years in 10	261	235	218
5 years in 10	283	254	231
2 years in 10	306	273	244
1 year in 10	320	283	250

TABLE 4.--SUITABILITY AND LIMITATIONS OF MAP UNITS ON THE GENERAL SOIL MAP FOR MAJOR LAND USES

Map unit	Percent of area	Cultivated farm crops	Pastureland	Woodland	Urban uses	Intensive recreation areas
Eastwood-Angie-Bowie----	6	Moderately well suited: wetness, slope, low fertility, potential aluminum toxicity in root zone.	Well suited.	Well suited.	Poorly suited: moderately slow and very slow permeability, shrink-swell, low strength for roads, wetness, slope.	Poorly suited: moderately slow and very slow permeability, slope.
Sacul-Bowie------------	4	Not suited: slope.	Moderately well suited: slope, low fertility.	Well suited.	Poorly suited: slow permeability, shrink-swell, slope, low strength for roads.	Moderately well suited: slope, slow permeability.
Eastwood-Wolfpen--------	14	Moderately well suited: slope, low fertility, potential aluminum toxicity in root zone, low available water capacity.	Well suited.	Well suited.	Poorly suited: very slow permeability, shrink-swell, slope, low strength for roads, wetness, seepage, too sandy.	Poorly suited: very slow permeability, slope, too sandy.
Flo-Smithdale-McLaurin--	3	Somewhat poorly suited: low fertility, low to moderate available water capacity, slope, potential aluminum toxicity in root zone.	Moderately well suited: low fertility, slope, low to moderate available water capacity.	Moderately well suited: equipment use limitation, seedling mortality, erosion hazard.	Moderately well suited: slope, seepage, too sandy.	Moderately well suited: slope, too sandy.
Sacul-Wolfpen-Darley----	14	Not suited: slope.	Moderately well suited: low or medium fertility, slope, low to moderate available water capacity.	Well suited.	Poorly suited: slow permeability, shrink-swell, slope, small stones on surface, low strength for roads, ironstone layers in subsoil, seepage, too sandy.	Moderately well suited: slope, slow permeability, small stones on surface, too sandy.

TABLE 4.--SUITABILITY AND LIMITATIONS OF MAP UNITS ON THE GENERAL SOIL MAP FOR MAJOR LAND USES--Continued

Map unit	Percent of area	Cultivated farm crops	Pastureland	Woodland	Urban uses	Intensive recreation areas
Darley-Mahan	17	Not suited: slope.	Moderately well suited: medium fertility, slope.	Well suited.	Moderately well suited: ironstone layers in subsoil, moderately slow permeability, small stones on surface, low strength for roads, slope.	Moderately well suited: slope, moderately slow permeability, small stones on surface.
Ruple-Sacul-Darley	1	Not suited: slope.	Moderately well suited: low and medium fertility, slope.	Well suited.	Moderately well suited: slope, ironstone layers in subsoil, small stones on surface, slow and moderately slow permeability, low strength for roads.	Moderately well suited: slope, small stones on surface, slow and moderately slow permeability.
Darley-Sacul	4	Not suited: slope.	Moderately well suited: low or medium fertility, slope.	Well suited.	Moderately well suited: slope, ironstone layers in subsoil, slow and moderately slow permeability, low strength for roads.	Moderately well suited: slope, small stones on surface, slow and moderately slow permeability.
Darley-Bowie	6	Not suited: slope.	Moderately well suited: slope, low and medium fertility.	Well suited.	Moderately well suited: slope, ironstone layers in subsoil, moderately slow permeability, small stones on surface.	Moderately well suited: slope, small stones on surface, moderately slow permeability.
Sacul-Darley-Darbonne	15	Not suited: slope.	Moderately well suited: slope, low and medium fertility.	Well suited.	Poorly suited: slope, slow and moderately slow permeability, shrink-swell, ironstone layers in subsoil, low strength for roads.	Moderately well suited: slope, small stones on surface, slow and moderately slow permeability.

TABLE 4.--SUITABILITY AND LIMITATIONS OF MAP UNITS ON THE GENERAL SOIL MAP FOR MAJOR LAND USES--Continued

Map unit	Percent of area	Cultivated farm crops	Pastureland	Woodland	Urban uses	Intensive recreation areas
Guyton-Iuka-Ouachita----	16	Somewhat poorly suited: flooding, wetness.	Somewhat poorly suited: flooding, wetness.	Moderately well suited: flooding, wetness, seedling mortality, equipment use limitations.	Poorly suited: flooding, wetness.	Poorly suited: flooding, wetness.

TABLE 5.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
An	Angie very fine sandy loam, 1 to 3 percent slopes	7,911	1.6
Bw	Bowie fine sandy loam, 1 to 5 percent slopes	19,082	3.9
Ca	Cahaba fine sandy loam, 1 to 3 percent slopes	947	0.2
Db	Darbonne loamy fine sand, 1 to 5 percent slopes	7,312	1.5
De	Darley gravelly loamy fine sand, 1 to 5 percent slopes	43,663	8.8
Dr	Darley gravelly fine sandy loam, 5 to 12 percent slopes	53,599	10.8
Dy	Darley-Sacul complex, 12 to 30 percent slopes	44,651	9.0
Ea	Eastwood very fine sandy loam, 1 to 5 percent slopes	20,106	4.1
Ed	Eastwood very fine sandy loam, 5 to 12 percent slopes	46,067	9.3
Fe	Flo loamy fine sand, 1 to 5 percent slopes	5,403	1.1
Fo	Flo loamy fine sand, 5 to 12 percent slopes	5,238	1.1
Gn	Guyton silt loam	1,747	0.4
Go	Guyton-Ouachita silt loams, frequently flooded	53,602	10.9
Ha	Harleston fine sandy loam, 1 to 3 percent slopes	1,270	0.3
Io	Iuka-Dela complex, frequently flooded	24,823	5.0
La	Larue loamy fine sand, 1 to 5 percent slopes	2,599	0.5
Ma	Mahan fine sandy loam, 1 to 5 percent slopes	12,518	2.5
Mn	Mahan fine sandy loam, 5 to 12 percent slopes	9,051	1.8
Mr	McLaurin loamy fine sand, 1 to 3 percent slopes	2,433	0.5
Re	Ruple gravelly loam, 1 to 5 percent slopes	1,145	0.2
Rp	Ruple gravelly loam, 5 to 12 percent slopes	1,371	0.3
Sa	Sacul very fine sandy loam, 1 to 5 percent slopes	18,348	3.7
Sc	Sacul very fine sandy loam, 5 to 12 percent slopes	40,383	8.2
Sg	Sacul gravelly fine sandy loam, 1 to 5 percent slopes	2,914	0.6
Sk	Sacul gravelly fine sandy loam, 5 to 12 percent slopes	13,552	2.7
Sm	Smithdale fine sandy loam, 5 to 12 percent slopes	4,998	1.0
Wp	Wolfpen loamy sand, 1 to 3 percent slopes	43,755	8.8
	Water	6,175	1.2
	Total	494,663	100.0

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Map symbol and soil name	Land capability	Cotton lint	Grain sorghum	Soybeans	Common bermudagrass	Improved bermudagrass	Bahiagrass
		Lbs	Cwt	Bu	AUM*	AUM*	AUM*
An-------------- Angie	IIe	450	38	28	5.0	10.0	7.5
Bw-------------- Bowie	IIIe	450	43	30	7.0	14.0	8.0
Ca-------------- Cahaba	IIe	750	45	32	7.0	15.0	8.0
Db-------------- Darbonne	IIIe	500	42	28	7.0	11.0	7.0
De-------------- Darley	IIIe	500	42	28	6.0	12.0	7.0
Dr-------------- Darley	VIe	---	---	---	5.0	10.0	5.0
Dy-------------- Darley-Sacul	VIe	---	---	---	5.0	8.0	5.0
Ea-------------- Eastwood	IIIe	---	---	---	6.5	11.0	6.5
Ed-------------- Eastwood	VIe	---	---	---	5.5	9.0	5.5
Fe-------------- Flo	IIIs	---	---	---	4.0	10.0	6.0
Fo-------------- Flo	VIe	---	---	---	4.0	9.0	5.0
Gn-------------- Guyton	IIIw	---	---	23	6.5	---	6.0
Go-------------- Guyton-Ouachita	IVw	600	---	20	5.5	---	---
Ha-------------- Harleston	IIe	---	38	30	7.0	15.0	8.5
Io-------------- Iuka-Dela	IIw	700	41	30	6.0	10.0	7.0
La-------------- Larue	IIIe	---	40	---	6.0	11.0	6.0
Ma-------------- Mahan	IIIe	550	43	31	5.5	10.0	7.0
Mn-------------- Mahan	VIe	---	---	---	5.0	9.0	6.0
Mr-------------- McLaurin	IIe	600	41	30	5.0	10.0	8.0

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Cotton lint	Grain sorghum	Soybeans	Common bermudagrass	Improved bermudagrass	Bahiagrass
		Lbs	Cwt	Bu	AUM*	AUM*	AUM*
Re-------------- Ruple	IIIe	700	41	31	6.0	10.0	7.0
Rp-------------- Ruple	VIe	---	---	---	4.5	9.0	6.0
Sa-------------- Sacul	IVe	---	---	---	6.5	12.0	7.5
Sc-------------- Sacul	VIe	---	---	---	5.5	10.0	6.5
Sg-------------- Sacul	IVe	---	---	---	6.5	9.5	6.5
Sk-------------- Sacul	VIe	---	---	---	5.5	9.0	6.0
Sm-------------- Smithdale	IVe	---	---	---	5.0	9.0	6.0
Wp-------------- Wolfpen	IIIs	600	41	25	---	10.0	6.5

* 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.

TABLE 7.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	---	---	---	---
II	37,384	12,561	24,823	---
III	157,330	106,425	1,747	49,158
IV	79,862	26,260	53,602	---
V	---	---	---	---
VI	213,912	213,912	---	---
VII	---	---	---	---
VIII	---	---	---	---

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
An------------- Angie	9W	Slight	Moderate	Slight	Moderate	Loblolly pine-------	86	9	Loblolly pine.
						Shortleaf pine------	---	---	
						Sweetgum-----------	---	---	
						Southern red oak----	---	---	
Bw------------- Bowie	9A	Slight	Slight	Slight	Moderate	Loblolly pine-------	86	9	Loblolly pine.
						Shortleaf pine------	80	9	
						Sweetgum-----------	---	---	
						Southern red oak----	---	---	
Ca------------- Cahaba	9A	Slight	Slight	Slight	Moderate	Loblolly pine-------	87	9	Loblolly pine, southern red oak.
						Shortleaf pine------	70	8	
						Sweetgum-----------	90	7	
						Southern red oak----	---	---	
						Water oak-----------	---	---	
Db------------- Darbonne	8F	Slight	Slight	Slight	Moderate	Loblolly pine-------	80	8	Loblolly pine.
						Shortleaf pine------	75	8	
						Hickory------------	---	---	
						Southern red oak----	---	---	
						White oak----------	---	---	
						Sweetgum-----------	---	---	
De, Dr---------- Darley	8F	Slight	Slight	Slight	Moderate	Loblolly pine-------	85	8	Loblolly pine.
						Shortleaf pine------	75	8	
						Hickory------------	---	---	
						Southern red oak----	---	---	
						White oak----------	---	---	
						Sweetgum-----------	---	---	
Dy:									
Darley---------	8R	Moderate	Moderate	Slight	Moderate	Loblolly pine-------	85	8	Loblolly pine.
						Shortleaf pine------	75	8	
						Hickory------------	---	---	
						Southern red oak----	---	---	
						White oak----------	---	---	
						Sweetgum-----------	---	---	
Sacul----------	8R	Moderate	Moderate	Slight	Moderate	Loblolly pine-------	80	8	Loblolly pine.
						Shortleaf pine------	70	8	
						Sweetgum-----------	---	---	
						Southern red oak----	---	---	
Ea------------- Eastwood	10C	Slight	Moderate	Slight	Slight	Loblolly pine-------	93	10	Loblolly pine.
						Shortleaf pine------	---	---	
						Sweetgum-----------	---	---	
						Southern red oak----	---	---	
						Hickory------------	---	---	
Ed------------- Eastwood	9C	Moderate	Moderate	Slight	Slight	Loblolly pine-------	86	9	Loblolly pine.
						Shortleaf pine------	77	9	
						Sweetgum-----------	---	---	
						Southern red oak----	---	---	
						Hickory------------	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Productivity class*	
Fe, Fo Flo	8S	Slight	Severe	Moderate	Moderate	Loblolly pine Shortleaf pine	85 80	8 9	Loblolly pine, shortleaf pine.
Gn Guyton	9W	Slight	Severe	Moderate	Moderate	Loblolly pine Sweetgum Green ash Southern red oak Water oak	90 --- --- --- ---	9 --- --- --- ---	Loblolly pine.
Go: Guyton	9W	Slight	Severe	Severe	Moderate	Loblolly pine Sweetgum Green ash Southern red oak Water oak	90 --- --- --- ---	9 --- --- --- ---	Loblolly pine.
Ouachita	11W	Slight	Moderate	Moderate	Moderate	Loblolly pine Sweetgum Eastern cottonwood Cherrybark oak	100 100 100 ---	11 10 9 ---	Loblolly pine, sweetgum, eastern cottonwood, cherrybark oak.
Ha Harleston	9W	Slight	Slight	Slight	Moderate	Loblolly pine Shortleaf pine Sweetgum Water oak	90 80 75 ---	9 9 5 ---	Loblolly pine, southern red oak.
Io: Iuka	9W	Slight	Moderate	Moderate	Severe	Loblolly pine Sweetgum Eastern cottonwood Water oak	100 100 105 100	9 10 --- ---	Loblolly pine, cherrybark oak.
Dela	4A	Slight	Slight	Moderate	Severe	Southern red oak Sweetgum Eastern cottonwood Shortleaf pine Green ash Hickory	80 90 100 80 --- ---	4 7 --- 9 --- ---	Loblolly pine, southern red oak.
La Larue	8S	Slight	Moderate	Moderate	Moderate	Loblolly pine Shortleaf pine Longleaf pine Southern red oak Sweetgum	80 70 70 --- ---	8 8 6 --- ---	Loblolly pine.
Ma, Mn Mahan	9A	Slight	Slight	Slight	Slight	Loblolly pine Shortleaf pine Hickory Southern red oak Sweetgum Post oak	90 --- --- --- --- ---	9 --- --- --- --- ---	Loblolly pine.
Mr McLaurin	8A	Slight	Moderate	Slight	Slight	Loblolly pine Shortleaf pine Sweetgum Southern red oak	83 70 --- ---	8 8 --- ---	Loblolly pine.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Productivity class*	
Re, Rp---------- Ruple	8F	Slight	Slight	Slight	Slight	Loblolly pine------- Shortleaf pine------ Hickory------------ Southern red oak---- Sweetgum----------- Post oak-----------	85 75 --- --- --- ---	8 8 --- --- --- ---	Loblolly pine.
Sa, Sc, Sg, Sk-- Sacul	8C	Moderate	Slight	Slight	Moderate	Loblolly pine------- Shortleaf pine------ Sweetgum----------- Southern red oak----	80 70 --- ---	8 8 --- ---	Loblolly pine.
Sm------------- Smithdale	8A	Slight	Slight	Slight	Slight	Loblolly pine------- Shortleaf pine------ Sweetgum----------- Southern red oak----	80 69 --- ---	8 8 --- ---	Loblolly pine.
Wp------------- Wolfpen	9S	Slight	Slight	Moderate	Moderate	Loblolly pine------- Shortleaf pine------ Longleaf pine------- Sweetgum----------- Southern red oak----	90 78 --- --- ---	9 9 --- --- ---	Loblolly pine.

* 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.

TABLE 9.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
An-------------------- Angie	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight----------	Slight.
Bw-------------------- Bowie	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
Ca-------------------- Cahaba	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
Db-------------------- Darbonne	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----------	Moderate: small stones, droughty.
De-------------------- Darley	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----------	Moderate: small stones, cemented pan.
Dr-------------------- Darley	Moderate: small stones, slope.	Moderate: small stones, slope.	Severe: slope, small stones.	Slight----------	Moderate: small stones, slope, cemented pan.
Dy:					
Darley---------------	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Sacul----------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ea-------------------- Eastwood	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight----------	Slight.
Ed-------------------- Eastwood	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: slope.
Fe-------------------- Flo	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
Fo-------------------- Flo	Moderate: too sandy.	Moderate: too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: droughty.
Gn-------------------- Guyton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Go:					
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.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ha------------------ Harleston	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Slight----------	Slight.
Io:					
Iuka----------------	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
Dela----------------	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
La------------------ Larue	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
Ma------------------ Mahan	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Slight.
Mn------------------ Mahan	Slight----------	Slight----------	Severe: slope.	Slight----------	Slight.
Mr------------------ McLaurin	Slight----------	Slight----------	Moderate: slope.	Slight----------	Moderate: droughty.
Re------------------ Ruple	Moderate: small stones, percs slowly.	Moderate: small stones, percs slowly.	Severe: small stones.	Slight----------	Moderate: small stones, cemented pan.
Rp------------------ Ruple	Moderate: small stones, percs slowly, slope.	Moderate: small stones, percs slowly.	Severe: slope, small stones.	Slight----------	Moderate: small stones, cemented pan, slope.
Sa------------------ Sacul	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight----------	Slight.
Sc------------------ Sacul	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----------	Moderate: slope.
Sg------------------ Sacul	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly, small stones.	Slight----------	Moderate: small stones.
Sk------------------ Sacul	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----------	Moderate: slope.
Sm------------------ Smithdale	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
Wp------------------ Wolfpen	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: droughty, too sandy.

TABLE 10.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
An----------------- Angie	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Bw----------------- Bowie	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Ca----------------- Cahaba	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Db----------------- Darbonne	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
De----------------- Darley	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Dr----------------- Darley	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Dy:											
Darley------------	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Sacul-------------	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Ea----------------- Eastwood	Fair	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Ed----------------- Eastwood	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Fe, Fo------------- Flo	Poor	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Gn----------------- Guyton	Fair	Fair	Fair	Fair	Fair	Good	Good	Good	Fair	Fair	Good.
Go:											
Guyton------------	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Ouachita----------	Fair	Fair	Fair	Good	Good	Good	Good	Fair	Fair	Good	Fair.
Ha----------------- Harleston	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Io:											
Iuka--------------	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Dela--------------	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
La----------------- Larue	Fair	Fair	Good	Good	Good	Fair	Poor	Very poor.	Fair	Good	Very poor.
Ma, Mn------------- Mahan	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
Mr------------------ McLaurin	Fair	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Re------------------ Ruple	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rp------------------ Ruple	Poor	Good	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Sa------------------ Sacul	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Sc------------------ Sacul	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Sg------------------ Sacul	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Sk------------------ Sacul	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Sm------------------ Smithdale	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Wp------------------ Wolfpen	Fair	Fair	Good	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.

TABLE 11.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
An----------------- Angie	Moderate: too clayey, wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
Bw----------------- Bowie	Slight-----------	Slight-----------	Slight-----------	Slight-----------	Slight.
Ca----------------- Cahaba	Severe: cutbanks cave.	Slight-----------	Slight-----------	Slight-----------	Slight.
Db----------------- Darbonne	Slight-----------	Slight-----------	Slight-----------	Slight-----------	Moderate: small stones, droughty.
De----------------- Darley	Moderate: cemented pan, too clayey.	Slight-----------	Slight-----------	Moderate: low strength.	Moderate: small stones, cemented pan.
Dr----------------- Darley	Moderate: slope, cemented pan, too clayey.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Moderate: small stones, slope, cemented pan.
Dy: Darley------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Sacul------------	Severe: slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.	Severe: slope.
Ea----------------- Eastwood	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
Ed----------------- Eastwood	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: slope.
Fe----------------- Flo	Severe: cutbanks cave.	Slight-----------	Slight-----------	Slight-----------	Moderate: droughty.
Fo----------------- Flo	Severe: cutbanks cave.	Slight-----------	Moderate: slope.	Slight-----------	Moderate: droughty.
Gn----------------- Guyton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Go:					
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: low strength, flooding.	Severe: flooding.
Ha Harleston	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight.
Io:					
Iuka	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.
Dela	Moderate: flooding, wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
La Larue	Severe: cutbanks cave.	Slight	Moderate: slope.	Slight	Moderate: droughty.
Ma Mahan	Moderate: too clayey.	Slight	Slight	Moderate: low strength.	Slight.
Mn Mahan	Moderate: too clayey, slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
Mr McLaurin	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: droughty.
Re Ruple	Moderate: cemented pan, too clayey.	Slight	Slight	Moderate: low strength.	Moderate: small stones, cemented pan.
Rp Ruple	Moderate: slope, cemented pan, too clayey.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Moderate: small stones, slope, cemented pan.
Sa Sacul	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
Sc Sacul	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.
Sg Sacul	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
Sk Sacul	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Sm----------------- Smithdale	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
Wp----------------- Wolfpen	Severe: cutbanks cave.	Slight-----------	Slight-----------	Slight-----------	Moderate: droughty, too sandy.

TABLE 12.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
An: Angie	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
Bw: Bowie	Severe: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.
Ca: Cahaba	Slight	Severe: seepage.	Severe: seepage.	Slight	Fair: thin layer.
Db: Darbonne	Severe: percs slowly.	Severe: seepage.	Slight	Slight	Fair: small stones.
De: Darley	Severe: percs slowly, cemented pan.	Severe: cemented pan, seepage.	Moderate: cemented pan, too clayey.	Severe: cemented pan.	Poor: cemented pan.
Dr: Darley	Severe: percs slowly, cemented pan.	Severe: slope, seepage, cemented pan.	Moderate: slope, cemented pan, too clayey.	Severe: cemented pan.	Poor: cemented pan.
Dy:					
Darley	Severe: slope, percs slowly, cemented pan.	Severe: slope, seepage, cemented pan.	Severe: slope.	Severe: slope, cemented pan.	Poor: cemented pan, slope.
Sacul	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Ea: Eastwood	Severe: percs slowly.	Moderate: slope.	Moderate: too clayey.	Slight	Poor: hard to pack.
Ed: Eastwood	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Poor: hard to pack.
Fe, Fo: Flo	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too sandy.
Gn: Guyton	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
Go:					
Guyton	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.

TABLE 12.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Go:					
Ouachita	Severe: flooding, percs slowly.	Severe: flooding.	Severe: flooding, seepage.	Severe: flooding.	Fair: too clayey.
Ha Harleston	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
Io:					
Iuka	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
Dela	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Fair: wetness.
La Larue	Severe: poor filter.	Severe: seepage.	Slight	Severe: seepage.	Good.
Ma Mahan	Slight	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
Mn Mahan	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: slope, too clayey.
Mr McLaurin	Slight	Severe: seepage.	Slight	Severe: seepage.	Good.
Re Ruple	Severe: percs slowly, cemented pan.	Severe: cemented pan.	Moderate: cemented pan, too clayey.	Severe: cemented pan.	Poor: cemented pan.
Rp Ruple	Severe: percs slowly, cemented pan.	Severe: slope, cemented pan.	Moderate: slope, cemented pan, too clayey.	Severe: cemented pan.	Poor: cemented pan.
Sa Sacul	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
Sc Sacul	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
Sg Sacul	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
Sk Sacul	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
Sm Smithdale	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey, slope.
Wp Wolfpen	Severe: poor filter.	Severe: seepage.	Severe: wetness.	Severe: seepage.	Fair: too clayey.

TABLE 13.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
An: Angie	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Bw: Bowie	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
Ca: Cahaba	Good	Probable	Improbable: too sandy.	Good.
Db: Darbonne	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
De, Dr: Darley	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey, area reclaim.
Dy:				
Darley	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey, area reclaim.
Sacul	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
Ea, Ed: Eastwood	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Fe, Fo: Flo	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
Gn: Guyton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Go:				
Guyton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Ouachita	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Ha: Harleston	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Io:				
Iuka	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Dela	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
La-------------------- Larue	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
Ma, Mn---------------- Mahan	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Mr-------------------- McLaurin	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Good.
Re, Rp---------------- Ruple	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, too clayey.
Sa, Sc, Sg, Sk-------- Sacul	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Sm-------------------- Smithdale	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
Wp-------------------- Wolfpen	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.

TABLE 14.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
An: Angie	Slight	Moderate: hard to pack, wetness.	Deep to water	Percs slowly, erodes easily.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
Bw: Bowie	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope, rooting depth.	Favorable	Rooting depth.
Ca: Cahaba	Severe: seepage.	Moderate: thin layer, piping.	Deep to water	Favorable	Favorable	Favorable.
Db: Darbonne	Moderate: slope, seepage.	Moderate: seepage, thin layer, piping.	Deep to water	Droughty, fast intake, slope.	Favorable	Droughty.
De: Darley	Moderate: slope, cemented pan, seepage.	Moderate: thin layer.	Deep to water	Slope, fast intake, droughty.	Cemented pan	Cemented pan, droughty.
Dr: Darley	Severe: slope.	Moderate: thin layer.	Deep to water	Slope, droughty.	Slope, cemented pan.	Slope, cemented pan, droughty.
Dy:						
Darley	Severe: slope.	Moderate: thin layer.	Deep to water	Slope, droughty.	Slope, cemented pan.	Slope, cemented pan, droughty.
Sacul	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly.	Slope, percs slowly.	Slope, percs slowly.
Ea: Eastwood	Moderate: slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly, erodes easily.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
Ed: Eastwood	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly, erodes easily.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
Fe, Fo: Flo	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, fast intake, droughty.	Soil blowing	Droughty.
Gn: Guyton	Moderate: seepage.	Severe: piping, wetness.	Percs slowly	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Go:						
Guyton	Moderate: seepage.	Severe: piping, wetness.	Percs slowly, flooding.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Go:						
Ouachita	Slight	Severe: piping.	Deep to water	Erodes easily, flooding.	Erodes easily	Percs slowly.
Ha Harleston	Moderate: seepage.	Severe: piping.	Favorable	Wetness	Wetness	Favorable.
Io:						
Iuka	Moderate: seepage.	Severe: piping, wetness.	Flooding	Wetness, flooding.	Wetness	Wetness.
Dela	Severe: seepage.	Severe: piping.	Deep to water	Fast intake, flooding.	Favorable	Favorable.
La Larue	Severe: seepage.	Severe: thin layer.	Deep to water	Droughty, fast intake, slope.	Soil blowing	Droughty.
Ma, Mn Mahan	Moderate: slope, seepage.	Moderate: hard to pack, thin layer, piping.	Deep to water	Slope	Favorable	Favorable.
Mr McLaurin	Severe: seepage.	Severe: piping.	Deep to water	Droughty	Favorable	Droughty.
Re Ruple	Moderate: seepage, cemented pan, slope.	Moderate: piping.	Deep to water	Slope, droughty.	Cemented pan	Cemented pan, droughty.
Rp Ruple	Severe: slope.	Moderate: piping.	Deep to water	Slope, droughty.	Slope, cemented pan.	Slope, cemented pan, droughty.
Sa Sacul	Moderate: slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly, wetness.	Percs slowly, wetness.	Percs slowly.
Sc Sacul	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly.	Slope, percs slowly.	Slope, percs slowly.
Sg Sacul	Slight	Severe: hard to pack.	Deep to water	Slope, percs slowly.	Percs slowly.	Percs slowly.
Sk Sacul	Slight	Severe: hard to pack.	Deep to water	Slope, percs slowly.	Slope, percs slowly.	Slope, percs slowly.
Sm Smithdale	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope	Slope	Slope.
Wp Wolfpen	Severe: seepage.	Severe: thin layer.	Deep to water	Droughty, fast intake.	Favorable	Droughty.

TABLE 15.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
An----------------- Angie	0-16	Very fine sandy loam.	ML, CL-ML	A-4	0	95-100	90-100	85-100	60-90	15-38	5-10
	16-77	Silty clay loam, silty clay, clay loam.	CH, CL	A-7-6	0	95-100	90-100	85-100	75-95	41-55	18-29
Bw----------------- Bowie	0-13	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-2-4, A-4	0	98-100	98-100	95-100	30-55	<25	NP-6
	13-25	Sandy clay loam, clay loam, fine sandy loam.	SC, CL	A-4, A-6	0	90-100	90-100	85-100	40-72	20-40	8-25
	25-63	Sandy clay loam, clay loam, fine sandy loam.	SC, CL	A-4, A-6, A-7	0	80-100	70-100	65-100	49-77	20-41	8-25
	63-75	Sandy clay loam, clay loam, sandy clay.	CL	A-6, A-7	0	95-100	90-100	75-100	51-80	31-49	14-30
Ca----------------- Cahaba	0-15	Fine sandy loam	SM	A-4, A-2-4	0	95-100	95-100	65-90	30-45	---	NP
	15-42	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
	42-70	Sand, loamy sand, sandy loam.	SM, SP-SM	A-2-4	0	95-100	90-100	60-85	10-35	---	NP
Db----------------- Darbonne	0-13	Loamy fine sand	SM, SM-SC, GM-GC, GM	A-2-4, A-4, A-1-b	0-5	60-95	50-90	40-80	15-40	<20	NP-5
	13-45	Fine sandy loam, gravelly sandy clay loam.	SM, SC, GC, GM	A-1-b, A-2-4, A-4, A-6	2-15	40-70	35-60	30-55	20-45	<30	NP-15
	45-70	Fine sandy loam, loam, sandy clay loam.	SM-SC, CL-ML, CL, SC	A-2-4, A-4, A-6, A-2-6	0-2	80-95	75-90	70-85	30-55	16-35	5-20
De----------------- Darley	0-14	Gravelly loamy fine sand, gravelly fine sandy loam.	SM, SM-SC, GM, GM-GC	A-1-b, A-2-4	0-5	55-80	40-70	35-65	10-30	<15	NP-5
	14-35	Sandy clay, gravelly sandy clay, clay.	GC, SC, CL, MH	A-7-6, A-7-5, A-2-7	0-5	65-90	55-85	45-80	30-60	40-60	16-30
	35-60	Gravelly clay, gravelly sandy clay, clay loam.	GC, SC, CL, MH	A-7-6, A-7-5, A-2-7	3-15	40-70	35-60	30-60	25-55	40-60	16-30
	60-81	Sandy loam, fine sandy loam, sandy clay loam.	SM-SC, CL-ML, CL, SC	A-2-4, A-4, A-6, A-2-6	0-2	80-95	75-90	70-85	30-55	16-35	5-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Dr---------------- Darley	0-6	Gravelly fine sandy loam.	SM, SM-SC, SC, GM	A-1-b, A-2-4, A-4	0-5	55-80	40-70	35-65	20-50	<20	NP-8
	6-24	Sandy clay, gravelly sandy clay, clay.	GC, SC, CL, MH	A-7-6, A-7-5, A-2-7	0-5	65-90	55-85	45-80	30-60	40-60	16-30
	24-40	Clay, gravelly clay, gravelly sandy clay.	GC, SC, CL, MH	A-7-6, A-7-5, A-2-7	3-15	40-70	35-60	30-60	25-55	40-60	16-30
	40-60	Sandy loam, fine sandy loam, sandy clay loam.	SM-SC, CL-ML, CL, SC	A-2-4, A-4, A-6, A-2-6	0-2	80-95	75-90	70-85	30-55	16-35	5-20
Dy: Darley-----------	0-8	Gravelly fine sandy loam.	SM, SM-SC, SC, GM	A-1-b, A-2-4, A-4	0-5	55-80	40-70	35-65	20-50	<20	NP-8
	8-22	Sandy clay, gravelly sandy clay, clay.	GC, SC, CL, MH	A-7-6, A-7-5, A-2-7	0-5	65-90	55-85	45-80	30-60	40-60	16-30
	22-40	Clay, gravelly clay, gravelly sandy clay.	GC, SC, CL, MH	A-7-6, A-7-5, A-2-7	3-15	40-70	35-60	30-60	25-55	40-60	16-30
	40-60	Sandy loam, fine sandy loam, sandy clay loam.	SM-SC, CL-ML, CL, SC	A-2-4, A-4, A-6, A-2-6	0-2	80-95	75-90	70-85	30-55	16-35	5-20
Sacul-----------	0-6	Fine sandy loam	SM, ML	A-4	0	95-100	90-100	80-100	40-65	<20	NP-3
	6-60	Clay, silty clay	CH, CL	A-7	0	95-100	90-100	85-95	80-90	45-70	20-40
Ea---------------- Eastwood	0-9	Very fine sandy loam.	CL, SM-SC, CL-ML, ML	A-4, A-6	0	98-100	98-100	95-100	40-75	20-33	3-13
	9-47	Clay, silty clay	CH, CL	A-7-6	0	100	95-100	90-100	70-98	40-75	25-45
	47-75	Clay loam, silty clay loam, loam.	CL, CH	A-6, A-7-6	0	100	95-100	90-100	55-98	35-65	15-45
Ed---------------- Eastwood	0-4	Very fine sandy loam.	CL, SM-SC, CL-ML, ML	A-4, A-6	0	98-100	98-100	95-100	40-75	20-33	3-13
	4-48	Silty clay, sandy clay.	CH, CL	A-7-6	0	100	95-100	90-100	70-98	40-75	25-45
	48-65	Clay loam, sandy clay loam, loam.	CL, CH	A-6, A-7-6	0	100	95-100	90-100	55-98	35-65	15-45
Fe---------------- Flo	0-20	Loamy fine sand	SM, SP-SM	A-2, A-3	0	98-100	95-100	85-100	5-35	<25	NP-3
	20-95	Loamy fine sand	SM	A-2, A-4	0	98-100	95-100	90-100	15-45	<25	NP-3
Fo---------------- Flo	0-20	Loamy fine sand	SM, SP-SM	A-2, A-3	0	98-100	95-100	85-100	5-35	<25	NP-3
	20-62	Loamy fine sand	SM	A-2, A-4	0	98-100	95-100	90-100	15-45	<25	NP-3
Gn---------------- Guyton	0-20	Silt loam--------	ML, CL-ML	A-4	0	100	100	95-100	65-90	<27	NP-7
	20-51	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
	51-75	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

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Go:											
Guyton----------	0-23	Silt loam--------	ML, CL-ML	A-4	0	100	100	95-100	65-90	<27	NP-7
	23-41	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
	41-65	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--------	0-17	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0	100	100	85-100	75-95	<30	NP-12
	17-71	Silt loam, loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	100	100	85-100	80-100	25-40	5-20
	71-80	Fine sandy loam, silt loam, loamy fine sand.	SM, ML, CL-ML, SM-SC	A-4, A-2	0	100	100	50-95	20-75	<30	NP-5
Ha--------------- Harleston	0-19	Fine sandy loam	ML, SM, CL-ML, SM-SC	A-2, A-4	0	90-100	85-100	60-85	30-55	<25	NP-7
	19-47	Sandy loam, loam	SC, CL, CL-ML, SM-SC	A-2, A-4	0	90-100	85-100	60-95	30-70	20-30	5-10
	47-81	Sandy loam, loam, sandy clay loam.	SC, CL, CL-ML, SM-SC	A-2, A-4, A-6	0	90-100	85-100	60-95	30-70	20-35	5-13
Io:											
Iuka------------	0-7	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-4, A-2	0	95-100	90-100	70-100	30-60	<20	NP-7
	7-15	Fine sandy loam, loam, sandy loam.	SM, SM-SC, ML, CL-ML	A-4	0	95-100	85-100	65-100	36-75	<30	NP-7
	15-70	Fine sandy loam, loam, silt loam.	SM, ML	A-2, A-4	0	95-100	90-100	70-100	25-60	<30	NP-7
Dela------------	0-4	Loamy fine sand	SM	A-2	0	100	98-100	90-100	15-35	---	NP
	4-32	Fine sandy loam, sandy loam, loam.	ML, CL, SM, SC	A-4	0	100	98-100	94-100	36-70	<30	NP-10
	32-60	Stratified fine sandy loam to loamy fine sand.	ML, CL, SM, SC	A-2, A-4	0	100	98-100	90-100	15-60	<30	NP-10
La--------------- Larue	0-24	Loamy fine sand	SM	A-2-4	0	100	98-100	50-75	15-30	---	NP
	24-62	Sandy clay loam	SC, SM-SC	A-2-4, A-4, A-6, A-2-6	0	100	95-100	80-90	30-45	20-35	5-12
	62-86	Sandy clay loam, clay loam, fine sandy loam.	SM, SM-SC, SC	A-2-4, A-4	0	100	95-100	60-70	30-40	20-30	3-10

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Ma---------------- Mahan	0-5	Fine sandy loam	SM, SM-SC, ML, SC	A-2-4, A-4	0-1	90-100	85-100	65-80	30-55	<25	NP-8
	5-21	Clay loam, sandy clay, clay.	CL, CH	A-7-6	0-2	90-100	85-95	80-90	50-85	40-55	16-30
	21-59	Sandy loam, fine sandy loam, sandy clay loam.	SC, SM-SC, CL, CL-ML	A-4, A-6	0-2	90-100	85-95	65-85	35-55	16-35	4-18
	59-82	Stratified sandy clay to sandy loam.	SC, SM-SC, CL, CL-ML	A-4, A-6	0-1	90-100	85-95	65-85	35-55	16-30	4-15
Mn---------------- Mahan	0-5	Fine sandy loam	SM, SM-SC, ML, SC	A-2-4, A-4	0-1	90-100	85-100	65-80	30-55	<25	NP-8
	5-58	Sandy clay loam, sandy clay, clay.	CL, CH	A-7-6	0-2	90-100	85-95	80-90	50-85	40-55	16-30
	58-75	Sandy loam, fine sandy loam, sandy clay loam.	SC, SM-SC, CL, CL-ML	A-4, A-6	0-2	90-100	85-95	65-85	35-55	16-35	4-18
Mr---------------- McLaurin	0-9	Loamy fine sand	SM	A-2	0	90-100	90-100	50-75	15-30	<20	NP-4
	9-42	Sandy loam, fine sandy loam, loam.	SM, SC, SM-SC	A-4	0	90-100	90-100	85-95	36-45	<30	NP-10
	42-53	Loamy fine sand, loamy sand, sandy loam.	SM	A-2, A-4	0	90-100	90-100	50-85	15-45	<20	NP-4
	53-64	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
Re---------------- Ruple	0-5	Gravelly loam----	SM, SM-SC, GM-GC, GM	A-1-b, A-2-4	0-5	55-80	40-70	35-65	10-30	<30	NP-10
	5-16	Gravelly clay, gravelly sandy clay, clay.	GC, SM, MH, CL	A-7-5, A-7-6, A-6, A-2-6	1-10	45-75	40-65	30-60	25-55	33-60	11-27
	16-60	Stratified clay to sandy clay loam.	CL, GC, SC	A-6, A-7-6, A-2-6, A-2-7	3-15	40-70	35-60	30-60	25-55	30-50	11-27
Rp---------------- Ruple	0-11	Gravelly loam----	SM, SM-SC, GM-GC, GM	A-1-b, A-2-4	0-5	55-80	40-70	35-65	10-30	<30	NP-10
	11-25	Gravelly clay, gravelly sandy clay, clay.	GC, SM, MH, CL	A-7-5, A-7-6, A-6, A-2-6	1-10	45-75	40-65	30-60	25-55	33-60	11-27
	25-60	Stratified clay to sandy clay loam.	CL, GC, SC	A-6, A-7-6, A-2-6, A-2-7	3-15	40-70	35-60	30-60	25-55	30-50	11-27
Sa---------------- Sacul	0-7	Very fine sandy loam.	SM, ML	A-4	0	95-100	90-100	80-100	40-65	<20	NP-3
	7-52	Clay, sandy clay.	CH, CL	A-7	0	95-100	90-100	85-95	80-90	45-70	20-40
	52-80	Sandy clay loam, sandy loam, clay loam, sandy clay.	CL, CH, SC	A-6, A-7, A-4	0	95-100	90-100	85-100	40-90	25-55	8-32

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Sc----------------- Sacul	0-8	Very fine sandy loam.	SM, ML	A-4	0	95-100	90-100	80-100	40-65	<20	NP-3
	8-50	Clay, sandy clay.	CH, CL	A-7	0	95-100	90-100	85-95	80-90	45-70	20-40
	50-65	Sandy clay loam, clay loam, sandy clay.	CL, CH, SC	A-6, A-7, A-4	0	95-100	90-100	85-100	40-90	25-55	8-32
Sg----------------- Sacul	0-8	Gravelly fine sandy loam.	SM, ML	A-4	0	75-100	70-100	60-90	40-60	<20	NP-3
	8-51	Clay, sandy clay.	CH, CL	A-7	0	95-100	90-100	85-95	80-90	45-70	20-40
	51-60	Sandy clay loam, clay loam, sandy clay.	CL, CH, SC	A-6, A-7, A-4	0	95-100	90-100	85-100	40-90	25-55	8-32
Sk----------------- Sacul	0-8	Gravelly fine sandy loam.	SM, ML	A-4	0	75-100	70-100	60-90	40-60	<20	NP-3
	8-54	Clay, sandy clay.	CH, CL	A-7	0	95-100	90-100	85-95	80-90	45-70	20-40
	54-72	Sandy clay loam, clay loam, sandy clay.	CL, CH, SC	A-6, A-7, A-4	0	95-100	90-100	85-100	40-90	25-55	8-32
Sm----------------- Smithdale	0-18	Fine sandy loam.	SM, SM-SC	A-4, A-2	0	100	85-100	60-95	28-49	<20	NP-5
	18-47	Sandy clay loam, sandy loam.	SM-SC, SC, CL, CL-ML	A-6, A-4	0	100	85-100	80-96	45-75	23-38	7-16
	47-75	Loam, sandy loam.	SM, ML, CL, SC	A-4	0	100	85-100	65-95	36-70	<30	NP-10
Wp----------------- Wolfpen	0-6	Loamy sand	SM, SM-SC	A-2-4	0	95-100	95-100	85-100	15-35	<25	NP-7
	6-26	Loamy sand, loamy fine sand.	SM, SM-SC	A-2-4	0	95-100	95-100	85-100	15-35	<25	NP-7
	26-53	Sandy clay loam, clay loam, sandy loam.	SC, CL	A-6, A-4, A-2	0	95-100	95-100	85-100	26-55	25-40	8-20
	53-78	Sandy clay loam, clay loam, sandy loam.	SC, SM, CL, ML	A-4, A-6, A-2, A-7	0	95-100	95-100	85-100	25-55	15-45	2-27

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cc	In/hr	In/in	pH				Pct
An--------------- Angie	0-16	4-18	1.35-1.65	0.06-0.2	0.13-0.24	4.5-6.5	Low----------	0.49	5	.5-2
	16-77	35-50	1.20-1.60	0.06-0.2	0.12-0.18	3.6-6.0	High---------	0.32		
Bw--------------- Bowie	0-13	5-15	1.40-1.62	2.0-6.0	0.10-0.15	4.5-6.5	Low----------	0.32	5	.5-2
	13-25	18-35	1.60-1.75	0.6-2.0	0.11-0.18	4.5-5.5	Low----------	0.32		
	25-63	18-35	1.70-1.80	0.2-0.6	0.11-0.18	4.5-5.5	Low----------	0.32		
	63-75	25-40	1.70-1.80	0.2-0.6	0.11-0.18	4.5-5.5	Moderate-----	0.32		
Ca--------------- Cahaba	0-15	7-17	1.35-1.60	2.0-6.0	0.10-0.14	4.5-6.0	Low----------	0.24	5	.5-2
	15-42	18-35	1.35-1.60	0.6-2.0	0.12-0.20	4.5-6.0	Low----------	0.28		
	42-70	4-20	1.40-1.70	2.0-20	0.05-0.10	4.5-6.0	Low----------	0.24		
Db--------------- Darbonne	0-13	2-15	1.25-1.70	6.0-20	0.07-0.11	4.5-6.5	Low----------	0.15	4	.5-4
	13-45	10-30	1.35-1.70	0.6-2.0	0.07-0.15	4.5-6.0	Low----------	0.20		
	45-70	10-30	1.35-1.70	0.2-0.6	0.07-0.17	4.5-6.0	Low----------	0.28		
De--------------- Darley	0-14	2-15	1.35-1.70	6.0-20	0.07-0.11	4.5-6.5	Low----------	0.15	3	.5-4
	14-35	35-60	1.20-1.40	0.6-2.0	0.10-0.20	4.5-5.5	Low----------	0.24		
	35-60	35-60	1.20-1.40	0.2-0.6	0.10-0.20	4.5-5.5	Low----------	0.24		
	60-81	15-35	1.35-1.70	0.2-0.6	0.11-0.17	4.5-5.5	Low----------	0.28		
Dr--------------- Darley	0-6	5-15	1.35-1.70	2.0-6.0	0.08-0.12	4.5-6.5	Low----------	0.17	3	.5-4
	6-24	35-60	1.20-1.40	0.6-2.0	0.10-0.20	4.5-5.5	Low----------	0.24		
	24-40	35-60	1.20-1.40	0.2-0.6	0.10-0.20	4.5-5.5	Low----------	0.24		
	40-60	15-35	1.35-1.70	0.2-0.6	0.11-0.17	4.5-5.5	Low----------	0.28		
Dy:										
Darley-----------	0-8	5-15	1.35-1.70	2.0-6.0	0.08-0.12	4.5-6.5	Low----------	0.17	3	.5-4
	8-22	35-60	1.20-1.40	0.6-2.0	0.10-0.20	4.5-5.5	Low----------	0.24		
	22-40	35-60	1.20-1.40	0.2-0.6	0.10-0.20	4.5-5.5	Low----------	0.24		
	40-60	15-35	1.35-1.70	0.2-0.6	0.11-0.17	4.5-5.5	Low----------	0.28		
Sacul-----------	0-6	5-25	1.30-1.50	0.6-2.0	0.10-0.20	4.5-5.5	Low----------	0.32	5	1-3
	6-60	35-60	1.20-1.35	0.06-0.2	0.12-0.18	3.6-5.5	High---------	0.32		
Ea--------------- Eastwood	0-9	3-18	1.20-1.60	0.6-2.0	0.13-0.20	4.5-6.0	Low----------	0.55	4	.5-1
	9-47	40-65	1.20-1.45	<0.06	0.12-0.18	3.6-5.5	Very high----	0.32		
	47-75	25-40	1.20-1.50	0.06-0.2	0.12-0.20	3.6-6.0	High---------	0.32		
Ed--------------- Eastwood	0-4	3-18	1.20-1.60	0.6-2.0	0.13-0.20	4.5-6.0	Low----------	0.55	4	.5-1
	4-48	40-65	1.20-1.45	<0.06	0.12-0.18	3.6-5.5	Very high----	0.32		
	48-65	25-40	1.20-1.50	0.06-0.2	0.12-0.20	3.6-6.0	High---------	0.32		
Fe--------------- Flo	0-20	1-6	1.35-1.60	6.0-20	0.05-0.09	4.5-6.0	Low----------	0.17	5	<1
	20-95	5-12	1.35-1.70	6.0-20	0.07-0.14	4.5-6.0	Low----------	0.17		
Fo--------------- Flo	0-20	1-6	1.35-1.60	6.0-20	0.05-0.09	4.5-6.0	Low----------	0.17	5	<1
	20-62	5-12	1.35-1.70	6.0-20	0.07-0.14	4.5-6.0	Low----------	0.17		
Gn--------------- Guyton	0-20	7-25	1.35-1.65	0.6-2.0	0.20-0.23	3.6-6.0	Low----------	0.43	5	<2
	20-51	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-6.0	Low----------	0.37		
	51-75	20-35	1.35-1.70	0.06-2.0	0.15-0.22	3.6-6.0	Low----------	0.37		

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	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
Go:										
Guyton	0-23	7-25	1.35-1.65	0.6-2.0	0.20-0.23	3.6-6.0	Low	0.43	5	<2
	23-41	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-6.0	Low	0.37		
	41-65	20-35	1.35-1.70	0.06-2.0	0.15-0.22	3.6-8.4	Low	0.37		
Ouachita	0-17	8-25	1.25-1.60	0.6-2.0	0.15-0.24	4.5-6.0	Low	0.37	5	1-2
	17-71	18-35	1.25-1.60	0.2-0.6	0.15-0.24	4.5-5.5	Low	0.32		
	71-80	15-30	1.25-1.65	0.6-6.0	0.07-0.24	4.5-5.5	Low	0.24		
Ha Harleston	0-19	2-8	1.25-1.35	0.6-6.0	0.08-0.16	3.6-5.5	Low	0.20	5	.5-5
	19-47	8-18	1.35-1.65	0.6-2.0	0.13-0.16	3.6-5.5	Low	0.32		
	47-81	8-27	1.35-1.65	0.6-2.0	0.13-0.16	3.6-5.5	Low	0.32		
Io:										
Iuka	0-7	6-15	1.35-1.65	2.0-6.0	0.10-0.15	5.1-6.0	Low	0.24	5	.5-2
	7-15	8-18	1.35-1.65	0.6-2.0	0.10-0.20	4.5-5.5	Low	0.28		
	15-70	5-15	1.35-1.65	0.6-2.0	0.10-0.20	4.5-5.5	Low	0.20		
Dela	0-4	5-10	1.35-1.50	2.0-6.0	0.07-0.11	5.1-6.5	Low	0.17	5	.5-2
	4-32	5-18	1.50-1.70	2.0-6.0	0.10-0.20	5.1-7.3	Low	0.32		
	32-60	5-18	1.50-1.70	2.0-6.0	0.07-0.15	5.1-7.3	Low	0.20		
La Larue	0-24	3-15	1.30-1.50	6.0-20	0.05-0.10	5.1-6.5	Low	0.17	5	.5-2
	24-62	20-30	1.40-1.60	0.6-2.0	0.10-0.15	5.1-6.5	Low	0.24		
	62-86	15-30	1.40-1.60	0.6-2.0	0.10-0.15	5.1-6.5	Low	0.24		
Ma Mahan	0-5	2-15	1.35-1.70	2.0-6.0	0.10-0.15	5.1-6.0	Low	0.28	5	.5-4
	5-21	35-60	1.30-1.70	0.6-2.0	0.12-0.18	4.5-6.0	Low	0.32		
	21-59	10-35	1.35-1.70	0.6-2.0	0.10-0.17	4.5-6.0	Low	0.28		
	59-82	10-45	1.35-1.70	0.2-0.6	0.10-0.17	4.5-6.0	Low	0.28		
Mn Mahan	0-5	2-15	1.35-1.70	2.0-6.0	0.10-0.15	5.1-6.0	Low	0.28	5	.5-4
	5-58	35-60	1.30-1.70	0.6-2.0	0.12-0.18	4.5-6.0	Low	0.32		
	58-75	10-35	1.35-1.70	0.6-2.0	0.10-0.17	4.5-6.0	Low	0.28		
Mr McLaurin	0-9	1-5	1.30-1.70	6.0-20	0.05-0.10	4.5-5.5	Very low	0.17	5	.5-2
	9-42	10-18	1.40-1.60	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.20		
	42-53	5-15	1.30-1.70	2.0-6.0	0.05-0.10	4.5-5.5	Very low	0.20		
	53-64	5-27	1.40-1.60	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.20		
Re Ruple	0-5	5-25	1.25-1.65	2.0-6.0	0.07-0.17	5.6-7.3	Low	0.17	3	1-6
	5-16	40-80	1.15-1.40	0.6-2.0	0.10-0.20	5.1-6.5	Low	0.24		
	16-60	30-80	1.10-1.40	0.2-0.6	0.07-0.17	4.5-6.5	Low	0.24		
Rp Ruple	0-11	5-25	1.25-1.65	2.0-6.0	0.07-0.17	5.6-7.3	Low	0.17	3	1-6
	11-25	40-80	1.15-1.40	0.6-2.0	0.10-0.20	5.1-6.5	Low	0.24		
	25-60	30-80	1.10-1.40	0.2-0.6	0.07-0.17	4.5-6.5	Low	0.24		
Sa Sacul	0-7	5-25	1.30-1.50	0.6-2.0	0.10-0.20	4.5-5.5	Low	0.32	5	1-3
	7-52	35-60	1.20-1.35	0.06-0.2	0.12-0.18	3.6-5.5	High	0.32		
	52-80	20-40	1.25-1.45	0.2-0.6	0.16-0.24	3.6-5.5	Moderate	0.37		
Sc Sacul	0-8	5-25	1.30-1.50	0.6-2.0	0.10-0.20	4.5-5.5	Low	0.32	5	1-3
	8-50	35-60	1.20-1.35	0.06-0.2	0.12-0.18	3.6-5.5	High	0.32		
	50-65	20-40	1.25-1.45	0.2-0.6	0.16-0.24	3.6-5.5	Moderate	0.37		
Sg Sacul	0-8	5-25	1.30-1.50	2.0-6.0	0.08-0.16	4.5-5.5	Low	0.20	3	1-3
	8-51	35-60	1.20-1.35	0.06-0.2	0.12-0.18	3.6-5.5	High	0.32		
	51-60	20-40	1.25-1.45	0.2-0.6	0.16-0.24	3.6-5.5	Moderate	0.37		

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
Sk----------------	0-8	5-25	1.30-1.50	2.0-6.0	0.08-0.16	4.5-5.5	Low-----------	0.20	3	1-3
Sacul	8-54	35-60	1.20-1.35	0.06-0.2	0.12-0.18	3.6-5.5	High----------	0.32		
	54-72	20-40	1.25-1.45	0.2-0.6	0.16-0.24	3.6-5.5	Moderate------	0.37		
Sm----------------	0-18	2-15	1.40-1.50	2.0-6.0	0.14-0.16	4.5-6.0	Low-----------	0.28	5	.5-2
Smithdale	18-47	18-33	1.40-1.55	0.6-2.0	0.15-0.17	4.5-5.5	Low-----------	0.24		
	47-75	12-27	1.40-1.55	2.0-6.0	0.14-0.16	4.5-5.5	Low-----------	0.28		
Wp----------------	0-6	3-12	1.30-1.60	6.0-20	0.07-0.11	4.5-6.5	Low-----------	0.17	5	.5-2
Wolfpen	6-26	3-12	1.30-1.65	6.0-20	0.07-0.11	4.5-6.5	Low-----------	0.17		
	26-53	20-30	1.30-1.65	0.6-2.0	0.12-0.17	3.6-6.0	Low-----------	0.24		
	53-78	20-35	1.30-1.65	0.6-2.0	0.12-0.17	3.6-6.0	Low-----------	0.24		

TABLE 17.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Map symbol and soil name	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
An----------------- Angie	D	None---------	---	---	3.0-5.0	Apparent	Dec-Apr	High------	Moderate.
Bw----------------- Bowie	B	None---------	---	---	>6.0	---	---	Moderate	High.
Ca----------------- Cahaba	B	None---------	---	---	>6.0	---	---	Moderate	Moderate.
Db----------------- Darbonne	B	None---------	---	---	>6.0	---	---	Low-------	Moderate.
De, Dr------------- Darley	C	None---------	---	---	>6.0	---	---	High------	High.
Dy:									
Darley------------	C	None---------	---	---	>6.0	---	---	High------	High.
Sacul-------------	C	None---------	---	---	>6.0	---	---	High------	Moderate.
Ea, Ed------------- Eastwood	D	None---------	---	---	>6.0	---	---	High------	High.
Fe, Fo------------- Flo	A	None---------	---	---	>6.0	---	---	Low-------	Moderate.
Gn----------------- Guyton	D	None---------	---	---	0-1.5	Perched	Dec-May	High------	Moderate.
Go:									
Guyton------------	D	Frequent-----	Very brief to long.	Jan-Dec	0-1.5	Perched	Dec-May	High------	Moderate.
Ouachita----------	C	Frequent-----	Very brief to long.	Jan-Dec	>6.0	---	---	Moderate	Moderate.
Ha----------------- Harleston	C	None---------	---	---	2.0-3.0	Apparent	Nov-Mar	Moderate	High.
Io:									
Iuka--------------	C	Frequent-----	Very brief to brief.	Dec-Jun	1.0-3.0	Apparent	Dec-Apr	Moderate	High.
Dela--------------	B	Frequent-----	Very brief	Dec-Jun	3.0-5.0	Apparent	Dec-Apr	Moderate	Moderate.
La----------------- Larue	A	None---------	---	---	>6.0	---	---	Moderate	Moderate.
Ma, Mn------------- Mahan	C	None---------	---	---	>6.0	---	---	High------	High.
Mr----------------- McLaurin	B	None---------	---	---	>6.0	---	---	Low-------	Moderate.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
Re, Rp------------ Ruple	C	None--------	---	---	>6.0	---	---	High-----	High.
Sa, Sc, Sg, Sk---- Sacul	C	None--------	---	---	>6.0	---	---	High-----	Moderate.
Sm---------------- Smithdale	B	None--------	---	---	>6.0	---	---	Low------	Moderate.
Wp---------------- Wolfpen	A	None--------	---	---	4.0-6.0	Apparent	Dec-May	Moderate	High.

TABLE 18.--FERTILITY TEST DATA FOR SELECTED SOILS

[The symbol < means less than. Dashes indicate analyses not made. The soils are the same as the typical pedon for the series. For the description and location of each of the soils, see the section "Soil Series and Their Morphology"]

Soil name and sample number	Depth	Horizon	pH 1:1 H_2O	Organic matter content	Extractable P	Exchangeable cations: Ca	Mg	K	Na	Al	H	Extractable acidity	Cation-exchange capacity (sum)	Base saturation (sum)	Saturation: Effective cation-exchange capacity Al	Saturation: Sum of cation-exchange capacity Na
	In			Pct	Ppm	------Milliequivalents/100 grams of soil-----								Pct	Pct	Pct
Bowie fine sandy loam: (S82LA27-2)	0-7	Ap	5.1	1.52	9	0.6	0.1	0.1	<0.1	0.6	0.5	5.0	5.8	13.8	31.6	0.0
	7-13	E	5.2	0.41	13	0.3	0.1	<0.1	<0.1	1.0	0.0	2.5	2.9	13.8	71.4	0.0
	13-25	Bt	5.4	0.19	<5	1.5	1.4	0.1	<0.1	0.6	0.6	5.2	8.2	36.6	14.3	0.0
	25-35	Btv1	5.3	0.06	<5	0.9	2.6	0.1	<0.1	1.7	0.8	7.6	11.2	32.1	27.9	0.0
	35-63	Btv2	5.1	0.02	<5	0.2	2.2	0.1	<0.1	4.4	1.5	8.8	11.3	22.1	52.4	0.0
	63-75	Btv3	5.5	0.02	<5	<0.1	1.6	0.1	<0.1	8.5	0.3	14.4	16.1	10.6	81.0	0.0
Flo loamy fine sand: (S82LA27-6)	0-6	A	5.2	0.81	32	0.4	0.1	0.1	<0.1	0.7	0.2	2.9	3.5	17.1	46.7	0.0
	6-20	E1	5.9	0.02	31	0.5	0.1	<0.1	<0.1	0.2	0.2	1.1	1.7	35.3	20.0	0.0
	20-34	E2	5.8	0.02	24	0.5	0.1	<0.1	<0.1	0.1	0.2	1.1	1.7	35.3	11.1	0.0
	34-55	Bw	5.7	0.02	21	0.7	0.1	0.1	<0.1	0.1	0.2	0.7	1.6	56.3	8.3	0.0
	55-62	Bw	5.8	0.02	22	1.0	0.3	<0.1	<0.1	0.1	0.1	1.1	2.4	54.2	6.7	0.0
	62-75	Bt1	5.6	0.02	19	2.3	1.1	0.1	0.1	0.1	0.1	1.8	5.4	66.7	5.1	1.9
	75-80	Bt2	---	---	---	0.3	2.4	0.1	0.1	---	---	11.5	14.4	20.1	---	0.7
	80-85	B/E1	---	---	---	0.4	5.3	0.4	0.1	---	---	27.4	33.6	18.5	---	0.3
	85-95	B/E2	---	---	---	1.6	2.9	0.3	0.1	---	---	23.0	27.9	17.6	---	0.4
Harleston fine sandy loam: (S85LA27-4)	0-4	A	4.6	2.09	5	1.7	0.3	0.0	0.0	0.8	0.4	7.2	9.2	21.7	25.6	0.0
	4-13	E	4.3	0.68	5	0.8	0.2	0.0	0.0	1.2	0.0	2.6	3.6	27.8	55.2	0.0
	13-19	BE	4.1	0.19	5	0.7	0.5	0.0	0.0	1.4	0.5	2.2	3.4	35.3	45.6	0.0
	19-29	Bt1	3.9	0.15	5	0.4	0.9	0.1	0.0	2.8	0.2	5.0	6.4	21.9	64.7	0.0
	29-39	Bt2	3.9	0.01	5	0.3	0.6	0.1	0.0	3.0	0.3	5.3	6.3	15.9	69.4	0.0
	39-47	Bt3	4.0	0.06	5	0.3	0.4	0.1	0.0	2.4	0.2	3.4	4.2	19.0	72.5	0.0
	47-81	Bt4	4.1	0.06	5	0.3	1.7	0.2	1.4	8.8	0.7	12.7	16.3	22.1	67.6	8.4
Larue loamy fine sand: (S82LA27-3)	0-4	A	5.2	1.16	<5	0.6	0.1	0.1	<0.1	0.5	0.2	4.0	4.8	16.7	33.3	0.0
	4-14	E1	5.7	0.19	<5	0.5	0.1	0.1	<0.1	0.2	0.2	1.4	2.1	33.3	18.2	0.0
	14-24	E2	5.8	0.10	<5	0.5	0.1	0.1	<0.1	0.2	0.1	1.4	2.1	33.3	20.0	0.0
	24-36	Bt1	5.5	0.02	<5	2.9	1.0	0.2	0.1	0.6	0.5	4.3	8.5	49.4	11.3	1.2
	36-51	Bt2	5.5	0.06	<5	4.3	1.6	0.2	0.1	0.5	0.3	4.7	10.9	56.9	7.1	0.9
	51-62	Bt3	5.6	0.02	<5	4.1	1.5	0.2	0.1	0.2	0.4	4.0	9.9	59.6	3.1	1.0
	62-86	BC	5.7	0.10	<5	2.9	2.2	0.2	<0.1	0.2	0.2	4.0	9.3	57.0	3.5	0.0

TABLE 19.--PHYSICAL TEST DATA FOR SELECTED SOILS

[Dashes indicate analyses not made]

Soil name and sample number	Horizon	Depth	Particle-size distribution: Sand: Very coarse (2-1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Coarse fraction: (2-5 mm)	(5-20 mm)	(20-75 mm)	Water content: 1/3 bar	15 bar	Water retention	Bulk density: Air-dry	Oven-dry	Field moist
		In	Pct								Pct <75mm			Pct (wt)			G/gm		
Darbonne loamy fine sand: 1/ (S84LA027-4)	A	0-5	0.0	1.8	5.3	61.0	5.1	73.2	22.6	4.2	5.1	10.2	1.4	15.5	6.0	9.5	---	1.10	---
	BE	5-13	0.0	0.7	2.0	63.5	5.8	72.0	24.7	3.3	3.3	4.3	0.9	10.5	3.1	7.4	1.75	1.76	1.75
	Bt1	13-23	0.0	0.6	2.1	56.8	4.3	63.8	25.2	11.0	5.3	7.8	2.0	15.0	5.2	9.8	1.85	1.86	1.84
	Bt2	23-35	0.0	2.1	3.2	44.9	3.0	53.2	20.3	26.5	10.4	20.7	23.9	24.3	11.6	12.7	1.84	1.88	1.83
	Bt3	35-45	0.0	3.3	3.8	50.6	3.5	61.2	15.6	23.2	9.3	10.4	31.7	20.9	11.3	9.6	1.80	1.82	1.76
	B/C1	45-57	0.0	4.0	4.7	49.5	3.3	61.5	15.8	22.7	---	---	---	22.3	12.1	10.2	1.67	1.69	1.61
	B/C2	57-70	0.0	1.8	4.1	58.6	2.8	67.3	9.9	22.8	---	---	---	25.6	11.6	14.0	1.69	1.72	1.58
Darley gravelly loamy fine sand: 1/ (S84LA027-4)	Ap	0-4	0.0	0.7	2.1	67.1	5.7	75.6	19.1	5.3	5.0	6.5	13.5	12.0	4.9	7.1	1.54	1.58	1.54
	E	4-14	0.0	0.3	1.0	65.6	5.9	72.8	21.1	6.1	4.0	6.9	12.8	10.8	3.7	7.1	1.60	1.61	1.60
	Bt1	14-24	0.0	0.2	1.4	40.8	1.4	45.6	5.6	48.8	---	0.2	---	29.3	18.9	10.4	1.54	1.55	1.54
	Bt2	24-35	0.0	0.2	0.9	43.5	2.5	47.1	5.6	47.3	---	---	---	29.0	20.0	9.0	1.68	1.72	1.57
	Bt/Bsm	35-60	0.0	2.9	4.1	33.0	3.8	43.8	16.9	39.3	5.9	0.8	11.3	32.5	19.8	12.7	1.58	1.62	1.57
	BC	60-81	0.0	1.3	1.8	71.2	3.1	77.4	6.7	15.1	---	---	---	13.7	7.8	5.9	1.59	1.61	1.58
Dela loamy fine sand: 1/ (S83LA027-6)	Ap	0-4	<0.1	0.2	1.3	65.0	14.6	81.2	11.8	7.0	---	---	---	35.1	5.0	30.1	1.50	1.51	1.46
	C1	4-10	<0.1	0.2	1.4	54.6	17.9	74.2	17.0	8.8	---	---	---	31.6	4.8	26.8	1.60	1.61	1.56
	C2	10-16	<0.1	0.1	0.7	46.8	19.3	67.0	23.3	9.7	---	---	---	31.2	5.0	26.2	1.61	1.63	1.59
	C3	16-25	0.0	<0.1	1.1	59.6	14.0	74.7	17.8	7.5	---	---	---	28.1	3.9	22.2	1.63	1.65	1.57
	C4	25-32	0.0	<0.1	0.8	37.2	16.7	54.7	31.8	13.5	---	---	---	33.6	7.1	26.5	1.57	1.59	1.52
	C5	32-60	0.0	0.0	0.3	37.3	18.2	55.8	27.6	16.6	---	---	---	33.7	7.4	26.3	1.52	1.58	1.42
Flo loamy fine sand: 1/ (S83LA027-1)	A	0-8	0.1	0.5	17.6	67.1	2.7	88.0	9.1	2.9	---	---	---	10.4	2.0	8.4	---	---	1.25
	E1	8-18	0.0	0.2	16.4	67.5	2.3	86.4	10.3	3.3	---	---	---	8.3	1.6	6.7	---	---	1.40
	E2	18-28	0.0	0.2	19.1	64.9	1.9	86.1	10.0	3.9	---	---	---	8.2	1.7	6.5	---	---	1.35
	Bw1	28-39	0.0	0.2	19.4	65.2	1.5	86.3	9.5	4.2	---	---	---	7.4	1.3	6.1	---	---	1.25
	Bw2	39-55	0.0	0.2	23.7	64.4	1.5	89.8	5.9	4.3	---	---	---	6.4	1.3	5.1	---	---	1.45
	Bt	55-74	0.0	0.3	23.2	63.1	1.3	87.8	0.7	11.5	---	---	---	15.6	4.6	11.0	---	---	1.38
Guyton silt loam: 1/ (S84LA027-1)	A	0-4	0.0	0.0	3.0	16.5	18.5	38.0	55.6	6.4	---	---	---	34.2	8.5	25.7	1.39	1.42	1.32
	Eg1	4-12	0.0	0.0	1.9	14.0	15.5	31.4	63.1	5.5	---	---	---	26.0	5.1	20.9	1.59	1.60	1.53
	Eg2	12-20	0.0	0.0	1.3	13.0	14.1	28.4	58.2	13.4	---	---	---	28.9	7.4	21.5	1.62	1.65	1.54
	E/B	20-30	0.0	0.0	0.7	9.1	10.3	20.1	53.8	26.1	---	---	---	31.5	17.3	14.2	1.64	1.66	1.51
	B/E1	30-40	0.0	0.0	0.6	7.8	10.7	19.1	52.9	28.1	---	---	---	33.2	15.3	17.9	1.76	1.80	1.57
	B/E2	40-51	0.0	0.0	0.6	6.3	9.3	16.2	59.2	24.6	---	---	---	33.2	15.4	17.8	1.70	1.75	1.60
	Btg	51-75	0.0	0.0	0.4	4.8	6.7	11.9	67.2	20.9	---	---	---	32.5	15.0	17.5	1.75	1.79	1.69

TABLE 19.--PHYSICAL TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Particle-size distribution: Sand: Very coarse (2-1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Coarse fraction: (2-5 mm)	(5-20 mm)	(20-75 mm)	Water content: 1/3 bar	15 bar	Water retention	Bulk density: Air-dry	Oven-dry	Field moist
		In	Pct								Pct <75mm			Pct (wt)			G/gm		
Mahan fine sandy loam: 1/ (S83LA027-5)	Ap	0-5	4.4	2.0	4.2	57.3	8.3	76.2	17.4	6.4	24.7	---	---	15.1	8.8	6.3	1.73	1.79	1.72
	Bt1	5-13	1.9	1.3	2.1	43.1	3.9	53.3	10.9	35.8	6.2	---	---	29.4	20.0	9.4	1.56	1.65	1.49
	Bt1	13-21	3.0	1.6	1.8	40.5	3.1	50.0	9.8	40.2	2.8	---	---	33.3	21.3	12.0	1.54	1.54	1.47
	Bt2	21-35	3.5	1.6	2.0	44.5	3.4	55.0	10.1	34.9	9.5	---	---	30.8	14.9	15.9	1.53	1.54	1.47
	Bt3	35-50	2.9	1.8	1.7	52.8	3.4	62.6	6.4	31.0	16.0	---	---	27.2	14.0	13.2	1.65	1.66	1.63
	BC	50-59	3.9	2.3	1.8	51.6	3.9	63.5	7.0	29.5	17.5	---	---	24.0	13.5	10.5	1.64	1.65	1.61
	C	59-76	5.6	2.1	1.3	44.9	5.1	59.0	10.6	30.4	3.4	---	---	25.4	13.1	12.3	1.68	1.69	1.60
	C	76-82	1.3	0.6	0.4	51.5	4.6	58.4	10.0	31.6	---	---	---	25.8	13.8	12.0	1.70	1.71	1.59
McLaurin loamy fine sand: 3/ (S83LA027-3)	A	0-3	0.4	1.0	3.7	32.9	23.2	61.2	34.4	4.4	0.4	---	---	14.3	3.2	11.1	1.63	1.63	1.50
	E	3-11	0.2	0.2	3.0	33.4	22.5	59.3	34.7	6.0	0.2	---	---	14.4	2.4	12.0	1.71	1.72	1.64
	BE	11-16	0.1	0.2	2.6	30.0	20.9	53.8	36.2	10.0	---	---	---	17.5	3.9	13.6	1.67	1.67	1.63
	Bt1	16-27	0.1	0.2	2.2	25.7	17.3	45.5	31.9	22.6	0.2	---	---	23.5	8.8	14.7	1.75	1.77	1.66
	Bt2	27-35	0.2	2.2	2.4	27.5	18.7	49.0	32.3	18.7	0.3	---	---	22.9	7.4	15.5	1.78	1.79	1.75
	B/E	35-44	0.4	0.2	2.8	32.7	21.1	57.2	29.5	13.2	---	---	---	17.4	5.1	12.3	1.90	1.90	1.82
	B't1	44-55	0.3	0.2	2.8	31.2	17.8	52.3	25.4	22.3	---	---	---	24.5	8.4	16.1	1.75	1.75	1.68
	B't2	55-73	0.0	0.0	3.4	43.3	15.0	61.7	11.8	26.5	---	---	---	25.6	10.9	14.7	1.80	1.80	1.75
	B't3	73-81	0.0	<0.1	6.0	56.7	7.3	70.1	26.3	26.4	---	---	---	21.4	9.9	11.5	1.79	1.79	1.75
Sacul very fine sandy loam: 1/ (S83LA027-4)	A	0-2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	E	2-7	3.2	2.5	1.9	18.9	48.1	74.6	21.0	4.4	20.3	---	---	16.4	3.6	12.8	1.61	1.61	1.51
	Bt1	7-17	1.4	0.7	0.6	6.9	28.2	37.8	7.6	54.6	0.2	---	---	42.8	19.6	23.2	1.71	1.71	1.38
	Bt2	17-23	0.6	0.2	0.2	17.9	28.2	47.1	9.7	43.2	---	---	---	40.7	17.8	22.9	1.63	1.67	1.43
	Bt3	23-33	0.8	0.3	0.2	13.2	30.5	45.0	5.4	49.6	---	---	---	33.9	15.3	18.6	1.73	1.73	1.59
	Bt4	33-45	0.6	0.3	0.2	18.3	27.7	47.1	10.1	42.8	---	---	---	34.5	19.9	14.6	1.74	1.75	1.63
	Bt5	45-52	0.4	0.2	0.3	13.3	20.1	34.3	14.9	50.8	---	---	---	35.3	24.4	10.9	1.70	1.71	1.57
	BC	52-57	0.2	0.1	0.1	39.6	29.1	69.1	5.3	25.6	---	---	---	23.1	15.9	7.2	1.67	1.67	1.62
	C1	57-69	1.2	0.3	0.2	19.1	18.5	39.3	20.9	39.8	---	---	---	20.3	20.3	0.0	1.70	1.70	1.61
	C2	69-80	1.0	0.8	0.7	18.1	26.1	46.7	16.1	37.2	6.5	---	---	32.7	20.7	10.0	1.78	1.78	1.48

TABLE 19.--PHYSICAL TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Particle-size distribution: Sand: Very coarse (2-1 mm)	Sand: Coarse (1-0.5 mm)	Sand: Medium (0.5-0.25 mm)	Sand: Fine (0.25-0.1 mm)	Sand: Very fine (0.1-0.05 mm)	Sand: Total (2-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Coarse fraction: (2-5 mm)	Coarse fraction: (5-20 mm)	Coarse fraction: (20-75 mm)	Water content: 1/3 bar	Water content: 15 bar	Water content: Water retention	Bulk density: Air-dry	Bulk density: Oven-dry	Bulk density: Field moist
		In	Pct								Pct <75mm			Pct (wt)			G/gm		
Wolfpen loamy fine sand: 1/ (S84LA027-2)	Ap	0-6	0.0	3.2	51.9	26.5	3.7	85.3	12.5	2.2	---	---	---	7.4	2.4	5.0	---	1.29	---
	E1	6-18	0.0	2.1	48.4	26.1	3.1	79.7	17.4	2.9	---	---	---	7.6	4.0	3.6	---	1.53	---
	E2	18-26	0.0	1.8	46.8	25.9	3.4	77.9	19.0	3.1	---	---	---	8.4	4.2	4.2	---	1.55	---
	B/E	26-38	0.0	3.0	38.1	17.7	2.8	61.6	17.3	21.1	---	---	---	20.6	10.3	10.3	1.89	1.92	1.74
	Bt1	38-53	0.0	2.6	38.0	16.3	2.5	59.4	14.1	26.5	---	---	---	20.8	12.2	8.6	1.89	1.92	1.77
	Bt2	53-69	0.0	3.0	47.0	17.7	2.6	70.3	10.2	19.5	---	---	---	16.8	9.9	6.9	1.91	1.95	1.79
	BC	69-78	0.0	2.9	49.1	19.2	2.8	74.0	12.3	13.7	---	---	---	12.6	9.1	3.5	1.92	1.94	1.84

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 Flo pedon is 2,500 feet north and 3,204 feet east of the southwest corner of sec. 3, T. 23 N., R. 4 W.

3/ This McLaurin pedon is 6.25 miles east of Summerfield, 4.4 miles southeast of Highway 9 and U.S. Forest Service road, 20 feet west of logging road, SW1/4SE1/4 sec. 12, T. 22 N., R. 4 W. This pedon averages about 0.8 percent more clay in the control section than allowed by the McLaurin series. This is considered to be within the range of normal laboratory error.

TABLE 20.--CHEMICAL TEST DATA FOR SELECTED SOILS

[The symbol < means less than. Dashes indicate analyses not made]

Soil name and sample number	Horizon	Depth	Extractable cations: Ca	Extractable cations: Mg	Extractable cations: K	Extractable cations: Na	Extractable acidity	Cation-exchange capacity (NH4OAc)	Base saturation (NH4OAc)	Sum cation-exchange capacity	Sum base saturation	Extractable aluminum	Extractable hydrogen	Effective cation-exchange capacity Al	Clay ratio: Cation-exchange capacity	Clay ratio: 15 bar water	Organic matter	pH 1:1 H_2O	pH 1:1 KCl	pH 1:2 $CaCl_2$	Extractable iron	Extractable phosphorus: Bray 1	Extractable phosphorus: Bray 2
		In	Meq/100g				Pct	Pct		Meq/100g	Pct	Meq/100g		Pct			Pct				Pct	ppm	
Darbonne loamy fine sand: 1/ (S84LA027-4)	A	0-5	3.3	1.9	0.5	0.2	4.7	10.5	55.2	10.6	55.7	0.0	0.0	0	2.50	1.43	2.24	6.2	5.4	5.7	0.40	<1.0	3.0
	BE	5-13	2.2	1.3	0.2	0.2	3.6	7.4	52.7	7.5	52.0	0.0	0.0	0	2.20	0.94	0.45	6.2	4.7	5.3	0.41	3.0	10.0
	Bt1	13-23	2.5	1.6	0.2	0.2	4.0	8.0	56.3	8.5	52.9	0.0	0.0	0	0.73	0.47	0.52	5.6	4.2	5.0	0.77	<1.0	3.0
	Bt2	23-35	2.2	1.8	0.2	0.2	9.0	10.8	40.7	7.8	56.4	0.0	0.0	4	0.27	0.44	0.43	5.2	3.9	4.5	1.78	<1.0	3.0
	Bt3	35-45	2.2	1.4	0.2	0.2	4.6	7.6	52.6	8.6	46.5	0.0	0.0	0	0.34	0.49	0.26	5.4	4.9	4.8	3.12	<1.0	3.0
	B/C1	45-57	2.2	1.6	0.2	0.2	5.3	7.6	55.2	9.5	44.2	0.0	0.0	0	0.33	0.53	0.21	5.5	5.0	5.0	3.40	2.0	7.0
	B/C2	57-70	2.2	1.9	0.2	0.2	7.6	8.4	53.5	11.3	32.7	0.0	0.0	0	0.37	0.51	0.19	5.3	4.3	4.5	2.05	2.0	7.0
Darley gravelly loamy fine sand: 1/ (S84LA027-3)	Ap	0-4	1.2	2.4	0.2	0.1	6.8	10.1	38.6	10.7	36.4	0.4	0.1	9	1.90	0.92	1.25	5.4	4.1	4.5	0.44	<1.0	3.0
	E	4-14	0.2	0.4	0.1	0.1	1.3	1.9	42.0	2.1	38.1	0.4	0.1	31	0.31	0.61	0.47	5.2	4.0	4.2	0.50	2.0	7.0
	Bt1	14-24	0.3	0.1	<0.1	0.1	9.6	9.8	5.1	10.1	5.0	1.8	0.2	72	0.20	0.39	0.63	5.0	3.6	4.2	2.24	<1.0	3.0
	Bt2	24-35	1.2	0.5	0.1	0.1	12.6	13.2	14.4	13.8	8.7	3.1	0.1	70	0.28	0.42	0.50	5.0	3.6	4.1	3.44	<1.0	3.0
	Bt/Bsm	35-60	1.5	0.2	<0.1	0.1	13.4	14.4	12.5	14.1	5.0	5.0	0.2	85	0.36	0.50	0.12	4.6	3.5	3.8	5.37	<1.0	<1.0
	BC	60-81	<0.1	0.1	<0.1	0.1	4.6	---	4.8	5.1	11.8	2.3	0.2	74	0.28	0.49	0.11	4.6	3.6	3.8	1.76	2.0	7.0
Dela loamy fine sand: 1/ 2/ (S83LA027-6)	Ap	0-4	2.4	0.5	<0.1	<0.1	5.3	4.3	67.0	8.2	35.4	0.0	0.1	0	0.61	0.17	1.12	5.8	4.8	5.1	0.79	---	8.5
	C1	4-10	2.7	0.5	<0.1	<0.1	3.1	3.7	86.0	6.3	50.8	0.0	0.1	0	0.46	0.54	0.28	6.4	5.3	5.7	0.90	---	<0.1
	C2	10-16	2.2	0.6	<0.1	<0.1	3.1	4.9	57.0	5.9	47.5	0.0	0.1	0	0.50	0.52	0.07	6.5	5.3	5.7	0.81	---	<0.1
	C3	16-25	1.4	0.4	<0.1	<0.1	3.7	3.6	50.0	5.5	32.7	0.0	0.1	0	0.48	0.52	<0.01	5.9	4.8	5.2	0.80	---	<0.1
	C4	25-32	2.2	0.8	<0.1	<0.1	5.3	6.3	47.0	8.3	36.1	0.1	0.1	2	0.47	0.53	<0.01	5.6	4.4	4.8	1.75	---	<0.1
	C5	32-60	1.3	0.9	<0.1	<0.1	7.4	8.6	25.0	9.6	22.9	1.9	0.5	38	0.52	0.45	<0.01	5.0	3.9	4.3	1.43	---	2.3
Flo loamy fine sand: 3/ (S83LA027-1)	A	0-8	1.3	<0.1	<0.1	<0.1	3.1	1.8	72.0	4.4	29.5	0.4	0.2	21	0.62	0.69	0.32	5.0	4.1	4.3	0.09	---	43.0
	E1	8-18	0.4	0.6	<0.1	<0.1	3.1	1.4	42.0	4.1	24.4	0.0	0.1	0	0.42	0.48	<0.01	5.8	4.5	5.0	0.09	---	36.8
	E2	18-28	0.3	<0.1	<0.1	<0.1	1.1	1.7	17.0	1.4	21.4	0.1	0.1	8	0.43	0.44	<0.01	5.6	4.4	4.7	0.11	---	28.2
	Bw1	28-39	0.4	0.1	<0.1	<0.1	1.0	1.3	38.0	1.5	33.3	0.1	0.1	14	0.31	0.31	<0.01	5.5	4.3	4.7	0.12	---	22.0
	Bw2	39-55	0.7	0.5	0.1	<0.1	1.0	5.6	23.0	2.3	56.5	0.1	0.0	7	0.30	0.30	<0.01	5.6	4.3	4.6	0.11	---	18.3
	Bt	55-74	1.6	0.6	0.1	<0.1	1.0	3.5	65.0	3.3	69.7	0.1	0.1	4	0.30	0.40	<0.01	5.6	4.2	4.7	0.18	---	27.0

See footnotes at end of table.

TABLE 20.--CHEMICAL TEST DATA FOR SELECTED SOILS--Continued

Soil and sample number	Horizon	Depth	Extractable cations: Ca	Extractable cations: Mg	Extractable cations: K	Extractable cations: Na	Extractable acidity	Cation-exchange capacity (NH4OAc)	Base saturation (NH4OAc)	Sum cation-exchange capacity	Sum base saturation	Extractable aluminum	Extractable hydrogen	Effective cation-exchange capacity Al	Clay ratio: Cation-exchange capacity	Clay ratio: 15 bar water	Organic matter	pH 1:1 H_2O	pH 1:1 KCl	pH 1:2 $CaCl_2$	Extractable iron	Extractable phosphorus Bray 1	Extractable phosphorus Bray 2
		In	Meq/100g				Pct	Pct		Meq /100g	Pct	Meq/100g		Pct			Pct				Pct	ppm	
Guyton silt loam: 1/ (S84LA027-1)	A	0-4	2.7	0.6	0.1	0.1	12.6	11.8	29.7	16.1	21.7	0.7	0.0	17	1.72	1.30	2.07	4.7	3.4	3.9	0.10	1.0	7.0
	Eg1	4-12	0.6	0.4	<0.1	0.2	6.8	7.5	16.0	7.8	12.8	2.2	0.8	55	1.36	0.93	0.49	4.4	3.2	3.6	0.05	<1.0	<1.0
	Eg2	12-20	1.8	1.0	<0.1	0.2	8.6	9.9	30.3	11.6	25.9	3.2	0.4	48	0.74	0.56	0.31	4.1	3.1	3.7	0.06	<1.0	3.0
	E/B	20-30	5.4	2.8	0.1	0.4	10.8	17.3	50.3	19.5	44.6	3.7	0.2	29	0.66	0.66	0.17	3.7	2.9	3.7	0.13	<1.0	3.0
	B/E1	30-40	7.5	3.2	0.1	0.7	9.7	18.5	62.2	21.2	54.2	1.9	0.6	13	0.66	0.55	0.17	3.7	2.9	3.7	0.22	<1.0	3.0
	B/E2	40-51	8.9	2.3	0.1	0.5	8.1	15.8	74.7	19.9	59.3	1.3	0.4	10	0.64	0.63	0.10	3.7	3.0	3.7	0.14	<1.0	<1.0
	Btg	51-75	12.6	2.3	0.1	1.1	7.2	13.3	121.1	23.3	69.1	0.8	0.4	5	0.64	0.72	0.01	3.7	3.1	3.7	0.11	<1.0	<1.0
Mahan fine sandy loam: 1/ (S83LA027-5)	Ap	0-5	1.2	0.4	<0.1	<0.1	5.3	7.6	21.0	6.9	23.0	0.2	0.4	8	1.18	0.86	1.78	5.4	4.5	4.7	3.17	---	2.1
	Bt1	5-13	0.8	1.6	0.1	<0.1	9.7	12.2	20.0	12.2	20.0	2.1	0.2	43	0.34	0.61	0.83	5.2	4.1	4.4	3.20	---	<0.1
	Bt1	13-21	0.1	1.6	0.1	<0.1	9.7	8.6	21.0	8.6	15.0	2.8	0.4	55	0.21	0.40	<0.01	5.0	4.0	4.4	3.91	---	1.1
	Bt2	21-35	0.1	1.2	<0.1	<0.1	8.8	11.4	10.0	11.4	12.0	2.7	0.1	63	0.33	0.77	<0.01	5.3	4.0	4.3	3.67	---	<0.1
	Bt3	35-50	<0.1	1.3	0.1	<0.1	7.4	10.9	12.0	10.9	15.0	2.8	0.5	57	0.35	0.79	<0.01	5.2	3.9	4.3	3.39	---	7.0
	BC	50-59	<0.1	0.7	<0.1	<0.1	6.5	7.6	9.0	7.6	9.0	2.1	0.2	64	0.26	0.56	<0.01	5.2	4.0	4.3	3.44	---	<0.1
	C	59-76	<0.1	0.6	<0.1	<0.1	7.7	2.9	20.0	2.9	7.0	4.1	0.5	75	0.10	0.22	<0.01	5.0	3.8	4.1	1.87	---	<0.1
	C	76-82	<0.1	0.6	0.1	<0.1	8.5	12.0	5.0	12.0	7.0	6.5	0.4	83	0.38	0.87	<0.01	4.8	3.7	3.9	1.10	---	<0.1
McLaurin loamy fine sand: 4/ (S83LA027-3)	A	0-3	0.2	0.1	<0.1	<0.1	5.3	4.5	6.0	5.6	5.4	0.8	0.3	57	1.02	0.73	0.73	5.0	4.0	4.1	0.14	---	<0.1
	E	3-11	0.3	0.1	<0.1	<0.1	2.1	1.8	22.0	2.5	16.0	0.4	0.2	40	0.30	0.40	<0.01	5.2	4.3	4.4	0.18	---	<0.1
	BE	11-16	1.1	0.3	<0.1	<0.1	3.1	3.6	38.0	4.5	31.1	0.4	0.1	21	0.36	0.39	<0.01	5.5	4.3	4.6	0.35	---	<0.1
	Bt1	16-27	3.0	1.1	0.1	<0.1	5.9	8.2	51.0	10.1	41.6	0.7	0.4	13	0.36	0.39	<0.01	5.2	4.1	4.6	0.76	---	<0.1
	Bt2	27-35	1.8	1.0	0.1	<0.1	4.8	7.1	40.0	7.7	37.7	1.2	0.5	26	0.38	0.40	<0.01	5.3	4.0	4.4	0.63	---	<0.1
	B/E	35-44	0.8	0.6	<0.1	<0.1	3.2	4.8	29.0	4.6	30.4	1.1	0.5	37	0.36	0.38	<0.01	5.3	4.0	4.3	0.50	---	<0.1
	B't1	44-55	0.9	1.1	<0.1	<0.1	6.4	6.9	28.0	8.4	23.8	2.8	0.3	62	0.31	0.38	1.73	4.9	3.8	4.2	0.76	---	<0.1
	B't2	55-73	0.4	1.0	<0.1	<0.1	7.4	7.0	20.0	8.8	15.9	4.0	0.5	68	0.26	0.41	<0.01	5.0	3.8	4.1	0.68	---	<0.1
	B't3	73-81	0.2	0.7	<0.1	<0.1	7.4	7.2	12.0	8.3	10.8	4.3	0.3	77	0.27	0.38	<0.01	5.2	3.7	4.0	0.67	---	<0.1
Sacul very fine sandy loam: 1/ (S83LA027-4)	A	0-2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	E	2-7	0.7	0.3	0.1	<0.1	4.2	7.2	15.0	5.3	20.0	1.0	0.7	34	1.64	0.82	1.73	4.9	3.9	4.1	0.55	---	1.0
	Bt1	7-17	1.9	5.8	0.7	<0.1	16.0	22.0	33.0	23.4	31.0	6.8	0.6	43	0.40	0.36	0.16	4.9	3.8	4.3	1.28	---	12.8
	Bt2	17-23	0.3	3.0	0.5	<0.1	17.5	20.6	18.0	21.3	17.0	10.5	0.0	73	0.48	0.41	<0.01	4.7	3.6	4.1	1.31	---	<0.1
	Bt3	23-33	<0.1	1.9	0.3	<0.1	18.6	18.0	12.0	20.8	10.0	12.6	0.2	98	0.36	0.31	<0.01	4.7	3.6	3.9	1.38	---	<0.1
	Bt4	33-45	<0.1	1.4	0.2	<0.1	18.7	21.5	7.0	20.3	7.0	12.7	0.5	85	0.50	0.46	<0.01	4.5	3.5	3.8	1.25	---	<0.1
	Bt5	45-52	<0.1	1.6	0.2	<0.1	23.9	27.1	6.0	25.7	7.0	17.9	0.8	86	0.53	0.48	<0.01	4.3	3.4	3.7	1.03	---	<0.1
	BC	52-57	<0.1	0.7	<0.1	<0.1	11.1	12.0	5.0	11.8	5.0	8.3	0.5	85	0.47	0.62	<0.01	4.5	3.5	3.8	0.94	---	<0.1
	C1	57-69	<0.1	1.0	0.1	<0.1	18.5	19.8	5.0	19.6	5.0	12.8	0.4	88	0.50	0.51	<0.01	4.3	3.4	3.6	0.68	---	<0.1
	C2	69-80	<0.1	0.9	0.2	<0.1	18.6	16.2	6.0	19.7	5.0	12.6	0.6	87	0.44	0.56	<0.01	4.2	3.3	3.6	1.51	---	1.1

See footnotes at end of table.

TABLE 20.--CHEMICAL TEST DATA FOR SELECTED SOILS--Continued

Soil and sample number	Horizon	Depth	Extractable cations: Ca	Extractable cations: Mg	Extractable cations: K	Extractable cations: Na	Extractable acidity	Cation-exchange capacity (NH4OAc)	Base saturation (NH4OAc)	Sum cation-exchange capacity	Sum base saturation	Extractable aluminum	Extractable hydrogen	Effective cation-exchange capacity Al	Clay ratio: Cation-exchange capacity	Clay ratio: 15 bar water	Organic matter	pH 1:1 H_2O	pH 1:1 KCl	pH 1:2 $CaCl_2$	Extractable iron	Extractable phosphorus: Bray 1	Extractable phosphorus: Bray 2
		In	Meq/100g	Meq/100g	Meq/100g	Meq/100g	Pct	Pct	Pct	Meq/100g	Pct	Meq/100g	Meq/100g	Pct			Pct				Pct	ppm	ppm
Wolfpen loamy fine sand: 1/ (S84LA027-2)	Ap	0-6	0.5	0.1	<0.1	0.1	3.6	3.8	18.4	4.3	16.3	0.4	0.1	33	1.73	1.09	0.55	5.2	3.8	4.2	0.06	22.0	43.0
	E1	6-18	0.4	0.1	<0.1	0.1	2.9	3.4	17.6	3.5	17.1	0.3	0.2	27	1.17	1.38	0.01	5.5	4.1	4.5	0.07	3.0	10.0
	E2	18-26	0.3	0.1	<0.1	0.1	2.5	2.6	19.2	3.0	16.7	0.2	0.3	20	0.84	1.35	0.01	5.3	4.0	4.3	0.08	3.0	10.0
	B/E	26-38	2.3	1.5	0.2	0.1	6.1	8.0	51.3	10.2	40.2	3.6	0.2	46	0.38	0.49	0.01	5.2	3.8	4.5	0.60	<1.0	3.0
	Bt1	38-53	2.3	1.5	0.2	0.1	9.0	9.4	43.6	13.1	31.3	1.8	0.5	35	0.35	0.46	0.01	5.1	3.5	4.1	0.72	<1.0	<1.0
	Bt2	53-69	0.5	0.1	<0.1	0.1	4.8	5.4	12.7	5.5	12.7	2.8	0.4	70	0.28	0.51	0.01	4.9	3.4	3.9	0.56	<1.0	<1.0
	BC	69-78	2.1	1.6	0.2	0.1	6.1	6.6	60.6	10.1	39.6	1.9	0.3	68	0.48	0.66	0.01	4.8	3.5	3.8	0.36	2.0	7.0

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 Dela pedon is a taxadjunct to the Dela series because it has a very strongly acid C5 horizon. Typically, soils of the Dela series range from strongly acid to slightly acid throughout the profile.

3/ This Flo pedon is 2,500 feet north and 3,204 feet east of the southwest corner of sec. 3, T. 23 N., R. 4 W.

4/ This McLaurin pedon is 6.25 miles east of Summerfield, 4.4 miles southeast of Highway 9 and U.S. Forest Service road, 20 feet west of logging road, SW1/4SE1/4 sec. 12, T. 22 N., R. 4 W. This McLaurin pedon averages about 0.8 percent more clay in the control section than allowed by the McLaurin series. This is considered to be within the range of normal laboratory error.

TABLE 21.--MINERALOGY DATA OF VERY FINE SAND, SILT, AND CLAY FRACTIONS OF SELECTED SOILS

[The symbol > means greater than. The symbol < means less than. TR means trace]

Soil name and sample number	Depth	Horizon	Very fine sand and silt fraction 1/	Clay fraction 1/
			100-50, 50-2.0	0.2-2.0
	In		Microns	Microns
Darbonne loamy fine sand: 2/ (S84LA027-4)	25-35	Bt1	Q: 70; FeOx: 25; OU: 5	
	35-45	Bt2	Q: 70; FeOx: 25; OU: 5	
Darley gravelly loamy fine sand: 2/ (S84LA027-3)	14-24	Bt1		K: >60; Int: 15-25; Sm: TR; Mic: TR
	24-35	Bt2		K: >60; Int: 15-25; Sm: TR; Mic: TR
Dela loamy fine sand: 2/ (S83LA027-6)	4-10	C1	Q: 90-95; FeOx: 1-2; F: 2-4; Mic: 2-3; OU: 2-3	
	10-16	C2	Q: 90-95; FeOx: 1-2; F: 2-4; Mic: 2-3; OU: 2-3	
Flo loamy fine sand: 3/ (S83LA027-1)	39-55	Bw2	Q: >95; FeOx: 1-3; F: <3; Mic: <3	
	55-74	Bt	Q: >95; FeOx: 1-3; F: <3; Mic: <3	
Guyton silt loam: 2/ (S84LA027-1)	12-20	Eg2	Q: >90; F: <5; Mic: <5; FeOx: <5; OU: <5	
	20-30	E/B	Q: >90; F: <5; Mic: <5; FeOx: <5; OU: <5	
	30-40	B/E1	Q: >90; F: <5; Mic: <5; FeOx: <5; OU: <5	
Mahan fine sandy loam: 2/ (S83LA027-5)	5-21	Bt1		K: 80-90; Mic: TR; V: TR; Int: <10
	21-35	Bt2		K: 80-90; Mic: TR; V: TR; Int: <10
McLaurin loamy fine sand: 4/ (S83LA027-3)	16-27	Bt1	Q: 95; FeOx: 1-3; Mic: 2; F: 1-2	
	27-35	Bt2	Q: 95; FeOx: 1-3; Mic: 2; F: 1-2	
Sacul very fine sandy loam: 2/ (S83LA027-3)	7-17	Bt1		K: 65-70; Mic: 10; Sm: 15; Int: 5-10
	17-23	Bt2		K: 65-70; Mic: 10; Sm: 15; Int: 5-10
	23-33	Bt3		K: 65-70; Mic: 10; Sm: 15; Int: 5-10
Wolfpen loamy fine sand: 2/	26-38	B/E	Q: >90; FeOx: <5; F: <5; OU: <5	
	38-53	Bt1	Q: >90; FeOx: <5; F: <5; OU: <5	
	53-69	Bt2	Q: >90; FeOx: <5; F: <5; OU: <5	

1/ Code for mineralogical data in Very fine sand and silt fractions and in Clay fraction columns: The letter represents the kind of mineral and the number represents the quantity in percent.

F	feldspars	Sm	smectite
K	kaolinite	Int	interstratified (2:1-2:2)
Q	quartz	ON	other nonweatherable
V	vermiculite	OW	other weatherable
Mic	mica	OU	other undifferentiated
FeOx	iron oxides		

2/ This is the typical pedon for the series. For the description and location of the soil, see the section "Soil Series and Their Morphology."

3/ This Flo pedon is 2,500 feet north and 3,204 feet east of the southwest corner of sec. 3, T. 23 N., R. 4 W.

4/ This McLaurin pedon is 6.25 miles east of Summerfield, 4.4 miles southeast of Highway 9 and U.S. Forest Service road, 20 feet west of logging road, SW1/4SE1/4 sec. 12, T. 22 N., R. 4 W.

TABLE 22.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Angie	Clayey, mixed, thermic Aquic Paleudults
Bowie	Fine-loamy, siliceous, thermic Plinthic Paleudults
Cahaba	Fine-loamy, siliceous, thermic Typic Hapludults
Darbonne	Fine-loamy, siliceous, thermic Typic Paleudalfs
Darley	Clayey, kaolinitic, thermic Typic Hapludults
*Dela	Coarse-loamy, siliceous, nonacid, thermic Typic Udifluvents
Eastwood	Fine, montmorillonitic, thermic Vertic Hapludalfs
Flo	Sandy, siliceous, thermic Psammentic Paleudalfs
Guyton	Fine-silty, siliceous, thermic Typic Glossaqualfs
Harleston	Coarse-loamy, siliceous, thermic Aquic Paleudults
Iuka	Coarse-loamy, siliceous, acid, thermic Aquic Udifluvents
Larue	Loamy, siliceous, thermic Arenic Paleudalfs
Mahan	Clayey, kaolinitic, thermic Typic Hapludults
McLaurin	Coarse-loamy, siliceous, thermic Typic Paleudults
Ouachita	Fine-silty, siliceous, thermic Fluventic Dystrochrepts
Ruple	Clayey, oxidic, thermic Typic Rhodudults
Sacul	Clayey, mixed, thermic Aquic Hapludults
Smithdale	Fine-loamy, siliceous, thermic Typic Hapludults
Wolfpen	Loamy, siliceous, thermic Arenic Paleudalfs

* The soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

TABLE 23.--RELATIONSHIP OF PARENT MATERIAL, TOPOGRAPHY, RUNOFF, NATURAL DRAINAGE, AND SEASONAL HIGH WATER TABLE

[The symbol > means more than]

Parent material and soil series	Topography	Runoff	Natural drainage	Seasonal high water table	
				Depth	Duration
				ft	months
LOAMY AND SANDY TERTIARY PERIOD SEDIMENT:					
Bowie	Gently sloping ridgetops (1 - 5% slopes)	Medium	Moderately well drained.	>6.0	None
Darbonne	Gently sloping ridgetops (1 - 5% slopes)	Medium	Well drained.	>6.0	None
Flo	Gently sloping ridgetops and strongly sloping side slopes (1 - 12% slopes)	Very slow.	Somewhat excessively drained.	>6.0	None
Larue	Gently sloping ridgetops (1 - 5% slopes)	Slow	Well drained.	>6.0	None
McLaurin	Very gently sloping ridgetops (1 - 3% slopes)	Slow	Well drained.	>6.0	None
Smithdale	Strongly sloping side slopes (5 - 12% slopes)	Rapid	Well drained.	>6.0	None
Wolfpen	Very gently sloping ridgetops (1 - 3% slopes)	Slow	Well drained.	4.0-6.0	Dec-May
CLAYEY TERTIARY PERIOD SEDIMENT:					
Angie	Very gently sloping ridgetops (1 - 3% slopes)	Medium	Moderately well drained.	3.0-5.0	Dec-Apr
Darley	Gently sloping ridgetops and strongly sloping and moderately steep side slopes (1 - 30% slopes)	Medium and rapid.	Well drained.	>6.0	None
Eastwood	Gently sloping ridgetops and strongly sloping side slopes (1 - 12% slopes)	Medium and rapid.	Moderately well drained.	>6.0	None
Mahan	Gently sloping ridgetops and strongly sloping side slopes (1 - 12% slopes)	Medium and rapid.	Well drained.	>6.0	None

TABLE 23.--RELATIONSHIP OF PARENT MATERIAL, TOPOGRAPHY, RUNOFF, NATURAL DRAINAGE, AND SEASONAL HIGH WATER TABLE--Continued

Parent material and soil series	Topography	Runoff	Natural drainage	Seasonal high water table	
				Depth	Duration
				ft	months
CLAYEY TERTIARY PERIOD SEDIMENT (continued):					
Ruple	Gently sloping ridgetops and strongly sloping side slopes (1 - 12% slopes)	Medium and rapid.	Well drained.	>6.0	None
Sacul	Gently sloping ridgetops and strongly sloping and moderately steep side slopes (1 - 30% slopes)	Medium and rapid.	Moderately well drained.	>6.0	None
STREAM TERRACE SEDIMENT:					
Cahaba	Very gently sloping, low, convex ridges (1 - 3% slopes)	Medium	Well drained.	>6.0	None
Guyton	Level and depressional areas on terraces and flood plains (0 - 1% slopes)	Slow	Poorly drained.	0.0-1.5	Dec-May
Harleston	Very gently sloping low ridges (1 - 3% slopes)	Medium	Moderately well drained.	2.0-3.0	Nov-Mar
RECENT STREAM FLOOD PLAIN ALLUVIUM:					
Dela	Nearly level ridges or natural levees (0 - 2% slopes)	Slow	Moderately well drained.	3.0-5.0	Dec-Apr
Iuka	Level flats and low positions (0 - 1% slopes)	Slow	Moderately well drained.	1.0-3.0	Dec-Apr
Ouachita	Nearly level ridges or natural levees (0 - 2% slopes)	Slow	Well drained.	>6.0	None

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