United States
Department of
Agriculture

Soil
Conservation
Service

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

Soil Survey of Caldwell Parish, Louisiana

How To Use This Soil Survey

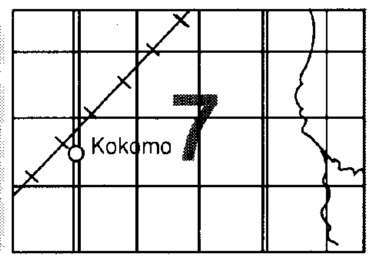
General Soil Map

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

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

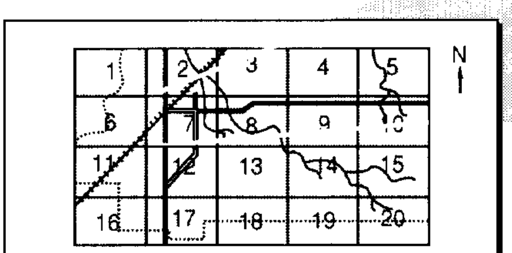
Detailed Soil Maps

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



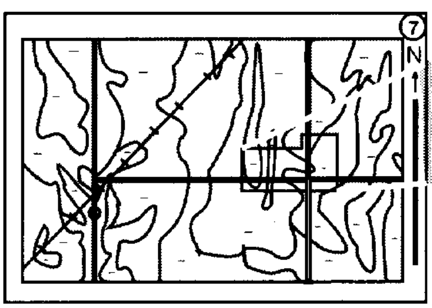
MAP SHEET

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

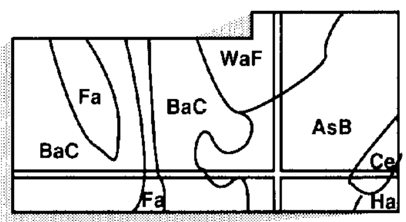


INDEX TO MAP SHEETS

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



MAP SHEET



AREA OF INTEREST

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

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

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

Major fieldwork for this soil survey was completed in 1986. Soil names and descriptions were approved in 1986. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1986. This soil survey was made cooperatively by the Soil Conservation Service, the Louisiana Agricultural Experiment Station, and the Louisiana Soil and Water Conservation Committee. It is part of the technical assistance furnished to the Dougdemona and the Boeuf River 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: Pine seedlings are grown for local use by the Office of Forestry, Louisiana Department of Natural Resources, at the Columbia Nursery in Caldwell Parish. These seedlings are in irrigated areas of Rilla silt loam and Sterlington silt loam.

Contents

Issued July 1990

Index to Map Units

Summary of Tables

Foreword

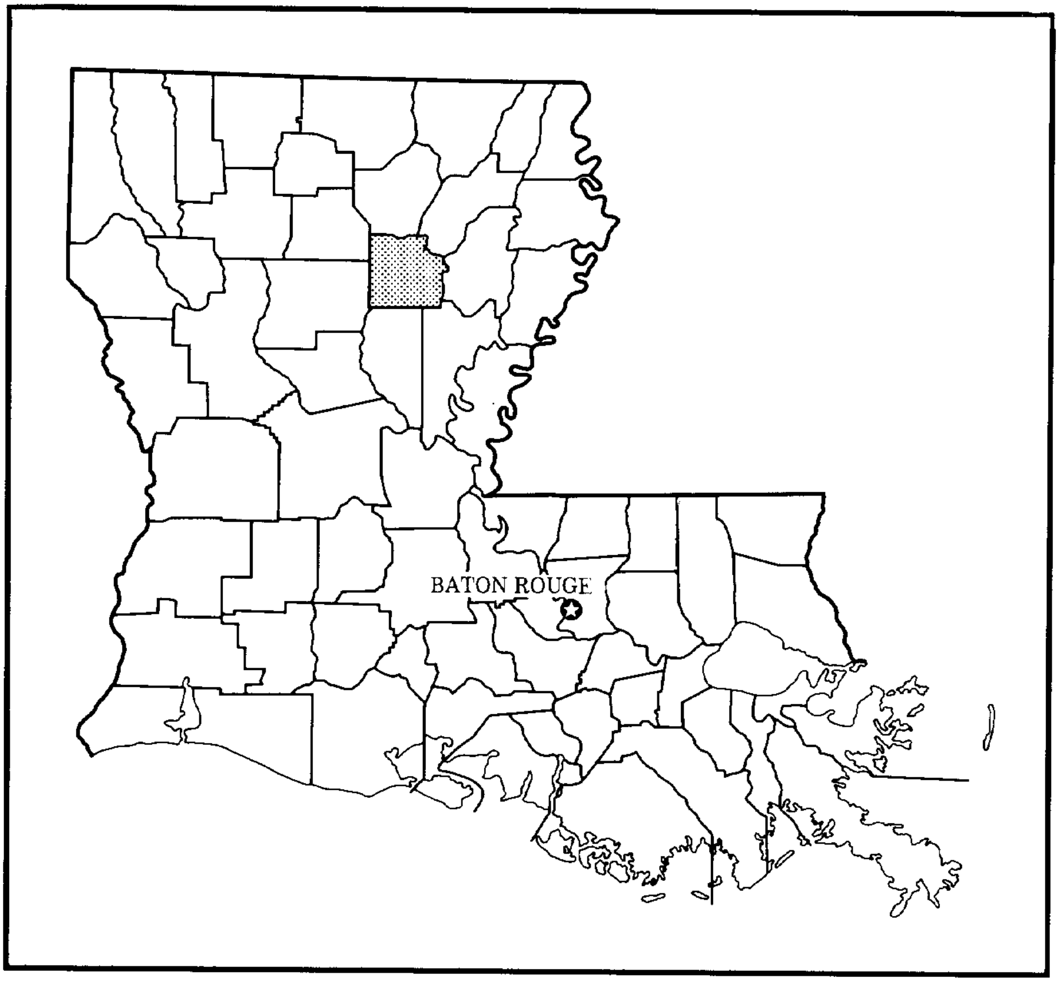
This soil survey contains information that can be used in land-planning programs in Caldwell Parish. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact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

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

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

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

Horace J. Austin
State Conservationist
Soil Conservation Service



Location of Caldwell Parish in Louisiana.

Soil Survey of Caldwell Parish, Louisiana

By William H. Boyd, Soil Conservation Service

Fieldwork by William H. Boyd and Gail Bowdan, Soil Conservation Service, and
Emile Williams, Louisiana Soil and Water Conservation Committee

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

CALDWELL PARISH is in northeast Louisiana. Columbia, the parish seat, is in the central part of the parish and is about 30 miles south of Monroe.

The parish is mainly rural and had a population of 10,800 in 1980. It has a total area of 350,590 acres, of which about 7,315 acres is lakes, bayous, and rivers. Land use is mainly agriculture and forest land. About 16 percent of the parish is cultivated cropland and pasture, and 74 percent is forest land.

The two major physiographic areas that make up the parish are flood plains and uplands.

The flood plains make up about 42 percent of the parish. They consist of level to undulating soils on natural levees along channels of the Ouachita and Boeuf Rivers and of level soils in low areas between the natural levees. Elevation ranges from about 40 to 70 feet above sea level. The soils on natural levees are mostly loamy. They are high to medium in fertility and are used mainly for cultivated crops and pasture. The main crops are cotton and soybeans. The soils between the natural levees are clayey. They are high to medium in fertility and are used for cultivated crops, pasture, and forest land and as habitat for wildlife. The main crops are soybeans, rice, and grain sorghum.

The uplands make up the other 58 percent of the parish. They consist of nearly level to steep soils on ridgetops and side slopes and in drainageways. Small areas of low stream terraces are included along the major streams. Elevation ranges from about 75 to 260 feet above sea level. These soils range from moderately deep sands to heavy clays and are used almost exclusively as forest land and habitat for wildlife. Most areas of the uplands are owned by large timber companies.

Descriptions, names, and delineations of soils in this soil survey do not fully agree with those on soil maps for adjacent parishes. Differences are the result of better information about soils, modifications in series concepts, intensity of mapping, or the extent of the soils in the survey area.

General Nature of the Parish

This section gives general information concerning the climate, history and development, agriculture, transportation, flood control, and water resources of the parish.

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 Chatham, Louisiana, in the period 1951 to 1975. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 47 degrees F, and the average daily minimum temperature is 34 degrees. The lowest temperature on record, which occurred at Chatham on February 2, 1951, is -7 degrees. In summer the average temperature is 80 degrees, and the average daily maximum temperature is 93 degrees. The highest recorded temperature, which occurred at Chatham on August 13, 1962, 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 50 inches. Of this, 25 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 19 inches. The heaviest 1-day rainfall during the period of record was 7.83 inches at Chatham on February 10, 1966. Thunderstorms occur on about 54 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 the average, there is seldom a day with as much as 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 70 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 11 miles per hour, in spring.

Severe local storms, including tornadoes, strike occasionally in or near the area. They are of short duration and cause variable and spotty damage. Every few years in summer and autumn, a tropical depression or remnant of a hurricane that has moved inland causes extremely heavy rains for 1 to 3 days.

History and Development

Caldwell Parish was established as a political unit in March 1838, when it was formed from parts of Ouachita and Catahoula Parishes. It is thought to be named after a prominent Ouachita Parish family. All of the land on the east side of the Ouachita River was taken from the southern part of Ouachita Parish, and all the land on the west side of the river was taken from Catahoula Parish.

Several French settlements were in the area of the parish east of the Ouachita River but ceased to exist after the Natchez Massacre in 1729. The earliest permanent settlement, Copenhagen, was established by a man of Danish origin. Later, people of French descent from southern Louisiana settled along the Ouachita River, and Anglo-Saxon settlers from Georgia, Alabama, the Carolinas, and Mississippi settled in the upland areas of the parish.

Columbia was among the first settlements in the parish and was used as early as 1823 as a fording place on the Ouachita River. From the middle of the 1800's to early in the 1900's, Columbia vied in importance with Monroe as a river port and trading center. Columbia was an important shipping point until the railroads came into the region. Three miles west of Columbia, a bear hunter named Banks founded a small settlement now known as Banks Springs. The names of other long-forgotten communities, represented by a house or a store, appear on early maps.

Agriculture

Caldwell Parish has always been an agricultural parish. The early settlers grew a variety of crops and raised livestock for subsistence. Indigo was the first cash crop grown by the early settlers, and later, cotton became the main cash crop. Cotton was grown entirely in the upland areas of the parish. Cotton is still the major crop, but now it is grown entirely on the more fertile soils on the bottom lands. In 1983, about 11,342 acres of cotton, valued at over 7 million dollars, was harvested.

Large areas of bottom land hardwoods have been cleared for cropland in the last 20 years. Soybeans have been the main crop. About 16,000 acres, with a crop value of over 2 million dollars, was planted to soybeans in 1983. Other important crops include grain sorghum, wheat, and rice. A variety of horticultural crops are grown in home gardens.

In 1983, the total value of agricultural products produced in Caldwell Parish was over 27 million dollars. Of this total, 41 percent was from farm crops, 4 percent from livestock, and 55 percent from forest products.

The present trend in agriculture in Caldwell Parish is toward fewer and larger farm units. Clearing land for soybean production has essentially ceased, and many acres recently cleared for crop production are not being planted because of current stress in the farm economy. The trend is toward using only the best loamy soils for crop production while abandoning the hard-to-manage clayey soils. A small acreage of clayey soils is used to produce pond-raised catfish and crawfish. Sunflowers are grown on a limited basis. Total acreage of cropland increased from about 24,000 acres in 1958 to about 31,000 acres in 1983. In 1985, 14,337 acres of cotton, 12,570 acres of soybeans, 3,456 acres of grain sorghum, 3,376 acres of rice, 1,349 acres of wheat, and 146 acres of corn were harvested.

Forest products include saw logs for timber, logs for poles, softwood and hardwood pulpwood, and hardwood logs for railroad crossties. The Columbia Nursery, managed by the Office of Forestry, Louisiana Department of Natural Resources, annually produces about 19 million pine seedlings and about 1 million seedlings of various other tree species, mainly for local marketing and planting.

About 135,000 acres of land on the uplands is owned by the forest industry. This land and some of the privately owned forest land are intensively managed for timber production.

Important nonagricultural industries in the parish include oil and gas production, a smelting plant, and a garment factory.

Transportation

Caldwell Parish is served by one major U.S. highway and several paved state and parish highways. Numerous graveled and unimproved roads provide access to rural areas. An airport near Columbia serves small private and commercial aircraft.

The Ouachita River provides transportation by barge and tugboats. One grain terminal and one oil terminal are served by tugs and barges that travel on the Ouachita River. A lock and dam system allows barge traffic as far north as Arkansas and south to the Mississippi River. Access to the Mississippi River is available through the Old River Locks near the mouth of the Red River.

Flood Control

Caldwell Parish is at the northernmost point in the Mississippi River flood control system. The parish has experienced many floods, and much attention has been focused on flood control.

Major floods are caused by backwater when water levels are unusually high in the Mississippi, Atchafalaya, and Red Rivers. Water backs up the Black, Ouachita, and Boeuf River systems, causing flooding of the low areas. This flooding is often intensified by heavy local storms. Flooding along the Ouachita River, Lafourche Canal, and Castor Creek also occurs during heavy local rainstorms even though water levels are not high in the other rivers of the drainage system.

Flood control in the parish is provided by the Ouachita River levee system. Several privately constructed levee systems also protect agricultural land in areas that are not protected by the Ouachita River levee system.

In May 1973, about 94,000 acres of land was inundated by floodwater, and in May 1979, about 84,000 acres was flooded.

This soil survey can be used to locate the areas that are subject to flooding. They are delineated on the maps, and the frequency, duration, and season of flooding are given in the section "Detailed Soil Map Units."

Soil Conservation Service engineers have determined flood frequencies for Caldwell Parish based on gauge readings and locally available data. Most of the soils at an elevation of more than 65.5 feet are not subject to flooding. Soils between 65.5 and 59 feet above sea level generally are flooded only rarely. Those between 59 and 48 feet are occasionally flooded, and soils at an elevation of less than 48 feet are frequently flooded.

This soil survey does not replace onsite investigation. The actual flooding frequencies and height of floodwaters are best determined by onsite engineering surveys and flood stage records.

Water Resources

Surface Water

Caldwell Parish has about 7,000 acres of surface water. The Ouachita River, Boeuf River, and Bayou Lafourche are the largest sources of surface water. Castor Creek and Beaucoup Creek are the major streams on the uplands. Davis Lake, Morengo Lake, and Long Lake are the major lakes in the parish. These bodies of water are used for wildlife, recreation, and irrigation of cropland.

Ground Water

Caldwell Parish is underlain by three major freshwater-bearing aquifers *(14, 26)*. These aquifers are in the Mississippi River alluvial aquifer of the Quaternary geologic period, in deposits of the Cockfield Formation, and in the Sparta Sands. Each aquifer is composed of numerous sandy zones that can act as individual aquifers.

The Mississippi River alluvial aquifer is east of the Ouachita River. It is overlain by a thin deposit of Holocene age alluvial deposits. The aquifer ranges in thickness from less than 60 feet to about 110 feet.

The altitude of its base ranges from near mean sea level to 50 feet. The average well in this alluvial aquifer is constructed to yield less than 3,000 gallons per minute. The water generally is moderately hard to very hard (equivalent calcium carbonate concentration of 90 to 1,000 milligrams per liter) and has high concentrations of iron (3 to 25 milligrams per liter) and manganese (0.6 to 1.4 milligrams per liter). The water is predominantly a calcium bicarbonate type with a pH of 6.8 to 7.1. Its temperature is 66 or 67 degrees Fahrenheit. Chloride content ranges from 11 to 4,100 milligrams per liter (less than 250 milligrams per liter is considered to be freshwater). Chloride concentrations generally are less than 30 milligrams per liter in the upper part of the aquifer and less than 100 milligrams per liter in the lower part.

Treatment generally is necessary for domestic, municipal, and industrial uses. More water is used for irrigation than for all other uses combined.

Freshwater can be obtained from the Cockfield Formation throughout Caldwell Parish. This formation lies under the Mississippi River alluvial aquifer east of the Ouachita River and is exposed intermittently at the surface on the uplands west of the Ouachita River. Few large-capacity wells have been established in aquifers in the Cockfield Formation because more suitable water is available from aquifers in the Sparta Sands and the Mississippi River alluvial aquifer.

Analysis of a water sample from the Cockfield Formation indicated the water was moderately hard (106 milligrams per liter) and had a total iron content of 7.5 milligrams per liter, a manganese content of 0.2 milligrams per liter, a chloride content of 23 milligrams per liter, and a pH of 6.9 *(14, 26)*.

Freshwater can be obtained from the Sparta Sands only in the northwestern part of the parish. The Sparta Sands lie below the Cockfield Formation and are not exposed at the surface in the parish. Wells can yield as much as 2,000 gallons per minute from large diameter industrial wells in the thick sands in the lower part of the formation.

Water from the Sparta Sands generally is soft, low in iron, and of the sodium bicarbonate kind. Analysis of a water sample from the Sparta Sands in Jackson Parish had 0.09 milligrams per liter total iron, 0.0 milligrams per liter manganese, 8.5 milligrams per liter chloride, 2 milligrams per liter hardness as calcium carbonate, and a pH of 7.3 *(14, 26)*.

How This Survey Was Made

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

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

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

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

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

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

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

Map Unit Composition

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

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

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

General Soil Map Units

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

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

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

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

Each map unit is rated for cultivated crops, pastureland, woodland, and urban uses. Cultivated crops are those grown extensively in the survey area. Pastureland refers to pasture of native and improved grasses for livestock. Woodland refers to areas of native or introduced trees. Urban uses include residential, commercial, and industrial developments.

The boundaries of the general soil map units in Caldwell Parish were matched, where possible, with those of the previously completed surveys of Catahoula, LaSalle, Franklin, and Ouachita Parishes. In a few places, however, the lines do not join and the names of the map units differ. These differences result mainly because of changes in soil series concepts, differences in map unit design, and changes in soil patterns near survey area boundaries.

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

Soils on Flood Plains

This group of map units consists of poorly drained, somewhat poorly drained, and well drained, level and gently undulating, clayey and loamy soils. The four map units in this group make up about 42 percent of the parish. Most of the acreage is in cultivated crops or woodland. Wetness and the hazard of flooding are the main limitations for most uses.

1. Perry-Alligator

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

This map unit consists of soils in broad, level areas and in gently undulating areas on flood plains. Most of the soils in this map unit are subject to rare, occasional, or frequent flooding; some are protected from flooding. Slopes range from 0 to 3 percent.

This map unit makes up about 16 percent of the parish. It is about 63 percent Perry soils, 19 percent Alligator soils, and 18 percent soils of minor extent.

The Perry soils are in low positions on natural levees. The surface layer is dark grayish brown or gray, very strongly acid to medium acid silty clay loam or clay. The upper part of the subsoil is gray, strongly acid clay, and the lower part is reddish brown, moderately alkaline clay. The soils have a high water table in winter and spring. Most of the soils are subject to rare or occasional flooding; some are protected from flooding.

The Alligator soils are on broad flats and in depressional areas on flood plains. The surface layer is dark grayish brown, very strongly acid clay, and the subsoil is gray, very strongly acid clay. The underlying material is gray, slightly acid clay. The soils are subject to frequent flooding and have a high water table in the winter and spring.

Of minor extent are the well drained to poorly drained Arents soils, the somewhat poorly drained Hebert soils, the poorly drained Portland soils, and the very poorly drained Yorktown soils. Arents are on spoil banks. The Hebert soils are on low ridges and in intermediate positions on natural levees. The Portland soils are in low positions on natural levees, and the Yorktown soils are in abandoned stream channels on flood plains.

Most of the acreage of these soils has been cleared and used for crops, mainly soybeans. Grain sorghum and rice also are grown. The remaining acreage is in pasture or in woodland that is used for grazing, timber production, and habitat for wildlife.

The soils in this map unit are poorly suited to crops and somewhat poorly suited to pasture. Soils that are frequently flooded are poorly suited to both crops and pasture. Poor tilth and wetness are the main limitations, and flooding is a hazard. In some years, floodwaters do not recede in time to plant a crop. Surface drainage systems and flood protection are needed.

These soils are moderately well suited to woodland. The dominant trees are Nuttall oak, overcup oak, water oak, eastern cottonwood, American sycamore, green ash, and sweetgum. Equipment use limitations caused by wetness and flooding are the main concerns in management.

The soils in this map unit are poorly suited to sanitary facilities and building site development. Areas subject to occasional or frequent flooding generally are not suitable for homesites. Wetness, very slow permeability, and very high shrink-swell potential are the main limitations. Flooding is a hazard, but it can be controlled by major flood control structures.

2. Perry-Hebert

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

This map unit consists of soils in broad, level areas and in gently undulating areas on flood plains. Most of the soils in this map unit are subject to rare or occasional flooding; some are protected from flooding. Slopes range from 0 to 3 percent.

This map unit makes up about 11 percent of the parish. It is about 62 percent Perry soils, 25 percent Hebert soils, and 13 percent soils of minor extent.

The somewhat poorly drained Hebert soils are in intermediate positions on natural levees. The surface layer is brown, slightly acid or medium acid silt loam or silty clay loam. The subsoil is light brownish gray and pale brown, medium acid clay loam and silt loam in the upper part and reddish brown, strongly acid and medium acid silty clay loam and silt loam in the lower part. The soils have a high water table in winter and spring.

The Perry soils are in low positions on natural levees. The surface layer is dark grayish brown or gray, very strongly acid to medium acid clay or silty clay loam. The subsoil is gray, very strongly acid or strongly acid clay in the upper part and reddish brown, moderately alkaline clay in the lower part. The soils have a high water table in winter and spring.

Of minor extent are the well drained Sterlington and Rilla soils in high positions on natural levees and the poorly drained Yorktown soils in abandoned river channels.

Most of the acreage of these soils has been cleared and used for crops, mainly soybeans. Cotton, corn, wheat, and grain sorghum are also grown. The remaining acreage is in pasture or mixed hardwoods and is used for grazing, timber production, and habitat for wildlife.

The soils in this map unit are moderately well suited to crops and pasture. Wetness and poor tilth are the main limitations, and flooding is a hazard. A surface drainage system and fertilizer are needed for crop production. The occasionally flooded soils need protection from flooding in the spring.

The soils in this map unit are well suited to production of southern hardwoods. The dominant trees are cherrybark oak, Nuttall oak, water oak, eastern cottonwood, American sycamore, pecan, and sweetgum. Wetness is a moderate to severe limitation affecting the use of equipment.

The soils in this map unit are poorly suited to sanitary facilities and building site development. Wetness and the hazard of flooding are the main limitations. Moderate and very high shrink-swell potential is an additional limitation affecting dwellings.

3. Hebert-Rilla

Level and gently undulating, somewhat poorly drained and well drained soils that have a loamy surface layer and subsoil

This map unit consists of soils in broad, level areas and in gently undulating areas on flood plains. Most of the soils in this map unit are protected from flooding. Slopes range from 0 to 3 percent.

This map unit makes up about 7 percent of the parish. It is about 61 percent Hebert soils, 30 percent Rilla soils, and 9 percent soils of minor extent.

The somewhat poorly drained Hebert soils are in intermediate positions on natural levees. The surface layer is brown, slightly acid or medium acid silt loam or silty clay loam. The subsoil is light brownish gray and pale brown, medium acid clay loam and silt loam in the upper part and reddish brown, strongly acid or medium acid silty clay loam and silt loam in the lower part. The soils have a high water table in winter and spring.

The well drained Rilla soils are in high positions on natural levees. The surface layer is dark brown, strongly acid silt loam. The subsoil is dark brown, very strongly acid silty clay loam in the upper part and brown, very strongly acid silt loam in the middle and lower parts.

Of minor extent are the well drained Sterlington soils in high positions on natural levees and the poorly drained Portland and Perry soils in low positions.

Most of the acreage of these soils has been cleared and used for crops, mainly cotton, soybeans, and corn. The remaining acreage is in mixed hardwoods and is used for timber production and habitat for wildlife.

The soils in this map unit generally are well suited to crops and pasture. Seasonal wetness can be a limitation. Some areas that are subject to occasional flooding are moderately well suited. A surface drainage system, fertilizer, and lime are needed for crop production.

These soils are well suited to production of southern hardwoods. The dominant trees are cherrybark oak, Nuttall oak, water oak, willow oak, eastern cottonwood, American sycamore, pecan, and sweetgum. Wetness is a moderate limitation affecting the use of equipment.

The soils in this map unit are moderately well suited to sanitary facilities and building site development. Wetness and moderately slow permeability are the main limitations, and flooding is a hazard.

4. Guyton-Ouachita

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

This map unit consists of soils on narrow flood plains of streams that drain the uplands. Most of the soils in this map unit are subject to frequent flooding. Slopes are dominantly less than 1 percent.

This map unit makes up about 8 percent of the parish. It is about 85 percent Guyton soils, 11 percent Ouachita soils, and 4 percent soils of minor extent.

The Guyton soils are poorly drained and are in low positions on the landscape. The surface layer is grayish brown or brown, extremely acid silt loam and the subsurface layer is grayish brown and light brownish gray, extremely acid silt loam. The subsoil is grayish brown, light brownish gray, and brown, very strongly acid silty clay loam. The soils have a high water table in winter and spring.

The Ouachita soils are well drained and are on convex ridges. The surface layer is brown, very strongly acid silt loam. The subsoil is yellowish brown and pale brown, very strongly acid and strongly acid silt loam.

Of minor extent are the poorly drained Brimstone soils, the somewhat poorly drained Frizzell soils, and the well drained Cahaba soils. All of these soils are on low stream terraces.

Most of the acreage of these soils is woodland that is mainly hardwoods along the major streams and mixed hardwoods and pine along smaller drainageways.

The soils in this map unit generally are not suited to crops and are poorly suited to pasture. Wetness and low fertility are the main limitations, and flooding is a hazard.

These soils are somewhat poorly suited to woodland. Soils that are flooded for long duration are poorly suited to pine. The dominant trees are loblolly pine, sweetgum, green ash, southern red oak, and water oak. Equipment use limitations and seedling mortality are the main concerns in woodland production.

The soils in this map unit generally are not suited to sanitary facilities or building site development. The hazard of flooding is too severe for these uses.

Soils on Uplands, Stream Terraces, and Flood Plains

This group of map units consists of well drained to somewhat poorly drained loamy and clayey soils on uplands and stream terraces and poorly drained soils on flood plains of streams that drain the uplands. The five map units in this group make up about 58 percent of the parish. Most of the acreage is woodland. Steepness of slope on the uplands and wetness on the stream terraces are the main limitations affecting most uses. In addition, flooding is a hazard on the flood plains.

5. Olla-Cadeville

Very steep to moderately sloping, well drained and moderately well drained soils that have a loamy surface layer and a loamy or clayey subsoil; on uplands

This map unit consists of moderately steep to very steep soils on side slopes and moderately sloping and strongly sloping soils on narrow ridgetops. Drainage is provided by small, deeply incised streams. Slopes range from 5 to 15 percent on the ridgetops and from 15 to 60 percent on the side slopes.

This map unit makes up about 5 percent of the parish. It is about 60 percent Olla soils, 24 percent Cadeville soils, and 16 percent soils of minor extent.

The Olla soils are well drained and are on side slopes. The surface layer is brown, extremely acid, fine sandy loam. The subsoil is strong brown sandy clay loam and yellowish brown and light yellowish brown fine sandy loam. The subsoil is very strongly acid.

The Cadeville soils are moderately well drained and are on side slopes and narrow ridgetops. The surface layer is dark brown, medium acid very fine sandy loam. The subsoil is yellowish red and light brownish gray, extremely acid clay.

Of minor extent are the Bayoudan, Guyton, Iuka, Larue, Ruston, Savannah, and Smithdale soils. The moderately well drained Bayoudan soils are on side slopes. The well drained Larue and Ruston soils are on ridgetops and side slopes. The well drained Smithdale soils are on side slopes. The poorly drained Guyton soils and the moderately well drained Iuka soils are on narrow flood plains.

Most of the acreage of these soils is in mixed pine and hardwoods and is managed for timber production.

These soils are moderately well suited to woodland. Because of steep slopes, equipment use limitations are severe. The hazard of erosion on skid trails, logging roads, and in loading areas is severe.

The soils in this map unit are not suited to crops and are poorly suited to pasture, sanitary facilities, and building site development, mainly because of steep slopes. Moderate and very slow permeability, the moderate and high shrink-swell potential, and low strength as it affects roads are additional limitations affecting urban uses.

These soils have good potential for the development of habitat for woodland wildlife. Habitat can be improved by encouraging the growth of hardwood trees, such as oak and hickory.

6. Sacul-Savannah

Moderately sloping and gently sloping, moderately well drained soils that have a loamy surface layer and a clayey and loamy subsoil or a loamy subsoil; on uplands

This map unit consists of moderately sloping and gently sloping soils on side slopes on uplands. Narrow drainageways are throughout the map unit. Slopes range from 1 to 12 percent.

This map unit makes up about 34 percent of the parish. It is about 50 percent Sacul soils, 25 percent Savannah soils, and 25 percent soils of minor extent.

The Sacul soils are gently sloping and moderately sloping. They have a surface layer of dark grayish brown, strongly acid fine sandy loam. The subsoil is red, very strongly acid clay in the upper part and light brownish gray, very strongly acid sandy clay loam in the lower part. The soils have a seasonal high water table in winter and spring.

The Savannah soils are gently sloping. They have a surface layer of brown, very strongly acid fine sandy loam. The subsoil is strong brown, strongly acid sandy clay loam and yellowish brown loam in the upper part. A fragipan of yellowish brown, strongly acid loam is in the lower part. The soils have a seasonal high water table perched on the fragipan in winter and spring.

Of minor extent are the Guyton, Frizzell, Providence, and Ruston soils. The poorly drained Guyton soils are on narrow flood plains and on stream terraces. The moderately well drained Frizzell soils are on stream terraces, and the moderately well drained Providence soils are on ridgetops on the uplands and on low stream terraces. The well drained Ruston soils are on ridgetops on the uplands.

Most of the acreage of these soils is in pine and mixed hardwoods and is intensively managed for timber production. A small acreage is in pure stands of loblolly pine.

The soils in this map unit are well suited to woodland. Equipment use limitations caused by wetness and a slight hazard of erosion are the main concerns in woodland management.

The Sacul soils are not suited to crops and are somewhat poorly suited to pasture. The Savannah soils are moderately well suited to crops and well suited to pasture. Steepness of slope and low fertility are the main limitations.

The soils in this map unit are poorly suited to sanitary facilities and building site development. Steepness of slope, wetness, moderately slow and slow permeability, and the high shrink-swell potential are the main limitations.

These soils have good potential for the development of habitat for woodland wildlife.

7. Falkner-Guyton

Level and nearly level, somewhat poorly drained and poorly drained soils that have a loamy surface layer and a loamy and clayey subsoil or a loamy subsoil; on uplands, stream terraces, and flood plains

This map unit consists of level and nearly level soils on broad ridgetops and on stream terraces and level soils on narrow flood plains. The soils on flood plains are subject to frequent flooding. Slopes range from 0 to 2 percent.

This map unit makes up about 7 percent of the parish. It is about 66 percent Falkner soils, 15 percent Guyton soils, and 19 percent soils of minor extent.

The Falkner soils are nearly level and somewhat poorly drained. They are on uplands and stream terraces. The surface layer is brown, very strongly acid silt loam. The subsoil is yellowish brown, extremely acid or very strongly acid silty clay loam in the upper part. It is mottled light brownish gray, yellowish brown, and brownish yellow, extremely acid or very strongly acid clay in the lower part. The soils have a high water table in winter and spring.

The Guyton soils are level and poorly drained. They are mainly on narrow flood plains, but are also on low stream terraces. The surface layer is grayish brown or brown, extremely acid silt loam, and the subsurface layer is grayish brown and light brownish gray, extremely acid silt loam. The subsoil is grayish brown, light brownish gray, and brown, very strongly acid silty clay loam. The soils have a high water table in winter and spring.

Of minor extent are the Bayoudan, Frizzell, Ouachita, Providence, and Tippah soils. The moderately well drained Frizzell, Providence, and Tippah soils are in positions similar to those of the Falkner soils. The Bayoudan soils are on side slopes along drainageways. The well drained Ouachita soils are in high positions on narrow flood plains.

Most of the acreage of these soils is woodland that is intensively managed for timber production. The soils are mainly in pine and mixed hardwoods. A few large areas have been planted to pure stands of loblolly pine.

The soils in this map unit are well suited to woodland. Seasonal wetness limits the use of equipment. Flooding is a hazard in most areas of the Guyton soils.

These soils generally are moderately well suited to crops and pasture. Frequently flooded areas of Guyton soils are poorly suited. Additional limitations are seasonal wetness and low fertility.

The soils in this map unit are poorly suited to sanitary facilities and building site development. Frequently flooded soils generally are not suited. The wetness, moderately slow and slow permeability, and the high shrink-swell potential are additional limitations.

These soils have good potential for the development of habitat for woodland wildlife.

8. Frizzell-Providence

Nearly level and gently sloping, moderately well drained soils that have a loamy surface layer and subsoil; on stream terraces and uplands

This map unit consists of nearly level and gently sloping soils on low stream terraces and uplands. Slopes range from 0 to 5 percent.

This map unit makes up about 8 percent of the parish. It is about 62 percent Frizzell soils, 23 percent Providence soils, and 15 percent soils of minor extent.

The Frizzell soils are nearly level and are on low stream terraces. The surface layer is brown, very strongly acid silt loam. The upper part of the subsoil is yellowish brown, pale brown, and light gray silt loam and very fine sandy loam. The lower part is yellowish brown silty clay loam and loam. The subsoil is very strongly acid or strongly acid.

The Providence soils are nearly level and gently sloping and are on low stream terraces and uplands. The surface layer is brown, strongly acid or medium acid silt loam. The subsoil is strong brown and yellowish brown, very strongly acid silt loam in the upper part. The lower part is a fragipan. It is yellowish brown, very strongly acid silty clay loam and clay loam.

Of minor extent are the Brimstone, Cahaba, Guyton, and Prentiss soils. The poorly drained Brimstone and Guyton soils are in low positions on stream terraces and in drainageways. The well drained Cahaba soils and the moderately well drained Prentiss soils are in high positions on stream terraces.

Most of the acreage of these soils is woodland that is intensively managed for timber production. Typically, the woodland is pine and mixed hardwoods. Some large areas have been planted to pure stands of loblolly pine.

The soils in this map unit are well suited to woodland. Equipment use limitations are moderate because of seasonal wetness.

The soils in this map unit are moderately well suited to crops and well suited to pasture. The main limitations are seasonal wetness and low fertility.

The soils in this map unit are somewhat poorly suited to sanitary facilities and building site development. The main limitations are wetness, moderately slow and slow permeability, and the moderate shrink-swell potential.

These soils have good potential for the development of habitat for woodland wildlife.

9. Bayoudan

Moderately sloping to steep, moderately well drained soils that have a clayey surface layer and subsoil; on uplands

This map unit consists of moderately sloping to steep soils on hilly uplands. Slopes range from 3 to 40 percent.

This map unit makes up about 4 percent of the parish. It is about 88 percent Bayoudan soils and 12 percent soils of minor extent.

The Bayoudan soils have a surface layer of dark brown or very dark grayish brown, medium acid or very strongly acid clay. The subsoil is strong brown, extremely acid clay in the upper part and light olive brown, yellowish brown, olive, and grayish brown, extremely acid and slightly acid clay in the lower part.

Of minor extent are poorly drained Guyton soils and well drained Ouachita soils on narrow flood plains and somewhat poorly drained Falkner soils and moderately well drained Tippah soils on ridgetops.

Most of the acreage of these soils is woodland that is used for timber production and habitat for wildlife.

The soils in this map unit are moderately well suited to woodland. The main limitations are steep slopes and the clay surface layer. Landslides are a potential hazard in steeply sloping areas.

These soils generally are not suited to crops and they are poorly suited to pasture, mainly because of steep slopes and the severe hazard of erosion.

The soils in this map unit are poorly suited to sanitary facilities and building site development. The main limitations are steepness of slope and the very high shrink-swell potential. Landslides are a hazard in steeply sloping areas.

These soils have good potential for the development of habitat for woodland wildlife.

Broad Land Use Considerations

The soils in Caldwell Parish vary widely in their suitability for major land uses. About 10 percent of the land is used for cultivated crops, mainly cotton and soybeans. Cultivated crops are a major land use in general soil map units 2 and 3.

The soils in general soil map units 2 and 3 are mostly loamy, have high or medium fertility, and are well suited to most crops. The main soils in these map units are Hebert, Rilla, and Perry soils. Perry soils are somewhat poorly suited to crops. Wetness is the main limitation affecting cultivation. Perry soils also have poor tilth, and flooding is a hazard.

Pastureland is a common land use in general soil map units 2, 3, 6, 7, and 8. The soils in these map units are well suited to pasture. Seasonal wetness is the main limitation. Soils in general soil map units 1, 4, 5, and 9 are poorly suited to pasture, mainly because of steep slopes and the hazard of erosion in general soil map units 5 and 9 and the hazard of flooding in general soil map units 1 and 4.

About 74 percent of the parish is woodland. The soils in general soil map units 4, 5, 6, 7, 8, and 9 are used mainly for timber production. Steepness of slope is the main limitation in general soil map units 5 and 9. Wetness of the soils is the main limitation in general soil map unit 4, and flooding is a hazard. Limitations in the use of equipment, caused by seasonal wetness, is the main concern in general soil map units 6, 7, and 8.

About 3,000 acres in the parish is urban or built-up areas. The major soils in each of the general soil map units have severe limitations affecting one or more urban uses and generally are poorly suited to urban development. Wetness is the main limitation affecting urban uses in general soil map units 1, 2, and 4, and flooding is a hazard. Steepness of slope is the main limitation in general soil map units 5 and 9. Wetness, low strength as it affects roads, restricted soil permeability, and the shrink-swell potential are the main limitations in general soil map units 3, 6, 7, and 8.

Detailed Soil Map Units

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

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

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

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

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

A *soil association* is made up of two or more geographically associated soils that are shown as one unit on the maps. Because of present or anticipated soil uses in the survey area, it was not considered practical or necessary to map the soils separately. The pattern and relative proportion of the soils are somewhat similar. Brimstone-Prentiss association, 0 to 3 percent slopes, is an example.

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

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

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

All the soils on the flood plains in Caldwell Parish were mapped at the same level of detail except for those soils that are subject to frequent flooding and the areas of spoil material. Frequent flooding limits the use and management of the soils, and separating the soils in these areas would be of little importance to the land user. The spoil areas consist of material that was deposited during construction activities. This material was so variable that it was not practical to separate the soils in these areas.

Most of the soils on the uplands and stream terraces are in forest land, and the use and management of these areas are not expected to change. If the landscape consisted of more than one soil in close association, the soils were not separated.

Ar—Alligator clay, frequently flooded. This level, poorly drained soil is in low positions on broad flats and in depressional areas on flood plains. The areas are irregular in shape and range from 40 to 1,000 acres or more. Slopes are less than 1 percent.

Typically, this soil has a dark grayish brown, very strongly acid clay surface layer about 4 inches thick. The subsoil to a depth of 40 inches is gray, mottled, very strongly acid clay. The substratum to a depth of about 60 inches is gray, mottled, slightly acid clay.

Included with this soil in mapping are a few small areas of Perry soils. Perry soils are in slightly higher positions than the Alligator soil and have a subsoil that is reddish brown in the lower part. Also included are small areas of Alligator soils that are subject to only occasional flooding. The included soils make up about 10 percent of the map unit.

Water and air move through this Alligator soil at a very slow rate, and water runs very slowly off the surface. This soil has medium fertility. A seasonal high water table is about 0.5 to 2.0 feet below the surface from January through April. This soil is subject to brief to very long periods of flooding during the same period. Floodwaters typically are 1 to 8 feet deep, exceeding 15 feet in places. Flood duration can exceed 60 days. This soil dries slowly and has very high shrink-swell potential.

Most of this soil is within the Boeuf Wildlife Management Area and is used as woodland and wildlife habitat. A small acreage is cropland.

This soil is somewhat poorly suited to woodland. Dominant trees are overcup oak, water hickory, and waterlocust. Common shrubs are swamp privet and deciduous holly (fig. 1). Flooding is a hazard and severely restricts reforestation. Only trees that can tolerate seasonal wetness should be planted. The suitable trees to plant are eastern cottonwood, green ash, and American sycamore. The main limitations affecting the production and harvesting of timber are wetness and the clayey texture of the surface layer. Conventional methods of harvesting timber generally can be used except sometimes during rainy periods. Because the clayey soil is sticky when wet, most planting and harvesting equipment should be used only during dry periods.

This soil is poorly suited to pasture and cultivated crops because of the hazard of flooding. Other concerns are wetness and poor tilth. Late-planted crops, such as soybeans and grain sorghum, can be grown in some years. Flooding can be controlled by levees. Suitable pasture plants are common bermudagrass and native grasses that are tolerant of frequent overflow. Applying high rates of fertilizer or lime on pastures generally is not practical because of the hazard of frequent overflow.

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

This soil is not suited to urban development. The hazard of flooding generally is too severe, and major flood control structures and extensive local drainage systems are needed. In addition, wetness, very slow permeability, low strength as it affects roads, and very high shrink-swell potential are limitations.

This Alligator soil is in capability subclass Vw. The woodland ordination symbol is 7W.

At—Arents, loamy and clayey. These well drained to poorly drained soils are in areas of spoil material along the Boeuf River and Lafourche Canal. The soils are variable, loamy and clayey material that was dredged and deposited as spoil during the construction of the Lafourche Canal and during channel improvement work on the Boeuf River. The soils in low positions are subject to flooding. The landscape is long, narrow ridges that are 200 to 400 feet wide and 10 to 25 feet high. Slopes generally are short and range from 5 to 20 percent.

The texture and thickness of the layers of these soils are highly variable within short distances. Typically, the surface layer is gray or grayish brown silty clay loam or clay about 8 inches thick. The underlying material to a depth of about 78 inches is layers of dark reddish brown, brown, and grayish brown clay, silty clay, silty clay loam, and very fine sandy loam. The soils typically are neutral or mildly alkaline, and they range from very strongly acid to moderately alkaline. Some clods of material break into medium angular blocks that have shiny faces. In places, the soils do not have distinct layers and are loamy or clayey throughout.

Included with these soils in mapping are a few small areas of Alligator, Forestdale, Hebert, and Perry soils. All of these soils are in lower positions than the Arents and have a distinct surface layer and subsoil. The included soils make up about 10 percent of the map unit.

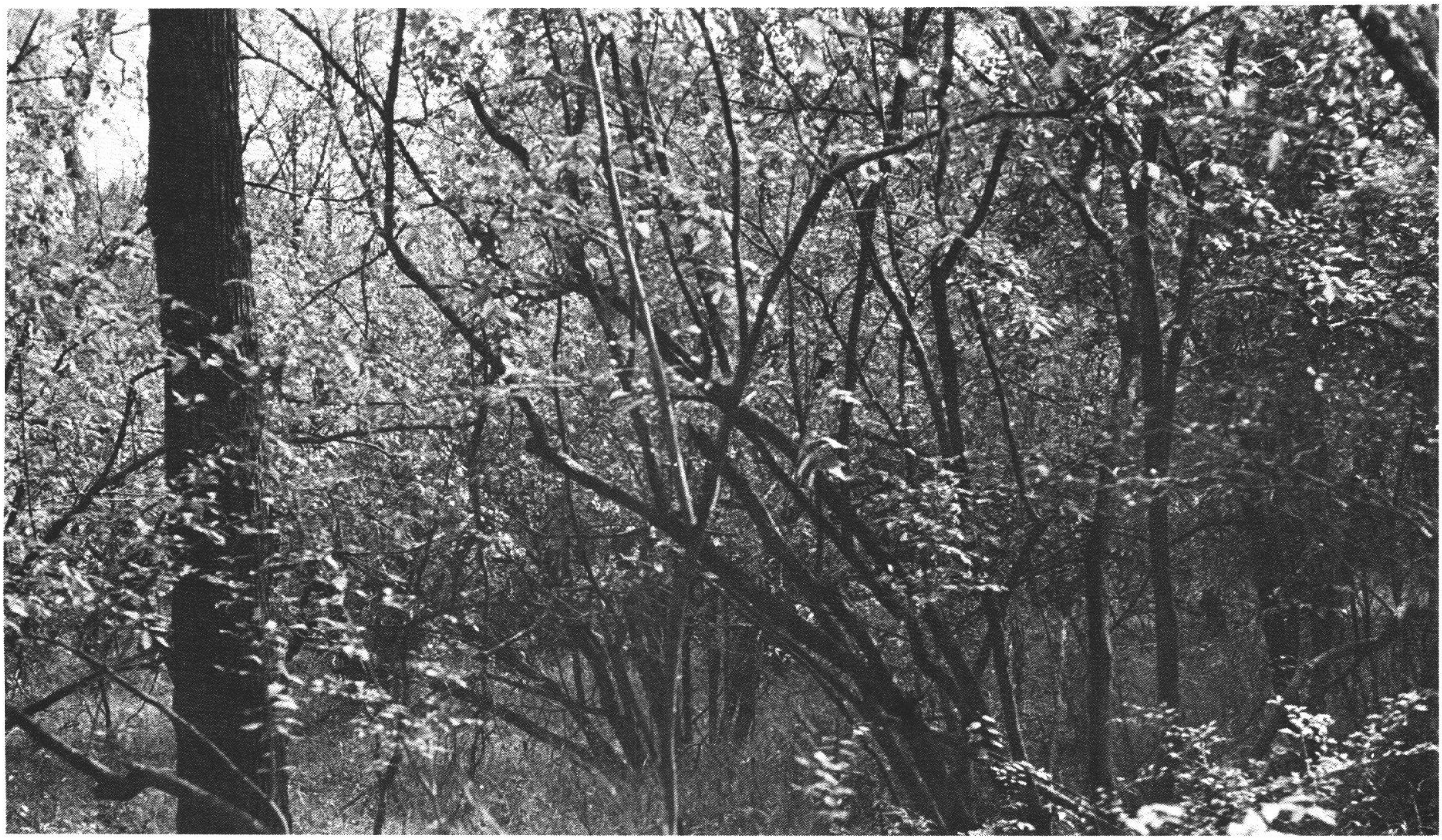


Figure 1.—Water-tolerant trees and shrubs, such as water hickory and swamp privet, are dominant in this area of Alligator clay, frequently flooded.

Soil properties, such as permeability, available water capacity, seasonal high water table, consistence, and shrink-swell potential, vary considerably within short distances. Water runs off the surface at a medium rate. The soils have medium fertility.

Most of these Arents are used as woodland and habitat for wildlife.

These soils are well suited as habitat for woodland wildlife, although habitat can be improved by planting appropriate vegetation or by promoting the natural establishment of desirable plants.

These soils are poorly suited to homesites, cropland, and pastureland, mainly because of steep slopes and the narrow and sharply convex shape of the ridges. In places, high or very high shrink-swell potential is a severe limitation affecting urban uses. If these soils are used as cropland or pastureland, special practices are needed to control erosion. Suitable pasture grasses are common bermudagrass, improved bermudagrass, and bahiagrass. Additions of lime and fertilizer are needed for optimum forage production. Soils that have slopes of 8 percent or more generally are not suited to cultivated crops.

Arents, loamy and clayey, are not assigned a capability subclass or a woodland ordination symbol.

Bb—Bayoudan clay, 3 to 8 percent slopes. This moderately sloping, moderately well drained soil typically is on uplands along drainageways on side slopes. The areas generally are long and narrow and range from 10 to 200 acres.

Typically, this soil has a dark brown, medium acid clay surface layer about 2 inches thick. The subsoil to a depth of 72 inches is very strongly acid clay. It is brown in the upper part and light yellowish brown in the lower part.

Included with this soil in mapping are a few small areas of Guyton, Falkner, and Tippah soils. Guyton soils are in drainageways and are grayish and loamy throughout. Falkner and Tippah soils are in higher positions on the landscape than the Bayoudan soil and are loamy in the upper part of the subsoil. Also included are small areas of Bayoudan soils that have a silt loam surface layer, or have no surface layer because of erosion, or have slopes of less than 3 percent or more than 8 percent. The included soils make up about 15 percent of the map unit.

Water and air move through this Bayoudan soil at a very slow rate. Runoff is medium, and the hazard of erosion is moderate. This soil has low fertility, and the root zone has moderately high levels of exchangeable aluminum that are potentially toxic to crops. Plants generally are damaged by a lack of water during dry periods in summer and fall of some years. This soil dries slowly, and the clay surface layer is very sticky when wet and very hard when dry. This soil has very high shrink-swell potential.

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

This soil is moderately well suited to woodland and has moderately high potential for production of loblolly pine. The main concerns in producing and harvesting timber are a moderate hazard of erosion that is caused by slope and moderate limitations in the use of equipment that are caused by the clay surface layer. Management practices that minimize the risk of erosion are essential in harvesting timber. Mechanical planting of trees on the contour is effective in controlling erosion. Conventional methods of harvesting timber can be used except sometimes during rainy periods, generally from December to April. Because the clay surface layer and subsoil are very sticky when wet, most planting and harvesting equipment should be used only during dry periods.

This soil is moderately well suited to pasture. The main limitations are steepness of slope and low fertility. Erosion is a hazard. Suitable pasture plants are bahiagrass, improved bermudagrass, common bermudagrass, crimson clover, and ryegrass. Seedbed preparation should be on the contour or across the slope where practical. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. When this soil is wet, grazing results in puddling of the surface layer, poor tilth, and excessive runoff. Periodic mowing and clipping helps to maintain uniform growth, discourages selective grazing, and reduces clumpy growth. Fertilizer and lime are needed for optimum production of forage.

This soil is poorly suited to cultivated crops, mainly because of steepness of slope, poor tilth, low fertility, and potentially toxic levels of exchangeable aluminum in the root zone. This soil is very sticky when wet and very hard when dry, and it becomes cloddy if tilled when too wet or too dry. The hazard of erosion is severe. Erosion can be reduced if conservation tillage is used and tillage and seeding are on the contour. Also, waterways should be shaped and seeded to perennial grass. Lime and fertilizer can improve fertility and reduce the level of exchangeable aluminum.

This soil is poorly suited to homesites or urban development. Limitations affecting building sites, local roads and streets, and most sanitary facilities are severe. The main limitations are very high shrink-swell potential, very slow permeability, and low strength as it affects roads. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed. Buildings and roads should be specially designed to offset the effects of shrinking and swelling. Roads should be designed to offset the limited ability of the soil to support a load. Where septic tanks are installed, using sandy backfill for the trench and constructing long absorption lines help to compensate for the very slow permeability of the soil. Lagoons or self-contained sewage disposal units can dispose of sewage properly.

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

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

Bc—Bayoudan clay, 8 to 40 percent slopes. This moderately well drained soil is on uplands. The landscape is hilly uplands where ridgetops are narrow and strongly sloping and side slopes are steep. Landslides are common. The areas of this soil are dissected by many small drainageways. Eroded spots and shallow to deep gullies occur in places. The areas generally are large and range to several thousand acres.

Typically, this soil has a very dark grayish brown, very strongly acid clay surface layer about 2 inches thick. The subsurface layer to a depth of about 5 inches is brown, very strongly acid clay. The subsoil extends to a depth of about 72 inches. It is strong brown, extremely acid clay in the upper part and light olive brown and yellowish brown, extremely acid clay in the middle part. The lower part of the subsoil is olive and grayish brown, extremely acid and slightly acid clay.

Included with this soil in mapping are a few small areas of Falkner and Tippah soils. Falkner and Tippah soils are on ridgetops at higher elevations and have a subsoil that is loamy in the upper part. Also included are small areas of soils that are similar to the Bayoudan soil except that they are alkaline and have numerous concretions of carbonates and fossils in the surface layer. Areas of these soils are indicated on the maps by a special symbol. The included soils make up about 10 percent of the map unit.

Water and air move through this Bayoudan soil at a very slow rate. Runoff is rapid or very rapid, and the hazard of erosion is very severe. Fertility is low. Plants generally are damaged by a lack of water during dry periods in summer and fall of some years. The surface layer is very sticky when wet and very hard when dry. This soil is subject to down-slope movement and slippage during wet periods, and it has very high shrink-swell potential.

Most of this soil is used as woodland for timber production and habitat for woodland wildlife.

This soil is moderately well suited to woodland and has moderately high potential for the production of loblolly pine. Common trees are post oak, southern red oak, loblolly pine, shortleaf pine, sweetgum, and blackgum. Loblolly pine is a suitable tree to plant. Trees should be planted by hand or seeded aerially. Leaning and deformed trees caused by landslides and the shrinking and swelling of this soil are common. The main concerns in producing and harvesting timber are steep slopes and the clay surface layer. In places, gullies limit the use of equipment. Conventional methods of harvesting are difficult because of steep slopes. Trafficability is poor when the soil is wet.

This soil is well suited to habitat for deer, turkey, squirrels, and other native woodland wildlife. Habitat for wildlife can be improved by leaving mast-producing trees along drainageways when harvesting timber and during site preparation for tree planting.

This soil generally is not suited to cultivated crops and pasture. The slopes are too steep and the hazard of erosion is too severe. Less sloping included soils can be used for pasture if erosion is controlled. Suitable pasture grasses are common bermudagrass and bahiagrass.

This soil is poorly suited to homesites and urban development. The main limitations are steep slopes, very high shrink-swell potential, and soil slippage caused by steep slopes and the clay subsoil. Construction of homes, pipelines, and roads and streets on this soil is risky because of the very high shrink-swell potential and the hazard of soil slippage. Cracked building foundations and high maintenance costs for repairs of roads, streets, and pipelines should be expected.

This Bayoudan soil is in capability subclass VIIe. The woodland ordination symbol is 8C.

BR—Brimstone-Prentiss association, 0 to 3 percent slopes. The poorly drained Brimstone soil and the moderately well drained Prentiss soil are on low stream terraces. The landscape is low, convex ridges and narrow flats and concave swales. The Brimstone soil is on flats and in concave positions, and the Prentiss soil is on low, convex ridges. Fewer observations were made than in other map units. The detail in mapping, however, is adequate for the expected use of the soils. The areas generally are large and variable, irregular in shape, and range from about 50 acres to several hundred acres. They are about 35 percent Brimstone soil and 25 percent Prentiss soil. The soils are in a regular and repeating pattern on the landscape, but their proportions vary appreciably from one mapped area to another. The Brimstone soil generally has slopes of less than 1 percent. The Prentiss soil has slopes that range from 1 to 3 percent.

Typically, the Brimstone soil has a grayish brown, strongly alkaline very fine sandy loam surface layer about 7 inches thick. The subsurface layer to a depth of about 21 inches is light brownish gray, mottled, strongly alkaline very fine sandy loam. The subsoil to a depth of about 62 inches is grayish brown, mottled, silty clay loam and light brownish gray, strongly alkaline silt loam in the upper part and light brownish gray, mottled, moderately alkaline and mildly alkaline silty clay loam in the lower part. The substratum to a depth of about 85 inches is gray, moderately alkaline fine sandy loam.

Water and air move through the Brimstone soil at a slow rate. Water runs off the surface at a slow rate and stands in low places for long periods after heavy rains. This soil has medium fertility. Plants generally are damaged by a lack of water during dry periods in summer and fall of some years. Concentrations of sodium salts in the subsoil limit the rooting depth and the water available to plants. Effective rooting depth is also limited by a seasonal high water table that ranges from the surface to 1.5 feet below the surface from December to April. This soil is subject to rare flooding during unusually wet periods.

Typically, the Prentiss soil has a brown, strongly acid fine sandy loam surface layer about 5 inches thick. The subsoil extends to a depth of about 64 inches. It is yellowish brown, very strongly acid and strongly acid loam to a depth of about 24 inches. The lower part of the subsoil is a fragipan that is yellowish brown, mottled, strongly acid loam. The substratum to a depth of about 84 inches is very strongly acid, stratified, yellowish brown loam and light brownish gray very fine sandy loam.

Water and air move through the upper part of the Prentiss soil at a moderate rate and through the lower part at a moderately slow rate. Water runs off the surface at a medium rate. This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to crops. A seasonal high water table is perched on the fragipan at a depth of about 2.0 to 2.5 feet from January through March. Plants generally are damaged by a lack of water during dry periods in summer and fall of some years. This soil has low shrink-swell potential.

Included with these soils in mapping are a few small areas of Cahaba, Frizzell, and Guyton soils. Cahaba and Frizzell soils are in slightly higher positions than the Prentiss soil, and they do not have a fragipan. Guyton soils are in positions similar to those of the Brimstone soil, and they do not have concentrations of sodium salts in the subsoil. Also included are small areas of soils that are similar to the Prentiss soil except that they do not have a fragipan or they are alkaline in the lower part of the subsoil. The included soils make up about 40 percent of the map unit. The Cahaba and Guyton soils are the most extensive of the included soils, each making up about 13 percent of the map unit.

These Brimstone and Prentiss soils are used mostly as woodland.

The soils in this map unit are moderately well suited to woodland, and they have a moderately high potential for the production of loblolly pine. In most areas, the woodland is mixed hardwood and pine stands. Trees commonly are subject to windthrow when the soil is excessively wet and winds are strong. The main limitations affecting the production and harvesting of timber are wetness and sodium salts. Wetness and flooding severely limit the use of equipment during the winter and spring. When the soils are wet, trafficability is poor and heavy equipment causes soil compaction, which reduces the productivity of the soils. Seedling mortality is moderate because of wetness. Concentrations of sodium salts in the Brimstone soil limit tree growth. If site preparation is not adequate, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees.

The soils in this map unit are poorly suited to homesites and urban development. The main limitations are wetness, slow and moderately slow permeability, moderate shrink-swell potential, and low strength as it affects roads. In addition, flooding is a hazard, and major flood control structures, along with extensive local drainage systems, are needed. Excess water can be removed by using shallow ditches and providing the proper grade for drainage. Roads should be designed to offset the limited ability of the Brimstone soil to support a load. Septic tank absorption fields do not function properly during rainy periods because of wetness and slow and moderately slow permeability. Lagoons or self-contained sewage disposal units can be used to dispose of sewage properly.

The soils in this map unit are somewhat poorly suited to cultivated crops, mainly because of wetness and concentrations of sodium salts in the Brimstone soil and low fertility and potentially toxic levels of exchangeable aluminum in the Prentiss soil. Drainage is needed if the Brimstone soil is used as cropland. Suitable crops are corn, soybeans, and grain sorghum. Fertilizer and lime can improve soil fertility and reduce the level of exchangeable aluminum.

The soils in this map unit are moderately well suited to pasture. Wetness and sodium salts in the Brimstone soil limit the choice of pasture plants and the time of grazing. Suitable pasture plants are common bermudagrass, tall fescue, Dallisgrass, bahiagrass, white clover, and winterpeas. Improved bermudagrass can also be grown in areas of the Prentiss soil. When this soil is wet, grazing results in puddling, compaction of the surface layer, and reduced forage production. Fertilizer and lime are needed for optimum production of forage.

The soils in this map unit are moderately well suited to habitat for woodland wildlife and well suited to wetland wildlife. Wildlife habitat can be improved by leaving den- and mast-producing trees, such as beech, hickory, and oak, along drainageways when harvesting timber and during site preparation for tree planting.

The Brimstone soil is in capability subclass IIIs, and the Prentiss soil is in capability subclass IIe. The woodland ordination symbol is 11T for the Brimstone soil and 9W for the Prentiss soil.

Ch—Cahaba fine sandy loam, 1 to 3 percent slopes. This well drained, very gently sloping soil is in high positions on low stream terraces. The areas generally are oblong and range from 5 to 50 acres. Slopes generally are short and convex.

Typically, this soil has a very dark grayish brown, strongly acid fine sandy loam surface layer about 6 inches thick. The subsoil extends to a depth of about 53 inches. It is yellowish red, strongly acid sandy clay loam in the upper and middle parts and strong brown, strongly acid fine sandy loam in the lower part. The substratum to a depth of about 62 inches is yellowish brown, very strongly acid fine sandy loam.

Included with this soil in mapping are a few small areas of Frizzell and Prentiss soils that are in slightly lower positions than the Cahaba soil. Frizzell soils have a brownish subsoil that has less clay than the subsoil of the Cahaba soil and less sand that is coarser than fine sand. Prentiss soils have a fragipan. Also included are small areas of soils similar to the Cahaba soil except that they have a brownish subsoil. The included soils make up about 15 percent of the map unit.

Water and air move through this Cahaba soil at a moderate rate, and water runs off the surface at a medium rate. This soil has low fertility. Plants generally are damaged by a lack of water during dry periods in summer and fall of some years. This soil dries quickly after rains, and the shrink-swell potential is low.

Most of this soil is used as woodland. A small acreage is used as cropland, pastureland, or homesites.

This soil is well suited to woodland and has few limitations affecting the production and harvesting of timber. Intensive site preparation and maintenance generally are not needed; however, undesirable plants can reduce adequate natural or artificial reforestation.

This soil is well suited to cultivated crops, such as corn, cotton, soybeans, and vegetables, but it is limited mainly by low fertility. The hazard of erosion is slight or moderate. Returning crop residue to the soil or regularly adding other organic matter improves fertility, reduces crusting, and increases the water intake rate. Crops respond well to additions of lime and fertilizer. Terraces reduce runoff and the risk of erosion and help to conserve moisture. In areas where water of suitable quality is available, supplemental irrigation can prevent damage to crops during dry periods.

This soil is well suited to pasture. Suitable pasture plants are improved bermudagrass, bahiagrass, common bermudagrass, crimson clover, and ryegrass. Low fertility is the main limitation. Fertilizer is needed for optimum growth of grasses and legumes.

This soil is well suited to habitat for upland and woodland wildlife. Habitat for woodland wildlife can be improved by encouraging the growth of mast-producing trees, such as oaks. Habitat for upland wildlife can be improved by planting or encouraging the growth of vegetation that provides adequate food and cover.

This soil is well suited to urban development. It has only slight limitations affecting dwellings and septic tank absorption fields; however, seepage from sanitary landfills and sewage lagoons can be a severe limitation. Preserving the existing plant cover during construction and revegetating disturbed areas around construction sites as soon as possible help to control erosion.

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

Fa—Falkner silt loam. This somewhat poorly drained, nearly level soil is on broad, convex ridgetops on uplands and is also on stream terraces. The areas are irregular in shape and range from 10 to several hundred acres. Slopes range from 0 to 2 percent.

Typically, this soil has a brown, very strongly acid silt loam surface layer about 5 inches thick. The subsoil extends to a depth of about 63 inches. It is yellowish brown, mottled, extremely acid and very strongly acid silty clay loam in the upper part; mottled light brownish gray and yellowish brown, extremely acid and very strongly acid clay in the middle part; and brownish yellow, medium acid clay in the lower part.

Included with this soil in mapping are a few small areas of Bayoudan, Cadeville, Guyton, Providence, and Tippah soils. Bayoudan and Cadeville soils are on side slopes and have a clayey subsoil. Guyton soils are in narrow drainageways and are grayish and loamy throughout. Providence and Tippah soils are in positions similar to those of the Falkner soil. Providence soils have a fragipan. The seasonal high water table in the Tippah soils is at a greater depth than the water table in the Falkner soil. Included are a few small areas of soils similar to the Falkner soil except that they are gray throughout. Also included are small areas of Falkner soils that have slopes of more than 2 percent. The included soils make up about 20 percent of the map unit.

Water and air move through the upper part of this Falkner soil at a moderately slow rate and through the lower part at a slow rate. Water runs off the surface at a slow or medium rate. This soil has medium fertility. A seasonal high water table is perched on the clayey lower part of the subsoil at about 1.5 to 2.5 feet below the surface from January through March. This soil dries quickly after rains. The shrink-swell potential is low in the surface layer and upper part of the subsoil and high in the lower part of the subsoil.

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

This soil is well suited to woodland and has high potential for the production of loblolly pine. The main limitation affecting production and harvesting of timber is wetness. Conventional methods of harvesting generally can be used except sometimes during rainy periods, generally from December to April. Trafficability is poor when the soil is wet, and heavy equipment causes rutting and soil compaction, which can reduce the productivity of the soil.

This soil is well suited to cultivated crops. Soybeans is the main crop, but cotton, grain sorghum, and corn also are grown. This soil is limited mainly by wetness, by only medium fertility, and by potentially toxic levels of exchangeable aluminum in the root zone. It is friable and easy to keep in good tilth and can be worked throughout a wide range of moisture content. Land grading and smoothing can improve surface drainage and permit more efficient use of farm equipment. A tillage pan can form where cultivation is excessive. It can be broken up by subsoiling when the soil is dry. Maintaining crop residue on or near the surface reduces runoff and helps to maintain soil tilth and organic matter content. Most crops respond well to additions of fertilizer and lime, which can improve fertility and reduce the level of exchangeable aluminum. Practices that can be used to control erosion include early fall seeding, conservation tillage, and construction of terraces, diversions, and grassed waterways.

This soil is well suited to pasture. The main limitations are seasonal wetness and only medium fertility. Suitable pasture plants are improved bermudagrass, bahiagrass, ryegrass, white clover, winterpeas, and common bermudagrass. When this soil is wet, grazing results in puddling and in damage to the plant community. Excess water on the surface can be removed by using shallow drains and providing the proper grade for drainage. Seedbed preparation should be on the contour or across the slope where practical. Fertilizer and lime are needed for optimum production of forage. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition.

This soil is poorly suited to urban development. The main limitations are wetness, low strength as it affects roads, slow permeability, and high shrink-swell potential. Buildings and roads should be designed to offset the effects of shrinking and swelling. Drainage should be provided around homesites. Roads should be designed to offset the limited ability of the soil to support a load. Septic tank absorption fields do not function properly because of seasonal wetness and slow permeability. Lagoons or self-contained sewage disposal units can be used to dispose of sewage properly.

This soil is well suited to habitat for upland and woodland wildlife. Habitat for wildlife can be improved by leaving mast-producing trees along drainageways when harvesting timber and during site preparation for tree planting. Every three years, prescribed burning rotated among several small tracts of land can increase the amount of palatable deer browse and seed-producing plants for quail and turkey.

This Falkner soil is in capability subclass IIw. The woodland ordination symbol is 8W.

Fe—Forestdale silty clay loam, occasionally flooded. This level, poorly drained soil is in intermediate positions on low stream terraces. The areas generally are long and narrow and range from 10 to 150 acres. Slopes are long and smooth and generally are less than 1 percent.

Typically, this soil has a very dark grayish brown, very strongly acid silty clay loam surface layer about 4 inches thick. The subsoil extends to a depth of about 87 inches. It is gray and light brownish gray, mottled, very strongly acid clay in the upper part; brown, mottled, very strongly acid and slightly acid clay loam in the middle part; and brown, mottled, neutral sandy clay loam in the lower part.

Included with this soil in mapping are a few small areas of Alligator and Perry soils and soils similar to the Forestdale soil except that they have a clay surface layer. The Alligator and Perry soils are in lower positions than the Forestdale soil, and they have more clay in the subsoil. The included soils make up about 10 percent of the map unit.

Water and air move through this Forestdale soil at a very slow rate. This soil has medium fertility and a moderately high level of exchangeable aluminum that is potentially toxic to crops. A seasonal high water table is about 0.5 to 2.0 feet below the surface from January through April. Adequate water is available to plants in most years. This soil is subject to brief to very long periods of flooding from January through April. Floodwaters typically are 1 to 5 feet deep, and the depth exceeds 5 feet in places. Flood duration may exceed 45 days. The surface layer remains wet for long periods after heavy rains. The shrink-swell potential is high.

Most of the acreage of this soil is wooded. It is within the Boeuf River Wildlife Management Area and is used as woodland and wildlife habitat. A small acreage is used for homesites.

This soil is moderately well suited to woodland and has high potential for the production of hardwood trees, such as Nuttall oak, willow oak, eastern cottonwood, sweetgum, green ash, and water oak. The understory vegetation is mainly hawthorn, honeysuckle, water elm, and deciduous holly. Wetness is the main limitation affecting the production and harvesting of timber, and flooding is a hazard. Wetness and flooding can be overcome by using special equipment during wet periods or by logging during the drier periods. In addition, planting only water-tolerant trees on bedded rows helps to increase seedling survival and hasten reforestation.

This soil is moderately well suited to habitat for woodland wildlife. Habitat for wildlife can be improved by encouraging the growth of oak trees and other desirable plants.

This soil is poorly suited to cropland and pastureland; however, late-planted crops, such as soybeans and grain sorghum, can be grown in some years. The main limitations are wetness and poor tilth. Flooding is a hazard, and major flood control structures, such as levees, are needed.

This soil is poorly suited to urban uses. It generally is not suited to sites for dwellings because of the hazard of flooding, which can be controlled only by major flood control structures, such as levees. Buildings can be placed on pilings or mounds, however, to elevate them above the expected flood levels. Additional problems are a seasonal high water table, very slow permeability, and high shrink-swell potential.

This Forestdale soil is in capability subclass IVw. The woodland ordination symbol is 9W.

FZ—Frizzell-Guyton-Providence association, 0 to 2 percent slopes. The moderately well drained Frizzell and Providence soils and the poorly drained Guyton soil are on low stream terraces. The landscape is broad flats, low ridges, and circular mounds. The circular mounds are 20 to 40 feet wide. The mounds and ridges are 1 to 3 feet high. The Frizzell and Providence soils are on low ridges and mounds; the Guyton soil is on broad flats. Fewer observations were made than in other map units. The detail in mapping, however, is adequate for the expected use of the soils. The areas generally are large and variable, irregular in shape, and range from 50 to several hundred acres. The areas generally parallel major streams, and most are crossed by a few, well-defined drainageways. This map unit is about 60 percent Frizzell soil, 12 percent Guyton soil, and 12 percent Providence soil. The soils are in a regular and repeating pattern on the landscape, but their proportions vary from one area to another. Frizzell and Providence soils have convex slopes that range from 1 to 2 percent. Guyton soil has plane or concave slopes that are less than 1 percent.

Typically, the Frizzell soil has a brown, mottled, very strongly acid silt loam surface layer about 4 inches thick. The subsoil extends to a depth of about 72 inches. It is yellowish brown loam and pale brown very fine sandy loam in the upper part, yellowish brown and light gray silt loam in the middle part, and yellowish brown silty clay loam and loam in the lower part. The subsoil is mottled throughout, and it is very strongly acid or strongly acid.

Water and air move through the Frizzell soil at a slow rate. Water runs slowly off the surface. This soil has low fertility and a high level of exchangeable aluminum that is potentially toxic to crops. A seasonal high water table is about 1.5 to 4.0 feet below the surface from December through April. Plants generally are damaged by a lack of water during dry periods in summer and fall of some years. This soil dries slowly after rains. It has low shrink-swell potential.

Typically, the Guyton soil has a brown, mottled, medium acid silt loam surface layer about 4 inches thick. The subsurface layer is light grayish brown, mottled, very strongly acid silt loam to a depth of about 28 inches. The subsoil to a depth of about 60 inches is grayish brown, mottled, very strongly acid silty clay loam.

Water and air move through the Guyton soil at a slow rate, and water runs slowly off the surface. This soil has low fertility and a high level of exchangeable aluminum that is potentially toxic to crops. A seasonal high water table ranges from the soil surface to a depth of about 1.5 feet from December through May. This soil is subject to rare flooding during unusually wet periods. The shrink-swell potential is low.

Typically, the Providence soil has a brown, medium acid silt loam surface layer about 5 inches thick. Upper and middle parts of the subsoil to a depth of about 34 inches are strong brown and yellowish brown, mottled, very strongly acid silty clay loam. The lower part to a depth of about 60 inches is a fragipan that is yellowish brown, mottled, very strongly acid, firm and brittle silty clay loam.

Water and air move through the upper part of the Providence soil at a moderate rate and through the fragipan at a moderately slow rate. Water runs off the surface at a slow to medium rate. This soil has medium fertility and a moderately high level of exchangeable aluminum that is potentially toxic to crops. A seasonal high water table is perched on the fragipan at a depth of about 1.5 to 3.0 feet from January through March. Plants generally are damaged by a lack of water during dry periods in summer and fall of some years. This soil has low shrink-swell potential.

Included with these soils in mapping are a few small areas of Brimstone, Cahaba, and Savannah soils. Brimstone soils are in positions similar to those of the Guyton soil and have concentrations of sodium in the subsoil. Cahaba and Savannah soils are in positions similar to those of the Providence soil. Cahaba soils have a reddish subsoil and do not have a fragipan. Savannah soils are similar to the Providence soil except they have more sand in the upper part of the subsoil. The included soils make up about 16 percent of the map unit.

These Frizzell, Guyton, and Providence soils are used mainly as woodland, but in some areas they are used for homesites or pasture.

These soils are well suited to woodland. The potential for the production of loblolly pine is high. The main concern in producing and harvesting timber is wetness that limits use of equipment and causes severe seedling mortality in areas of the Guyton soil. Conventional methods of harvesting timber generally can be used except sometimes during rainy periods, generally from December to April. Equipment use should be limited to dry periods to prevent rutting and compaction of the surface layer. If site preparation is not adequate, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Although the hazard of erosion is only slight, road cuts and fills need to be seeded to permanent plant cover.

These soils are somewhat poorly suited to homesites and urban development. The main limitations are wetness and slow and moderately slow permeability. Excess water can be removed by using shallow ditches and providing the proper grade for drainage. Septic tank absorption fields do not function properly during rainy periods because of wetness and slow and moderately slow permeability. Lagoons or self-contained sewage disposal units can be used to dispose of sewage properly. Flooding is a hazard only in areas of the Guyton soil, which should not be used for homesites.

The soils in this map unit are well suited to habitat for woodland wildlife. Wildlife habitat can be improved by leaving den- and mast-producing trees, such as beech, hickory, and oak, along drainageways when harvesting timber and during site preparation for tree planting.

The soils in this map unit are moderately well suited to cultivated crops. The main limitations are wetness, slope, low and medium fertility, and high and moderately high levels of exchangeable aluminum that are potentially toxic to crops. Drainage is needed to improve these soils for crops. Crusting of the surface and compaction can be reduced by returning crop residue to the soil. Using conservation tillage or regularly adding other organic matter improves fertility, helps to maintain the content of organic matter and reduces runoff and erosion. Most crops respond well to additions of lime and fertilizer, which improve fertility and reduce the levels of exchangeable aluminum within the root zone.

These soils are well suited to pasture. Wetness and low and medium fertility are the main limitations. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, white clover, and winterpea. Fertilizer is needed for optimum growth of grasses and legumes.

The Frizzell and Providence soils in this map unit are in capability subclass IIw. The Guyton soil is in capability subclass IIIw. The woodland ordination symbol is 9W for all the soils.

Go—Gallion silt loam. This level, well drained soil is in high positions on natural levees that are on the alluvial plains of the Ouachita and Boeuf Rivers. The areas generally are long and narrow and range from 10 to 100 acres. Slopes are less than 1 percent.

Typically, this soil has a neutral silt loam surface layer about 9 inches thick. It is dark grayish brown in the upper part and dark brown in the lower part. The subsoil extends to a depth of 46 inches. It is yellowish red, neutral silty clay loam in the upper part; dark brown, slightly acid silt loam in the middle part; and strong brown, neutral very fine sandy loam in the lower part. The substratum to a depth of about 64 inches is strong brown, neutral very fine sandy loam.

Included with this soil in mapping are a few small areas of Hebert, Rilla, and Sterlington soils. Hebert soils are in lower positions than the Gallion soil, and in the subsoil, grayish coatings are on surfaces of peds. The Rilla and Sterlington soils are in positions similar to those of the Gallion soil. Rilla soils are more acid than the Gallion soil, and Sterlington soils have less clay in the subsoil. Also included are small to large areas of Gallion soils in low places that are subject to rare flooding. The included soils make up about 15 percent of the map unit.

Water and air move through this Gallion soil at a moderate rate, and water runs slowly off the surface. This soil has high fertility. Plants generally are damaged by a lack of water during dry periods in summer and fall of some years. This soil dries quickly after rains. The shrink-swell potential is moderate in the subsoil.

This soil is used mostly as cropland. A small acreage is used as pastureland, woodland, or homesites or to produce turfgrass.

This soil is well suited to cultivated crops and has few limitations affecting this use. Cotton is the main crop, but soybeans, corn, grain sorghum, wheat, and vegetables also are grown. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. A tillage pan can form as a result of excessive cultivation, but it can be broken up by subsoiling when the soil is dry. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Limiting tillage for seedbed preparation and weed control also reduces runoff and erosion. Most crops respond well to additions of fertilizer.

This soil is well suited to pasture and has few limitations affecting this use. Suitable pasture plants are improved bermudagrass, white clover, tall fescue, ryegrass, and common bermudagrass. Grasses and legumes grow well if adequate fertilizer is used. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition.

This soil is well suited to woodland, but because it is also suited to cropland, most areas have been cleared for crops or pasture. Only a few small areas remain in native hardwoods. If this soil is used to produce timber for commercial use, suitable trees to plant are eastern cottonwood and American sycamore.

This soil is moderately well suited to urban development. The main limitations are moderate permeability, low strength as it affects roads, and moderate shrink-swell potential. The moderate permeability is a limitation affecting the performance of septic tank absorption fields but can be overcome by increasing the size of the absorption field. Roads should be designed to offset the limited ability of the soil to support a load. Buildings and roads can be designed to offset the effects of shrinking and swelling. The included soils that are at an elevation of less than 65.5 feet above sea level are subject to rare flooding and are poorly suited to dwellings. Homes built in areas of the included soils that are at a low elevation can be raised above the expected flood levels on properly designed mounds of soil material.

This Gallion soil is in capability class I. The woodland ordination symbol is 9A.

Gr—Gore silt loam, 2 to 5 percent slopes. This moderately well drained soil is on side slopes and ridgetops on uplands. Only two areas of this soil were mapped. The areas are oblong; one is about 30 acres, and the other is about 65 acres. Slopes generally are short and convex.

Typically, this soil has a brown, extremely acid silt loam surface layer about 6 inches thick. The subsoil to a depth of about 71 inches is reddish brown, extremely acid and very strongly acid clay in the upper and middle parts and brown, mottled, neutral silty clay in the lower part.

Included with this soil in mapping are a few small areas of Falkner soils. Falkner soils are in higher positions than the Gore soils and have a subsoil that is loamy in the upper part. Also included are small areas of soils that are similar to the Gore soil except that they are gray throughout. In places are areas of the Gore soil where the surface layer has eroded away. The included soils make up about 15 percent of the map unit.

Water and air move through this soil at a very slow rate. Runoff is medium, and the hazard of water erosion is severe. This soil has low fertility and a moderately high level of exchangeable aluminum that is potentially toxic to crops. Plants generally are damaged by a lack of water during dry periods in summer and fall of some years. The surface layer remains wet for long periods after heavy rains. The surface layer is friable, but it becomes somewhat difficult to keep in good tilth where cultivation has mixed some of the clayey subsoil into the plow layer. This soil has very high shrink-swell potential.

This soil is used as cropland or pastureland.

This soil is poorly suited to cultivated crops, mainly because of steepness of slope, low fertility, and a moderately high level of exchangeable aluminum within the root zone. The hazard of erosion is severe because of the slope, the silty surface layer, and the very slowly permeable subsoil. Suitable crops are wheat, grain sorghum, and soybeans. Where part of the subsoil has been mixed into the plow layer, this soil is difficult to keep in good tilth and can be worked only within a narrow range of moisture content. Crop residue left on or near the surface helps to conserve moisture, improve tilth, and control erosion. Most crops respond well to additions of fertilizer and lime, which improve fertility and lower the level of exchangeable aluminum. Terraces and contour farming reduce runoff and erosion.

This soil is moderately well suited to pasture. The main limitations are low fertility and steepness of slope. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, crimson clover, and ryegrass. Seedbed preparation should be on the contour, where practical, to control erosion. When the soil is wet, grazing results in puddling and in damage to the plant community. Fertilizer and lime are needed for optimum production of forage. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition.

This soil is moderately well suited to woodland. If it is used to produce timber, equipment use limitations are moderate because of the clay subsoil. Loblolly pine is a suitable tree to plant.

This soil is poorly suited to urban development and to homesites. The main limitations are low strength as it affects roads, very slow permeability, and the high shrink-swell potential. Roads should be designed to offset the limited ability of the soil to support a load. Lagoons or self-contained sewage disposal units can be used to dispose of sewage properly. Buildings and roads can be designed to offset the effects of shrinking and swelling. Preserving existing plant cover and revegetating disturbed areas around construction sites as soon as possible help to control soil erosion.

This Gore soil is in capability subclass IVe. The woodland ordination symbol is 7C.

GY—Guyton and Ouachita silt loams, frequently flooded. These level, poorly drained and well drained soils are on narrow or wide flood plains of streams. The Guyton soil is poorly drained and is in low positions. The Ouachita soil is well drained and is on slightly convex ridges or natural levees. These soils were not mapped separately because frequent flooding limits their use and management. Generally, the duration of flooding is very brief or brief, but it can be brief or long on the flood plains of Beaucoup Creek and Castor Creek. Floodwaters typically are 2 to 5 feet deep, but the depth exceeds 10 feet in places. The Guyton soil makes up about 72 percent of the map unit, and the Ouachita soil makes up about 15 percent. Most mapped areas contain both soils, but the proportion of each soil varies from place to place. Most areas are long and narrow. Areas on the flood plains of Beaucoup and Castor Creek are long and wide. Slopes are less than 1 percent.

Typically, the Guyton soil has a grayish brown, mottled, extremely acid silt loam surface layer about 4 inches thick. The subsurface layer to a depth of about 20 inches is extremely acid, mottled silt loam. It is grayish brown in the upper part and light brownish gray in the lower part. The subsoil to a depth of about 62 inches is grayish brown, very strongly acid silty clay loam. Mottles are in shades of brown.

Water and air move through the Guyton soil at a slow rate, and water runs slowly off the surface. This soil has low fertility and a high level of exchangeable aluminum within the root zone. A seasonal high water table fluctuates between the soil surface and 1.5 feet below the surface from December through May. This soil dries slowly after heavy rains, and the shrink-swell potential is low.

Typically, the Ouachita soil has a brown, very strongly acid silt loam surface layer about 7 inches thick. The subsoil to a depth of about 65 inches is yellowish brown, very strongly acid silt loam in the upper and middle parts and pale brown, mottled, strongly acid silt loam in the lower part. The substratum to a depth of about 72 inches is light brownish gray, mottled, strongly acid silty clay loam.

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

Included with these soils in mapping are a few small areas of Brimstone, Cahaba, and Frizzell soils. These soils are on low stream terraces. Brimstone soils have concentrations of sodium in the subsoil. Cahaba soils have a reddish subsoil that is distinct and well developed. Frizzell soils have a distinct and brownish subsoil. Also included are small areas of Guyton soils that are in slightly higher positions and subject to only occasional flooding. The included soils make up about 13 percent of the map unit.

These Guyton and Ouachita soils are used as woodland for timber production and habitat for wildlife.

The soils in this map unit are somewhat poorly suited to woodland. The soils on the flood plains of Castor and Beaucoup Creeks are not suited to pine trees because of the frequency and long duration of flooding. In other areas, the potential for production of loblolly pine is high. The main limitations affecting the production and harvesting of timber are high seedling mortality and poor trafficability caused by frequent flooding and wetness. 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 April. Rooting depth in the Guyton soil is limited by the seasonal high water table, and trees commonly are subject to windthrow when this soil is saturated and winds are strong.

These soils are not suited to cropland or homesites. The hazard of flooding generally is too severe.

These soils are poorly suited to pasture. The main limitations are wetness and low fertility, and flooding is a hazard. Common bermudagrass is the main pasture grass. Native water-tolerant grasses can also be used for permanent pasture. Applications of high rates of fertilizer or lime generally are not practical because of the frequent overflow.

These soils are moderately well suited to habitat for woodland wildlife. Habitat can be improved by planting appropriate vegetation, by maintaining existing plant cover, or by promoting the natural establishment of desirable plants.

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

He—Hebert silt loam. This level, somewhat poorly drained soil is in intermediate positions on natural levees of the Ouachita and Boeuf Rivers and their distributaries. Most areas are protected from flooding by levees. Areas are long and narrow and range from 10 to 300 acres. Slopes range from 0 to 2 percent.

Typically, this soil has a brown, mottled, slightly acid silt loam surface layer about 6 inches thick. The subsoil extends to a depth of about 72 inches. It is, in sequence downward, light brownish gray, mottled, slightly acid clay loam; pale brown, mottled, medium acid silt loam; reddish brown, mottled, strongly acid silt loam; and reddish brown, mottled, medium acid silt loam and silty clay loam. Light brownish gray silt coatings are on the surfaces of peds throughout the subsoil.

Included with this soil in mapping are a few small areas of Gallion, Perry, Portland, and Rilla soils. Gallion and Rilla soils are in higher positions than the Hebert soil and have a reddish subsoil that does not have grayish coatings on the surfaces of peds. Perry and Portland soils are in lower positions and have a clayey subsoil. Also included are small areas of Hebert soils that have a silty clay loam surface layer and small to large areas of Hebert soils in low and unprotected places that are subject to rare or occasional flooding. The included soils make up about 20 percent of the map unit.

Water and air move through the Hebert soil at a moderately slow rate, and water runs slowly off the surface. This soil has medium fertility. A seasonal high water table is about 1.5 to 3.0 feet below the surface from December through April. Plants generally are damaged by a lack of water during dry periods in summer and fall of some years. The surface layer of this soil remains wet for long periods after heavy rains.

This soil is used mostly for cultivated crops. A small acreage is used as pastureland, woodland, or homesites.

This Hebert soil is well suited to cultivated crops, such as cotton, soybeans, grain sorghum, corn, and vegetables. Most irrigation systems are suitable. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Land grading and smoothing improve surface drainage, allow more uniform application of irrigation water, and permit more efficient use of farm equipment. A tillage pan can form as a result of excessive cultivation, but it can be broken up by subsoiling when the soil is dry. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Most crops respond well to fertilizer. Lime generally is needed.

This soil is well suited to pasture. The main limitations are wetness and only medium fertility. Suitable pasture plants are improved bermudagrass, common bermudagrass, bahiagrass, tall fescue, white clover, and winterpeas. Excess water on the surface can be removed by surface drainage. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer is needed for optimum growth of grasses and legumes.

This soil is well suited to woodland and has high potential for production of eastern cottonwood, American sycamore, cherrybark oak, Nuttall oak, and sweetgum. This soil has few limitations affecting the production of commercial timber. Conventional methods of harvesting timber can be used except during rainy periods, generally from December to April. Soil compaction can be reduced by using suitable logging systems, laying out skid trails in advance, and harvesting timber when the soil is dry and least susceptible to compaction.

This soil is well suited to habitat for openland and woodland wildlife. Habitat can be improved by encouraging the growth of fruit-producing trees and the appropriate seed-producing plants. Additional cover can be provided by leaving vegetated end rows or waterways.

This soil is poorly suited to urban development and most sanitary facilities. The main limitations are wetness, moderate shrink-swell potential, low strength as it affects roads, and moderately slow permeability. Flooding is a hazard in areas of included soils that are at low elevations or that are not protected by levees. Major flood control structures, along with extensive local drainage systems, are needed. Excess water can be removed by using shallow ditches and providing the proper grade for drainage. In inadequately protected areas, homes can be built on properly designed mounds of soil material to raise them above expected flood levels. The effects of shrinking and swelling can be overcome by using proper engineering designs for structures and by backfilling with material that has low shrink-swell potential. 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 wetness and moderately slow permeability. Sewage lagoons or self-contained disposal units can be used to dispose of sewage properly.

This Hebert soil is in capability subclass IIw. The woodland ordination symbol is 8A.

Hh—Hebert silt loam, gently undulating, occasionally flooded. This somewhat poorly drained soil is on point bars and in low areas along the Ouachita River. The landscape is low to high ridges and swales between ridges. The ridges are 1 to 10 feet high and 30 to 100 feet wide. The swales are about 40 to 100 feet wide. Slopes generally are short and choppy and range from 0 to 5 percent. The mapped areas range from about 60 to 200 acres.

Typically, this soil has a brown, strongly acid silt loam surface layer about 5 inches thick. The subsurface layer to a depth of about 14 inches is light brownish gray, mottled, very strongly acid silt loam. The underlying material to a depth of about 60 inches is light gray, mottled, strongly acid silt loam. In places, thin reddish layers are at a depth of 30 inches or more. Light brownish gray silt coatings are on the surfaces of peds throughout the subsoil.

Included with this soil in mapping are a few small areas of Perry, Rilla, and Sterlington soils. Perry soils are in the swales and have a clayey subsoil. Rilla and Sterlington soils are in higher positions than the Hebert soil, and they do not have grayish coatings on the surfaces of peds in the subsoil. The included soils make up about 20 percent of the map unit.

Water and air move through the Hebert soil at a moderately slow rate. Water runs off the surface at a medium rate and stands in the swales for long periods after heavy rains. This soil has medium fertility. A seasonal high water table is about 1.5 to 3.0 feet below the surface from December through April. Plants generally are damaged by a lack of water during dry periods in summer and fall of some years. This soil is subject to brief to very long periods of flooding from December through April. Floodwaters typically are 5 to 10 feet deep, but the depth exceeds 15 feet in places. Flood duration can exceed 30 days. The shrink-swell potential in the subsoil is moderate.

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

This soil is moderately well suited to short-season cultivated crops, mainly soybeans, corn, and grain sorghum. Its use is limited mainly by wetness, flooding, and irregular slopes. This soil is friable and easy to keep in good tilth, although irregular slopes hinder tillage operations. The soil can be worked throughout a wide range of moisture content. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Planting dates are delayed and crops are damaged by floods in some years. Flooding can be controlled only with major flood control structures, such as levees. Maintaining crop residue on or near the surface reduces runoff and helps to maintain soil tilth and organic matter content. Most crops respond well to fertilizer, and lime generally is needed. A tillage pan can form as a result of excessive cultivation, but it can be broken up by subsoiling when the soil is dry.

This soil is moderately well suited to pasture but is limited by wetness and flooding. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, and white clover. Fertilizer and lime are needed for optimum production of forage. Excess water on the surface can be removed by installing a suitable drainage system. When the soil is wet, grazing results in puddling and in damage to the plant community. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition.

This soil is well suited to woodland and has high potential for the production of eastern cottonwood, American sycamore, sweetgum, water oak, and Nuttall oak. Wetness is the main limitation affecting the production and harvesting of timber, and flooding is a hazard. Trees should be water-tolerant and 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. Soil compaction reduces the productivity of the soil, but it can be reduced by using suitable logging systems, laying out skid trails in advance, and harvesting timber when the soil is dry and least susceptible to compaction.

This soil is well suited to habitat for woodland wildlife and moderately well suited to openland and wetland wildlife. Habitat for woodland wildlife can be improved by encouraging the growth of fruit-producing trees, such as oaks. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open-water areas for waterfowl and furbearers.

This soil is poorly suited to urban development. It generally is not suited to dwellings because of the hazard of flooding. Wetness, moderate shrink-swell potential, moderately slow permeability, and low strength as it affects roads are limitations. Drainage and protection from flooding are needed to improve this soil for urban uses.

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

Hn—Hebert silty clay loam. This level, somewhat poorly drained soil is in intermediate positions on natural levees of the Ouachita and Boeuf Rivers and their distributaries. Most areas of this soil are protected from flooding. Areas are long and narrow and range from 10 to 200 acres. Slopes range from 0 to 2 percent.

Typically, this soil has a brown, medium acid, silty clay loam surface layer about 5 inches thick. The subsurface layer to a depth of about 10 inches is light brownish gray, slightly acid silt loam. The subsoil to a depth of about 47 inches is reddish brown, mottled, very strongly acid silty clay loam in the upper part and brown and dark brown, mottled, very strongly acid silty clay loam in the lower part. The substratum to a depth of about 71 inches is dark brown, mottled, neutral silt loam.

Included with this soil in mapping are a few small areas of Gallion, Perry, and Portland soils. Gallion soils are in higher positions than the Hebert soil, and they do not have grayish coatings on the surfaces of peds in the subsoil. Perry and Portland soils are in lower positions and have a clayey subsoil. Also included are small areas of Hebert soils that have a silt loam surface layer. Included in low places and in places not protected by levees are small to large areas of Hebert soils that are subject to rare or occasional flooding. The included soils make up about 20 percent of the map unit.

Water and air move through the Hebert soil at a moderately slow rate, and water runs slowly off the surface. This soil has medium fertility. A seasonal high water table is about 1.5 to 3.0 feet below the surface from December through April. Plants generally are damaged by a lack of water during dry periods in summer and fall of some years. The surface layer remains wet for long periods after heavy rains. The shrink-swell potential is moderate in the subsoil.

This soil is used mostly for cultivated crops. A small acreage is used as pastureland, woodland, or homesites.

This soil is moderately well suited to cultivated crops, such as cotton, soybeans, grain sorghum, corn, and vegetables. Most irrigation systems are suitable. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Land grading and smoothing improve surface drainage, allow more uniform application of irrigation water, and permit more efficient use of farm equipment. A tillage pan can form as a result of excessive cultivation, but it can be broken up by subsoiling when the soil is dry. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Most crops respond well to fertilizer, and lime generally is needed.

This soil is well suited to pasture. The main limitations are medium fertility and wetness. Suitable pasture plants are improved bermudagrass, common bermudagrass, bahiagrass, tall fescue, white clover, and winterpeas. Excess water on the surface can be removed by installing a surface drainage system. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer is needed for optimum growth of grasses and legumes.

This soil is well suited to woodland and has high potential for the production of eastern cottonwood, American sycamore, cherrybark oak, Nuttall oak, and sweetgum. This soil has few limitations affecting the production and harvesting of timber. Conventional methods of harvesting can be used except sometimes during rainy periods, generally from December to April. Planting and harvesting should be done only during dry periods to reduce soil compaction.

This soil is well suited to habitat for openland and woodland wildlife. Habitat can be improved by planting appropriate vegetation or by promoting the natural establishment of desirable plants.

This soil is poorly suited to urban development. The main limitations are wetness, low strength as it affects roads, moderate shrink-swell potential, and moderately slow permeability. Flooding is a hazard in the areas of included soils that are in low places or that are unprotected by levees. Major flood control structures, along with extensive local drainage systems, are needed. In areas inadequately protected from flooding, homes can be built on properly designed mounds of soil material to raise them above expected flood levels. Excess water can be removed by using shallow ditches and providing the proper grade for drainage. 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 wetness and moderately slow permeability. Sewage lagoons or self-contained disposal units can be used to dispose of sewage properly.

This Hebert soil is in capability subclass IIw. The woodland ordination symbol is 8A.

Hs—Hebert-Sterlington silt loams, 0 to 2 percent slopes. These somewhat poorly drained and well drained soils are on the alluvial plain of the Ouachita River and are subject to rare flooding. The landscape is slightly convex, low ridges, level areas, and slightly concave swales and drainageways. Numerous circular depressional areas 2 to 6 feet deep and 1 to 15 acres in size are scattered across the landscape. The Hebert soil is in the level and concave areas. The Sterlington soil is on the low ridges. These soils are so intermingled that mapping them separately is not practical at the scale used. The areas are large and irregular in shape. The Hebert soil makes up about 44 percent of the map unit and the Sterlington soil about 30 percent.

Typically, the Hebert soil has a dark grayish brown, medium acid silt loam surface layer about 5 inches thick. The subsurface layer to a depth of about 8 inches is brown, medium acid silt loam. The subsoil to a depth of about 60 inches is reddish brown, mottled, very strongly acid silt loam and loam.

Water and air move through the Hebert soil at a moderately slow rate, and water runs slowly off the surface. This soil has medium fertility. A seasonal high water table is about 1.5 to 3.0 feet below the surface during December through April. Adequate water is available to plants in most years. This soil is subject to rare flooding during unusually wet periods. It dries slowly after heavy rains. The shrink-swell potential is moderate in the subsoil.

Typically, the Sterlington soil has a brown, very strongly acid silt loam surface layer about 8 inches thick. The subsurface layer to a depth of about 15 inches is brown, very strongly acid silt loam. The subsoil is strong brown, mottled, very strongly acid silt loam and loam. The substratum to a depth of about 60 inches is reddish brown, mottled, very strongly acid loam.

Water and air move through the Sterlington soil at a moderate rate, and water runs slowly off the surface. This soil has medium fertility and potentially toxic levels of exchangeable aluminum in the root zone. Plants generally are damaged by a lack of water during dry periods in summer and fall of some years. This soil dries quickly after rains, and the shrink-swell potential is low.

Included with these soils in mapping are a few small areas of Gallion, Perry, Rilla, and Yorktown soils. Gallion and Rilla soils are in positions similar to those of the Sterlington soil, and they contain more clay in the subsoil. Perry soils are in lower positions than the Hebert soil and are clayey throughout. Yorktown soils are in depressional areas. They are clayey throughout and are wet most of the time. Also included are small areas of Gallion, Perry, Rilla, and Sterlington soils that are subject to occasional flooding. The included soils make up about 26 percent of the map unit.

The Hebert and Sterlington soils are used mostly as woodland. A small acreage is used as cropland or pastureland.

The soils in this map unit are well suited to woodland and have high potential for the production of hardwoods. These soils have few limitations affecting production and harvesting of timber. Common trees include water oak, sweetgum, cherrybark oak, swamp chestnut, green ash, and American sycamore. Trees that are suitable for planting include eastern cottonwood, American sycamore, and sweetgum. Using standard-wheeled and tracked equipment when the soils are moist causes rutting and compaction. Planting and harvesting should be done when the soils are dry and least susceptible to compaction.

The soils in this map unit are moderately well suited to cultivated crops, and mainly soybeans and grain sorghum are grown. The main limitations are wetness, medium fertility, potentially toxic levels of exchangeable aluminum, and the irregularity of the landscape, which hinders tillage operations. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Land grading and smoothing remove excess water, but in places large volumes of soil need to be moved. A tillage pan can form as a result of excessive cultivation, but it can be broken up by subsoiling when the soil is dry. Returning crop residue to the soil or regularly adding other organic matter improves fertility, reduces crusting, and increases the water intake rate. Crops respond to lime and fertilizer, which improve fertility and reduce the levels of exchangeable aluminum.

These soils are well suited to pasture. The main limitations are medium fertility and wetness. Suitable pasture plants are improved bermudagrass, common bermudagrass, bahiagrass, white clover, and ryegrass. When the soil is wet, grazing results in puddling and damages the plant community. Excess water on the surface can be removed by using shallow ditches and providing the proper grade for drainage. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Periodic mowing and clipping help to maintain uniform growth, discourage selective grazing, and reduce clumpy growth. Fertilizer and lime are needed for optimum production of forage.

These soils are poorly suited to urban development, mainly because of wetness, low strength as it affects roads, moderate and moderately slow permeability, moderate shrink-swell potential, and flooding. Drainage is needed if roads and building foundations are constructed. Excess water can be removed by using shallow ditches and providing the proper grade for drainage. Roads should be designed to offset the limited ability of the soil to support a load. Moderately slow and moderate permeability and the high water table increase the possibility that septic tank absorption fields will fail. Lagoons or self-contained sewage disposal units can be used to dispose of sewage properly. In areas of the Hebert soil, homes can be built on properly designed mounds of soil material to raise them above expected flood levels.

The soils in this map unit are well suited to habitat for woodland and openland wildlife. Habitat can be improved by planting appropriate vegetation or by promoting the natural establishment of desirable plants.

The Hebert and Sterlington soils are in capability subclass IIw. The woodland ordination symbol for the Hebert soil is 8A. It is 3A for the Sterlington soil.

IB—Iuka fine sandy loam, frequently flooded. This moderately well drained soil is on the narrow flood plains of streams that drain the uplands. The landscape is low, broad, slightly convex ridges and flat areas between the ridges. The Iuka soil is on the ridges. In the flat areas is a soil similar to the Iuka soil. The similar soil is poorly drained, grayish throughout, and has a seasonal high water table that is 0.5 to 1.5 feet below the surface. It makes up about 27 percent of the map unit. Fewer observations were made than in other map units because of the frequent flooding. Separation of the major soil and similar soil would be of little value to the land user. The detail in mapping, however, is adequate for the expected use of these soils. The areas are long and narrow and range from 20 to 250 acres. Slopes generally are less than 1 percent.

Typically, the Iuka soil has a brown and yellowish brown, strongly acid fine sandy loam surface layer about 10 inches thick. The upper part of the underlying material is brown, mottled, medium acid fine sandy loam. The lower part to a depth of about 60 inches is light yellowish brown, mottled, medium acid fine sandy loam.

Included with this soil in mapping are a few small areas of Guyton soils. Guyton soils are in lower positions than the Iuka soil, are grayish throughout, and contain more clay in the subsoil. Also included are small areas of soils that have a silt loam surface layer and soils that have thin clayey layers within 40 inches of the soil surface. The included soils make up about 13 percent of the map unit.

Water and air move through the Iuka soil at a moderate rate, and water runs slowly off the surface. This soil has low fertility. A seasonal high water table is about 1 to 3 feet below the surface from December through April. Plants generally are damaged by a lack of water during dry periods in summer and fall of some years. The soil is subject to very brief to long periods of flooding from December through April. This soil dries quickly after rains, and it has low shrink-swell potential.

This soil is used mostly as woodland. A small acreage is used as pastureland.

This Iuka soil is moderately well suited to woodland and has high potential for the production of loblolly pine. Other common trees include water oak, willow oak, eastern cottonwood, yellow poplar, swamp chestnut, and sweetgum. Only trees that can tolerate seasonal wetness should be planted. Suitable trees to plant are loblolly pine, eastern cottonwood, and yellow poplar. The main concerns in producing and harvesting of timber are moderate limitations in the use of equipment and moderate seedling mortality caused by flooding, wetness, and a seasonal high water table. Using standard-wheeled and tracked equipment when the soil is wet or moist causes rutting and compaction. Using low-pressure ground equipment or using equipment only when the soil is dry reduces damage to the soil and helps to maintain productivity. If site preparation is not adequate, competition from undesirable plants can prevent or prolong natural or artificial reestablishment of trees. Bedding and surface drainage are necessary to ensure pine seedling survival. Natural regeneration of pines is difficult in wet years.

This soil is poorly suited to pasture. Wetness and low fertility are the main limitations, and flooding is a hazard. The only tame pasture grass that can be expected to grow well on this soil is common bermudagrass. Native water-tolerant grasses can also be used for permanent pasture. Rotation grazing helps to maintain the quality of forage. Adding high rates of fertilizer generally is not practical because of the hazard of frequent overflow.

This soil is not suited to urban development. The hazard of flooding generally is too severe. Deep drainage can reduce wetness. Flooding is possible to control, but only by constructing major structures, such as levees.

This soil is well suited to habitat for woodland wildlife. Habitat can be improved by planting appropriate vegetation or by promoting the natural establishment of desirable plants, such as oak trees.

This Iuka soil is in capability subclass Vw. The woodland ordination symbol is 11W.

LA—Larue-Smithdale association, moderately steep. These well drained soils are on uplands. The landscape is moderately sloping to strongly sloping ridgetops and moderately steep and steep side slopes. Many well defined drainageways cross the map unit. Eroded spots and gullies are in some places. The Larue soil is on ridgetops and side slopes, and the Smithdale soil is on side slopes. Fewer observations were made than in other map units because the moderately steep slopes are a major limitation affecting the use and management of these soils. Separating the soils would be of little value to the land user. The detail in mapping, however, is adequate for the expected use of these soils. In places are many small to large areas of soils that are similar to the Larue soil except that the combined thickness of their sandy surface and subsurface layers ranges from 40 to 80 inches. The soils that are similar to the Larue soil make up about 18 percent of the map unit. The map unit is about 45 percent Larue soil and similar soils and about 27 percent Smithdale soil. These soils are in a 1,500-acre area. Larue soil has slopes of 5 to 30 percent, and Smithdale soil has slopes of 12 to 30 percent.

Typically, the Larue soil has a brown, strongly acid loamy fine sand surface layer about 10 inches thick. The subsurface layer to a depth of about 29 inches is light yellowish brown, medium acid loamy fine sand. The subsoil extends to a depth of about 72 inches. It is red, strongly acid sandy clay loam in the upper part and yellowish red, strongly acid loam in the lower part.

Water and air move through the upper part of the Larue soil at a rapid rate and through the lower part at a moderate rate. Runoff is slow, and the hazard of water erosion is moderate. This soil has low fertility, and the root zone has moderately high levels of exchangeable aluminum that are potentially toxic to crops. Plants generally are damaged by a lack of water during dry periods in summer and fall of most years. This soil dries quickly after rains and it has low shrink-swell potential.

Typically, the Smithdale soil has a brown, strongly acid fine sandy loam surface layer about 7 inches thick. The subsurface layer to a depth of about 14 inches is light yellowish brown, medium acid fine sandy loam. The subsoil extends to a depth of about 95 inches. It is yellowish red, very strongly acid sandy clay loam in the upper part and yellowish red, very strongly acid loam in the lower part.

Water and air move through the Smithdale soil at a moderate rate. Runoff is rapid, and the hazard of water erosion is severe. This soil has low fertility and a potentially toxic level of exchangeable aluminum in the root zone. Plants generally are damaged by a lack of water during dry periods in summer and fall of some years. This soil dries quickly after rains, and it has low shrink-swell potential.

Included with these soils in mapping are a few small areas of Cadeville, Guyton, and Savannah soils. Cadeville soils are in positions similar to those of the Larue and Smithdale soils, and they have a clayey subsoil. Guyton soils are in drainageways and are grayish throughout. Savannah soils are on ridgetops and have a fragipan. The included soils make up about 28 percent of the map unit.

The Larue and Smithdale soils are used mostly as woodland for timber production and wildlife habitat.

These soils are moderately well suited to woodland, and they have high or moderately high potential for the production of loblolly pine. Common trees are loblolly pine, longleaf pine, shortleaf pine, white oak, southern red oak, blackgum, post oak, and hickory. The main concerns in producing and harvesting timber are a moderate hazard of erosion caused by steepness of slope and moderate seedling mortality caused by soil droughtiness. The steepness of slope limits the kinds of equipment that can be used in forest management. In addition, traction is poor in areas of the Larue soil, especially when the sandy surface layer is dry. Gullies limit the use of equipment in places. Management that minimizes the risk of erosion is essential in harvesting timber. Where slopes exceed 15 percent, logging trails should be on the contour and diversions should be constructed to control runoff and erosion. Competing vegetation can be controlled by proper site preparation and by spraying, cutting, or girdling to eliminate unwanted weeds, brush, or trees. Because the Larue soil is droughty, seedlings should not be planted during dry periods. Organic matter can be conserved in both soils by restricting burning and leaving slash well distributed.

These soils are well suited to habitat for woodland wildlife. Habitat can be improved by leaving mast-producing trees, such as beech, hickory, and oak, along drainageways when harvesting timber and during site preparation.

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

These soils are poorly suited to tame pasture, mainly because of the hazard of erosion. The moderately steep slopes and gullies limit the use of equipment. If these soils are used for tame pasture, special practices are needed to control erosion during the period of pasture establishment. Weeping lovegrass and improved bermudagrass are adapted to the Larue soil, and common bermudagrass and bahiagrass are better adapted to the Smithdale soil. Fertilizer and lime are needed for optimum forage production.

These soils generally are poorly suited to urban development, mainly because of steepness of slope. Where slopes are less than 15 percent, however, the soils are moderately well suited to most urban uses. Seepage can be a problem affecting sanitary facilities in areas of the Larue soil. On construction sites, the existing plant cover should be preserved during construction, and disturbed areas should be revegetated as soon as possible to control soil erosion.

The soils in this map unit are in capability subclass VIe. The woodland ordination symbol for Larue soil is 8S. It is 9R for the Smithdale soil.

OC—Olla-Cadeville association, steep. These well drained and moderately well drained soils are on uplands. The landscape is narrow, moderately sloping and strongly sloping ridgetops and moderately steep to very steep side slopes. The Olla soil is on side slopes, and the Cadeville soil is on ridgetops and side slopes. Many well defined drainageways cross the map unit. Eroded spots and gullies are in some places. Fewer observations were made in areas of these soils than in other areas because the moderately steep slopes are major limitations affecting the use and management of these soils. Separating the soils would be of little value to the land user. The detail in mapping, however, is adequate for the expected use of these soils. This map unit is about 57 percent Olla soil and 23 percent Cadeville soil. The areas are large and variable. Slopes range from 5 to 15 percent on the ridgetops and 15 to 40 percent on the side slopes.

Typically, the Olla soil has a brown, extremely acid fine sandy loam surface layer about 6 inches thick. The subsoil extends to a depth of about 64 inches. It is strong brown, very strongly acid sandy clay loam in the upper part; yellowish brown, very strongly acid fine sandy loam in the middle part; and light yellowish brown, mottled, very strongly acid fine sandy loam in the lower part. The substratum to a depth of about 72 inches is light yellowish brown, very strongly acid, stratified very fine sandy loam, silt loam, and clay.

Water and air move through the Olla soil at a moderate rate. Runoff is rapid, and the hazard of water erosion is high. The soil has low fertility and a high level of exchangeable aluminum that is potentially toxic to crops. Plants generally are damaged by a lack of water during dry periods in summer and fall of most years. Shrink-swell potential is moderate. This soil dries quickly after rains.

Typically, the Cadeville soil has a dark brown, medium acid very fine sandy loam surface layer about 3 inches thick. The subsoil extends to a depth of about 32 inches. It is yellowish red, extremely acid clay in the upper and middle parts and light brownish gray, mottled, extremely acid clay in the lower part. The substratum to a depth of about 60 inches is light brownish gray, extremely acid clay.

Water and air move through the Cadeville soil at a very slow rate. Water runs rapidly off the surface, and the hazard of water erosion is severe. This soil has low fertility and a high level of exchangeable aluminum that is potentially toxic to crops. Plants generally are damaged by a lack of water during dry periods in summer and fall of most years. Shrink-swell potential is high.

Included with these soils in mapping are a few small areas of Iuka, Ruston, and Savannah soils. These soils are loamy throughout. Iuka soils are in narrow drainageways. Ruston and Savannah soils are on ridgetops. The included soils make up about 20 percent of the map unit.

The Olla and Cadeville soils are used mostly as woodland for timber production and habitat for upland woodland wildlife.

The soils in this map unit are moderately well suited to woodland and have moderately high potential for the production of loblolly pine. Common trees are loblolly pine, shortleaf pine, white oak, southern red oak, sweetgum, post oak, and hickory. The main concerns in producing and harvesting timber are a severe erosion hazard and moderate limitations in the use of equipment that are caused by steep slopes and the clay subsoil. Seedling mortality is moderate in the summer because of soil droughtiness. Management that minimizes the risk of erosion is essential in harvesting timber. The protective layer of duff should be maintained, and equipment blades should be kept out of the ground as much as possible to reduce erosion. Logging trails should be on the contour, and diversions should be constructed to control runoff and erosion. Competing vegetation can be controlled by proper site preparation and by spraying, cutting, or girdling to eliminate unwanted weeds, brush, or trees.

The soils in this map unit are well suited to habitat for woodland wildlife. Habitat can be improved by leaving mast-producing trees, such as beech, hickory, and oak, along drainageways when harvesting timber and during site preparation.

Because of steep slopes and a severe hazard of erosion, these soils are poorly suited to urban development and pastureland, and they are not suited to cultivated crops.

These soils are in capability subclass VIIe. The woodland ordination symbol is 8R for the Olla soil and 8C for the Cadeville soil.

Pe—Perry silty clay loam. This level, poorly drained soil is in low positions on natural levees on the flood plains of the Ouachita and Boeuf Rivers. The areas are irregular in shape and range from 15 to 200 acres. Slopes are less than 1 percent.

Typically, this soil has a dark grayish brown, strongly acid silty clay loam surface layer about 6 inches thick. The subsoil extends to a depth of about 18 inches. It is gray, mottled, strongly acid clay in the upper part and dark reddish brown, mildly alkaline clay in the lower part. The substratum to a depth of about 60 inches is dark reddish brown, moderately alkaline clay.

Included with this soil in mapping are a few small areas of Hebert soils. Hebert soils are in slightly higher positions than the Perry soil and are loamy throughout. Also included are small areas of Perry clay and other Perry soils that have a silt loam surface layer. Included in low places are small to large areas of Perry soils that are subject to rare flooding. The included soils make up about 20 percent of the map unit.

Water and air move through the Perry soil at a very slow rate. Water runs slowly off the surface and stands in low places for long periods after heavy rains. This soil has medium fertility. A seasonal high water table fluctuates between a depth of about 2 feet and the soil surface from December through June. The surface layer remains wet for long periods after heavy rains. The shrink-swell potential is very high in the subsoil.

This soil is used mostly for cultivated crops. A small acreage is used as pastureland, woodland, or homesites.

This soil is moderately well suited to cultivated crops, mainly soybeans, grain sorghum, and rice. It is limited mainly by wetness and by only medium fertility. It is friable and easy to keep in good tilth and can be worked throughout a wide range of moisture content. However, the plow layer is difficult to keep in good tilth where cultivation has mixed in some of the clayey subsoil. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Land grading and smoothing improve surface drainage and permit more efficient use of farm equipment. Most crops respond well to fertilizer. Lime generally is needed.

This soil is moderately well suited to pasture. The main limitations are wetness and medium fertility. Suitable pasture plants are common bermudagrass, improved bermudagrass, Dallisgrass, white clover, and ryegrass. Excess water on the surface can be removed by shallow ditches. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum production of forage.

This soil is moderately well suited to woodland and has high potential for the production of green ash, sweetgum, water oak, and American sycamore. The main concerns in producing and harvesting timber are severe limitations in the use of equipment and moderate seedling mortality caused by wetness. Conventional methods of harvesting timber can be used except sometimes during rainy periods, generally from December to June. Logging should be done only during dry periods to reduce rutting and soil compaction. Only trees that can tolerate seasonal wetness should be planted. Bedding of rows helps to overcome wetness limitations and improve the rate of seedling survival.

This soil is well suited to habitat for woodland and wetland wildlife and moderately well suited to openland wildlife. Encouraging the growth of oak, beach, hickory, and other mast-producing trees can improve the habitat for woodland wildlife. Habitat for openland wildlife can be improved by planting appropriate grasses and forbs around cropland borders.

This soil is poorly suited to urban development. Limitations affecting building sites, local roads and streets, and most sanitary facilities are severe. The main limitations are wetness, very slow permeability, very high shrink-swell potential, and low strength as it affects roads. Excess water can be removed by using shallow ditches and providing the proper grade for drainage. 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 wetness and very slow permeability. Lagoons or self-contained sewage disposal units can be used to dispose of sewage properly. The effects of shrinking and swelling can be minimized by using proper engineering designs for structures and by backfilling with material that has low shrink-swell potential. In low places that are subject to flooding, homes can be built on properly designed mounds of soil material to raise them above expected flood levels.

This Perry soil is in capability subclass IIIw. The woodland ordination symbol is 3W.

Pf—Perry clay. This level, poorly drained soil is in low positions on the flood plains of the Ouachita and Boeuf Rivers. The areas are irregular in shape and range from 20 to 1,000 acres. Slopes are less than 1 percent.

Typically, this soil has a dark grayish brown, strongly acid clay surface layer about 4 inches thick. The subsoil extends to a depth of about 50 inches. It is gray, mottled, strongly acid clay in the upper part and reddish brown, neutral clay in the lower part. The substratum to a depth of about 64 inches is reddish brown, moderately alkaline clay.

Included with this soil in mapping are a few small areas of Alligator and Hebert soils. Alligator soils are in slightly lower positions than the Perry soil and are grayish throughout. Hebert soils are in higher positions and are loamy throughout. Also included in low positions are small areas of Perry soils that are subject to rare flooding. The included soils make up about 20 percent of the map unit.

Water and air move through the Perry soil at a very slow rate. Water runs very slowly off the surface and stands in low places for long periods after heavy rains. This soil has medium fertility. A seasonal high water table fluctuates between a depth of about 2 feet and the soil surface from December through June. This soil has very high shrink-swell potential.

This soil is used mostly for cultivated crops. A small acreage is used as pastureland, woodland, or homesites.

This soil is somewhat poorly suited to most cultivated crops, mainly because of wetness, medium fertility, and poor tilth. The crops grown are soybeans, grain sorghum, and rice. This soil is sticky when wet and hard when dry, and it becomes cloddy if tilled when it is too wet or too dry. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Using conservation tillage and returning all crop residue to the soil or regularly adding other organic matter improve fertility and soil tilth. Most crops respond well to additions of fertilizer and lime. Land grading and smoothing improve surface drainage, allow more uniform application of irrigation water, and permit more efficient use of farm equipment.

This soil is moderately well suited to pasture. The main limitations are wetness and medium fertility. Suitable pasture plants are common bermudagrass, Dallisgrass, white clover, improved bermudagrass, and ryegrass. Excess surface water can be removed by shallow ditches. Lime and fertilizer can overcome the medium fertility and promote good growth of forage plants. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition.

This soil is moderately well suited to the production of green ash, American sycamore, sweetgum, and water oak. The main concerns in producing and harvesting timber are severe limitations in the use of equipment and moderate seedling mortality caused by wetness. Conventional methods of harvesting timber can be used except sometimes during rainy periods, generally from December to April. Logging should be done only during dry periods to reduce rutting and soil compaction. Only trees that can tolerate seasonal wetness should be planted.

This soil is well suited to habitat for woodland wildlife and moderately well suited to habitat for openland wildlife. Habitat can be improved by planting appropriate vegetation, by maintaining existing plant cover, or by promoting the natural establishment of desirable plants. Leaving stubble and other crop residue on the land over winter benefits doves, rabbits, quail, and nongame birds and animals.

This soil is poorly suited to urban development. Limitations affecting building sites, local roads and streets, and most sanitary facilities are severe. The main limitations are wetness, low strength as it affects roads, very slow permeability, and very high shrink-swell potential. Excess water can be removed by using shallow ditches and providing the proper grade for drainage. 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 wetness and very slow permeability. Lagoons or self-contained sewage disposal units can be used to dispose of sewage properly. The effects of shrinking and swelling can be minimized by using proper engineering designs for structures and by backfilling with material that has low shrink-swell potential. In low places that are subject to flooding, homes can be built on properly designed mounds of soil material to raise them above expected flood levels.

This Perry soil is in capability subclass IIIw. The woodland ordination symbol is 3W.

Pg—Perry clay, occasionally flooded. This level, poorly drained soil is in low positions on the flood plains of the Ouachita and Boeuf Rivers. The areas are irregular in shape and range from 20 to several thousand acres. Slopes are less than 1 percent.

Typically, this soil has a dark grayish brown, medium acid clay surface layer about 5 inches thick. The subsoil extends to a depth of about 46 inches. It is gray, mottled, strongly acid clay in the upper part and reddish brown, moderately alkaline clay in the lower part. The substratum to a depth of about 60 inches is reddish brown, moderately alkaline clay.

Included with this soil in mapping are a few small areas of Alligator and Portland soils. Alligator soils are in slightly lower positions than the Perry soil and have a subsoil that is grayish throughout. Portland soils are in slightly higher positions and have a subsoil that is reddish in the upper part. Also included are small areas of Perry soils that are subject to rare flooding or to frequent flooding. The included soils make up about 15 percent of the map unit.

Water and air move through the Perry soil at a very slow rate, and water runs very slowly off the surface. This soil has medium fertility. A seasonal high water table fluctuates between a depth of about 2 feet and the soil surface from December through April. This soil is subject to brief to very long periods of flooding from December through June. Floodwaters typically are 1.5 to 3.0 feet deep, and the depth exceeds 5 feet in places. Flood duration may exceed 1 month. The surface layer is very sticky when wet and dries slowly. This soil has very high shrink-swell potential.

This soil is used mostly as cropland or woodland. A small acreage is used as pastureland or homesites. Many small to large areas of this soil were formerly in cropland but are now idle and are slowly being reforested by hardwood trees.

This soil is poorly suited to most cultivated crops, mainly because of flooding, wetness, and poor tilth. Suitable crops are soybeans, grain sorghum, and rice (fig. 2). Planting dates are delayed and crops are damaged by floods in some years. This soil is difficult to keep in good tilth and can be worked only within a narrow range of moisture content. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Land grading and smoothing improve surface drainage, allow more uniform application of irrigation water, and permit more efficient use of farm equipment. Flooding can be controlled only by major flood control structures, such as levees. Returning crop residue to the soil or regularly adding other organic matter improves fertility and increases the water intake rate. Most crops respond well to additions of fertilizer and lime.

This soil is moderately well suited to woodland and has moderately high potential for the production of cherrybark oak, green ash, water oak, and sweetgum. The main concerns in producing and harvesting timber are severe limitations in the use of equipment and seedling mortality caused by flooding and wetness. Conventional methods of harvesting timber generally can be used except sometimes during rainy periods, generally from December to June. Only trees that can tolerate seasonal wetness should be planted.

This soil is moderately well suited to habitat for woodland wildlife. Habitat can be improved by planting appropriate vegetation, by maintaining existing plant cover, or by promoting the natural establishment of desirable plants. A large acreage of this soil is within the Boeuf Wildlife Management Area.

This soil is somewhat poorly suited to pasture. Wetness is the main limitation, and flooding is a hazard. Common bermudagrass is a suitable pasture plant. Excess water on the surface can be removed by shallow ditches. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum production of forage.

This soil is poorly suited to urban development. It generally is not suited to dwellings because of the flood hazard. Major flood control structures, along with extensive local drainage systems, are needed. This soil has severe limitations affecting building sites, local roads and streets, and most sanitary facilities. The main limitations are wetness, very slow permeability, very high shrink-swell potential, and low strength as it affects roads. Septic tank absorption fields do not function properly during rainy periods because of wetness and very slow permeability. The effects of shrinking and swelling can be minimized by using proper engineering designs for structures and by backfilling with material that has low shrink-swell potential. Roads should be designed to offset the limited ability of the soil to support a load.

This Perry soil is in capability subclass IVw. The woodland ordination symbol is 3W.

Pk—Perry-Hebert complex, gently undulating. These poorly drained and somewhat poorly drained soils are on low parallel ridges and swales on the flood plains of the Ouachita and Boeuf Rivers. The Hebert soil is on low convex ridges that are 3 to 5 feet high and 50 to 200 feet wide. The Perry soil is in concave swales that are about 50 to 300 feet wide. These soils are subject to rare flooding. Areas of these soils are so intermingled that mapping them separately is not practical at the selected scale. The areas of these soils range from about 100 to 800 acres and are about 59 percent Perry soil and about 21 percent Hebert soil. Slopes are short and choppy and range from 0 to 3 percent.

Typically, the Perry soil has a gray, very strongly acid

Figure 2.—Because of its very slow permeability, Perry clay, occasionally flooded, is well suited to rice.

clay surface layer about 5 inches thick. The subsoil to a depth of about 46 inches is gray, mottled, strongly acid clay. The substratum to a depth of about 60 inches is reddish brown, moderately alkaline clay.

Water and air move through the Perry soil at a very slow rate. Water runs very slowly off the surface and stands in low places for long periods. This soil has medium fertility. Flooding is rare, but it can occur during unusually wet periods. A seasonal high water table ranges from the surface to about 0.5 foot below the surface from December through June. This soil dries slowly and has very high shrink-swell potential.

Typically, the Hebert soil has a grayish brown, very strongly acid silt loam surface layer about 6 inches thick. The subsurface layer to a depth of about 10 inches is pale brown, mottled, very strongly acid silt loam. The subsoil extends to a depth of about 52 inches. It is pale brown, mottled, very strongly acid silt loam in the upper part; brown, mottled, very strongly acid silty clay loam in the middle part; and brown, mottled, strongly acid silty clay loam in the lower part. The substratum to a depth of about 64 inches is brown, mottled, medium acid silt loam.

Water and air move through the Hebert soil at a moderately slow rate, and water runs slowly off the surface. This soil has medium fertility. Plants generally are damaged by a lack of water during dry periods in summer and fall of some years. Flooding is rare, but it can occur during unusually wet periods. A seasonal high water table is about 1.5 to 3.0 feet below the surface from December through April. The shrink-swell potential is moderate in the subsoil.

Included with these soils in mapping are a few small areas of Alligator, Gallion, Portland, and Rilla soils. Alligator soils are in slightly lower positions than the Perry soil, and they are grayish throughout. Gallion and Rilla soils are in high positions on some ridges and are reddish and loamy throughout. Portland soils are in slightly higher positions, and they have a subsoil that is reddish in the upper part. Also included are small areas of soils similar to the Perry soil except that they have layers of loamy material between depths of 10 and 30 inches. The included soils make up about 25 percent of the map unit.

The Perry and Hebert soils are used mostly as woodland for timber production and wildlife habitat. A small acreage is used for cultivated crops, pasture, or homesites.

These soils are moderately well suited to woodland and have high potential for the production of water oak, sweetgum, green ash, and pecan trees. The main concerns in producing and harvesting timber are severe limitations in the use of equipment and moderate seedling mortality caused by wetness and the clay surface layer in areas of the Perry soil. Conventional methods of harvesting timber can be used except sometimes during rainy periods, generally from January to June. Logging should be done only during dry periods to prevent rutting and to reduce soil compaction. Providing drainage and planting water-tolerant trees on bedded rows can reduce the seedling mortality rate.

These soils are well suited to habitat for woodland wildlife and moderately well suited to openland and wetland wildlife. A large acreage is in the Boeuf Wildlife Management Area. Habitat for wildlife can be improved by planting appropriate vegetation or by promoting the natural establishment of desirable plants.

These soils are somewhat poorly suited to cultivated crops, and mainly soybeans and grain sorghum are grown. The main limitations are wetness, irregular topography, poor tilth of the Perry soil, and only medium fertility. The Hebert soil is friable and easy to keep in good tilth. Irregular slopes hinder tillage operations and increase the cost of installing drainage systems. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Crop residue left on or near the surface helps to maintain or improve tilth and reduce erosion. Most crops respond well to additions of lime and fertilizer.

These soils are moderately well suited to pasture. Wetness in the swales is the main limitation. Suitable pasture plants are common bermudagrass, improved bermudagrass, Dallisgrass, white clover, and ryegrass. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum production of forage.

These soils are poorly suited to urban development. The main limitations are wetness, low strength as it affects roads, and moderate and very high shrink-swell potential. Also, flooding is a hazard. Flooding can be controlled, but only with major structures, such as levees. Homes can be built on properly designed mounds of soil material to raise them above expected flood levels. Drainage should be provided around homesites. Roads should be designed to offset the limited ability of the soil to support a load. Lagoons or self-contained sewage disposal units can be used to dispose of sewage properly. Buildings and roads need to be designed to offset the effects of shrinking and swelling.

These soils are in capability subclass IIIw. The woodland ordination symbol for the Perry soil is 3W. It is 8A for the Hebert soil.

Pm—Portland silty clay loam. This level, poorly drained soil is in low positions on natural levees on the flood plains of the Ouachita and Boeuf Rivers. The areas are irregular in shape and range from 15 to 200 acres. Slopes are less than 1 percent.

Typically, this soil has a grayish brown, strongly acid silty clay loam surface layer about 8 inches thick. The subsoil extends to a depth of about 48 inches. It is dark brown, mottled, strongly acid clay in the upper part and reddish brown, moderately alkaline clay in the lower part. The substratum to a depth of about 60 inches is stratified brown silt loam and reddish brown clay.

Included with this soil in mapping are a few small areas of Hebert, Perry, and Portland clay soils. Hebert soils are in slightly higher positions than the Portland silty clay loam soil and are loamy throughout. Perry and Portland clay soils are in slightly lower positions and have a subsoil that is grayish in the upper part. Also included are small areas of Portland and Perry soils that are subject to rare flooding. The included soils make up about 15 percent of the map unit.

Water and air move through the Portland soil at a very slow rate. Water runs slowly off the surface and stands in low places for long periods after heavy rains. This soil has medium fertility. A seasonal high water table fluctuates between a depth of about 2 feet and the soil surface from December through May. The surface layer is friable, but it becomes somewhat difficult to keep in good tilth where cultivation has mixed some of the clayey subsoil into the plow layer. This soil has high shrink-swell potential in the subsoil.

This soil is used mostly for cultivated crops. A small acreage is used as pastureland, woodland, or homesites.

This soil is moderately well suited to cultivated crops, and mainly soybeans, grain sorghum, and rice are grown. This soil is limited mainly by wetness, but it is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Land grading and smoothing improve surface drainage and permit more efficient use of farm equipment. Most crops respond well to additions of fertilizer, and lime generally is needed.

This soil is moderately well suited to pasture. The main limitations are wetness and medium fertility. Suitable pasture plants are common bermudagrass, improved bermudagrass, white clover, Dallisgrass, and ryegrass. Excess water on the surface can be removed by shallow ditches. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum production of forage.

This soil is moderately well suited to woodland and has high potential for the production of sweetgum, green ash, water oak, and American sycamore. The main concerns in producing and harvesting timber are severe limitations in the use of equipment and moderate seedling mortality caused by wetness. Conventional methods of harvesting timber can be used except sometimes during rainy periods, generally from December to April. Logging should be done during dry periods to reduce rutting and soil compaction. Only trees that can tolerate seasonal wetness should be planted.

This soil is well suited to habitat for woodland, wetland, and openland wildlife. Habitat for woodland wildlife can be improved by encouraging the growth of trees, such as oak, hickory, and beech. These areas can be improved for dove, rabbit, fox, and other openland wildlife if undisturbed areas of vegetation are provided around cropland. Habitat for wetland wildlife can be improved if shallow ponds are constructed to provide open-water areas for waterfowl, shore birds, and furbearers.

This soil is poorly suited to urban development. It has severe limitations affecting building sites, local roads and streets, and most sanitary facilities. The main limitations are wetness, very slow permeability, high shrink-swell potential, and low strength as it affects roads. Also, soils in low places are subject to flooding. In areas that are subject to flooding, homes can be built on properly designed mounds of soil material to raise them above expected flood levels. Excess water can be removed by using shallow ditches and providing the proper grade for drainage. Septic tank absorption fields do not function properly during rainy periods because of wetness and very slow permeability. Lagoons or self-contained sewage 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. The effects of shrinking and swelling can be minimized by using proper engineering designs for structures and by backfilling with material that has low shrink-swell potential.

This Portland soil is in capability subclass IIIw. The woodland ordination symbol is 3W.

Pn—Portland clay. This level, poorly drained soil is in low positions on the flood plains of the Ouachita and Boeuf Rivers. The areas are irregular in shape and range from 20 to 500 acres. Slopes are less than 1 percent.

Typically, this soil has a dark grayish brown, neutral clay surface layer about 5 inches thick. The subsoil extends to a depth of about 52 inches. It is dark brown, mottled, neutral clay in the upper part and reddish brown, moderately alkaline clay in the middle and lower parts. The substratum to a depth of about 72 inches is dark brown, mottled, moderately alkaline clay.

Included with this soil in mapping are a few small areas of Hebert and Perry soils. Hebert soils are in slightly higher positions than the Portland soil and are loamy throughout. Perry soils are in slightly lower positions and have a subsoil that is grayish in the upper part. Also included are small areas of Portland soils that have a silty clay loam surface layer or that are subject to rare flooding. The included soils make up about 20 percent of the map unit.

Water and air move through this Portland soil at a very slow rate. Water runs very slowly off the surface and stands in low places for long periods. This soil has medium fertility. A seasonal high water table fluctuates between the soil surface and a depth of 2 feet from December through May. This soil dries slowly after heavy rains, and it has high shrink-swell potential.

This soil is used mostly for cultivated crops. A small acreage is used as pastureland, woodland, or homesites.

This soil is moderately well suited to cultivated crops, and mainly soybeans, grain sorghum, and rice are grown. This soil is limited mainly by wetness and poor tilth. It is sticky when wet and hard when dry, and it becomes cloddy if tilled when too wet or too dry. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Using conservation tillage and returning all crop residue to the soil or regularly adding other organic matter improve fertility, soil tilth, and content of organic matter. Most crops respond well to additions of lime and fertilizer. Land grading and smoothing improve surface drainage, allow more uniform application of irrigation water, and permit more efficient use of farm equipment.

This soil is moderately well suited to pasture. The main limitations are wetness and medium fertility. Suitable pasture plants are common bermudagrass, improved bermudagrass, Dallisgrass, white clover, and ryegrass. Excess water on the surface can be removed by shallow ditches. Lime and fertilizer can overcome the medium fertility and promote good growth of forage plants. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition.

This soil is moderately well suited to woodland and has high potential for the production of American sycamore, sweetgum, and water oak. The main concerns in producing and harvesting timber are severe limitations in the use of equipment and moderate seedling mortality caused by wetness. Conventional methods of harvesting timber can be used except sometimes during rainy periods, generally from December to May. The soil can be compacted if heavy equipment is used when the soil is wet. Only trees that can tolerate seasonal wetness should be planted. Bedding of rows helps to overcome wetness limitations and increase seedling survival.

This soil is well suited to woodland, openland, and wetland wildlife. Habitat for wildlife can be improved by planting or encouraging the growth of existing oak trees and suitable understory plants. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open-water areas for waterfowl and furbearers, such as muskrat, nutria, and mink.

This soil is poorly suited to urban development. It has severe limitations affecting building sites, local roads and streets, and most sanitary facilities. The main limitations are wetness, low strength as it effects roads, very slow permeability, and high shrink-swell potential. In addition, flooding is a hazard in some low places. In low places that are subject to flooding, homes can be built on properly designed mounds of soil material to raise them above expected flood levels. Excess water can be removed by using shallow ditches and providing the proper grade for drainage. 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 wetness and very slow permeability. Lagoons or self-contained sewage disposal units can be used to dispose of sewage properly. The effects of shrinking and swelling can be minimized by using proper engineering designs for structures and by backfilling with material that has low shrink-swell potential.

This Portland soil is in capability subclass IIIw. The woodland ordination symbol is 3W.

Po—Providence silt loam, 1 to 5 percent slopes. This moderately well drained, moderately slowly permeable soil is on ridgetops on the uplands and on low terraces along major streams. The areas are irregular in shape and range from 15 to 300 acres.

Typically, this soil has a brown, strongly acid silt loam surface layer about 2 inches thick. The subsurface layer to a depth of about 6 inches is yellowish brown, very strongly acid loam. The subsoil extends to a depth of 72 inches. It is, in sequence downward, strong brown, very strongly acid silt loam; yellowish brown, mottled, very strongly acid silty clay loam; yellowish brown, mottled, very strongly acid silty clay loam that is a dense and brittle fragipan; and yellowish brown, mottled, very strongly acid loam.

Included with this soil in mapping are a few small areas of Guyton, Falkner, Frizzell, Sacul, and Tippah soils. None of these soils has a fragipan. Guyton soils are in drainageways and are grayish throughout. Falkner, Sacul, and Tippah soils are in positions similar to those of the Providence soil, and they have a subsoil that is clayey in some part. Frizzell soils are in lower positions. Also included are small areas of soils that are similar to the Providence soil except that they do not have a fragipan or they have steeper slopes. The included soils make up about 15 percent of the map unit.

Permeability in the Providence soil is moderately slow in the fragipan. Water runs off the surface at a medium rate. This soil has medium fertility and potentially toxic levels of exchangeable aluminum in the root zone. A seasonal high water table is about 1.5 to 3.0 feet below the surface from January through March. Plant roots generally cannot penetrate the fragipan, and plants are damaged by a lack of water during dry periods in summer and fall of some years. The surface layer dries quickly after rains, and this soil has moderate shrink-swell potential.

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

This soil is well suited to woodland and has only slight limitations affecting the production and harvesting of timber. Trees are subject to windthrow because of limited rooting depth. After harvesting, reforestation must be carefully managed to reduce competition from undesirable understory plants. Competing vegetation can be controlled by proper site preparation. Spraying, cutting, or girdling eliminates unwanted weeds, brush, or trees. Logging should be done only during dry periods to reduce rutting and soil compaction.

This soil is moderately well suited to urban development. Preserving the existing plant cover during construction helps to control erosion. The main limitations are wetness, moderately slow permeability, low strength as it affects roads, and moderate shrink-swell potential. A seasonal high water table is perched above the fragipan, and drainage should be provided if buildings are constructed. Septic tank absorption fields do not function properly during rainy periods because of wetness and moderately slow permeability. Lagoons or self-contained sewage 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. Buildings and roads can be designed to offset the effects of shrinking and swelling.

This soil is moderately well suited to cultivated crops. It is limited mainly by steepness of slope and medium fertility. The main crop is soybeans; but grain sorghum, cotton, corn, and wheat are also suitable. This soil is friable and easy to keep in good tilth and can be worked throughout a wide range of moisture content. A tillage pan can form as a result of excessive cultivation, but it can be broken up by subsoiling when the soil is dry. Maintaining crop residue on or near the surface reduces runoff and helps to maintain soil tilth and organic matter content. Crops respond well to additions of lime and fertilizer, which improve fertility and reduce the levels of exchangeable aluminum.

This soil is well suited to pasture and has few limitations affecting this use. Suitable pasture plants are bahiagrass, common bermudagrass, improved bermudagrass, white clover, winterpeas, and ryegrass. When the soil is wet, grazing results in puddling, poor tilth, and excessive runoff. Seedbed preparation should be on the contour or across the slope where practical. Fertilizer and lime are needed for optimum production of forage. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Periodic mowing and clipping helps to maintain uniform growth, discourages selective grazing, and reduces clumpy growth.

This soil is well suited to habitat for upland and woodland wildlife. Habitat for wildlife can be improved by planting appropriate vegetation or by promoting the natural establishment of desirable plants. Every three years, prescribed burning rotated among several small tracts of land can increase the amount of palatable deer browse and seed producing plants for quail and turkey.

This Providence soil is in capability subclass IIe. The woodland ordination symbol is 8W.

Rg—Rilla silt loam. This level, well drained soil is in high positions on natural levees on the flood plains of the Ouachita and Boeuf Rivers. The areas are irregular in shape and range from 10 to 500 acres. Slopes range from 0 to 2 percent.

Typically, this soil has a dark brown, strongly acid silt loam surface layer about 6 inches thick. The subsurface layer is brown, strongly acid silt loam to a depth of about 10 inches. The subsoil to a depth of about 56 inches is dark brown, mottled, very strongly acid silty clay loam in the upper part and brown, mottled, very strongly acid silt loam in the middle and lower parts. The substratum to a depth of about 68 inches is brown, mottled, very strongly acid loam.

Included with this soil in mapping are a few small areas of Gallion, Hebert, and Sterlington soils. Gallion soils are in positions similar to those of the Rilla soil and have a more alkaline subsoil. Hebert soils are in lower positions and have a subsoil that is grayish in the upper part. Sterlington soils are in slightly higher positions and have less than 18 percent clay in the subsoil. Also included at low elevations or in unprotected places are small to large areas of Rilla soils that are subject to rare or occasional flooding. The included soils make up about 15 percent of the map unit.

Water and air move through this Rilla soil at a moderate rate, and water runs slowly off the surface. This soil has medium fertility and potentially toxic levels of exchangeable aluminum. A seasonal high water table is about 4 to 6 feet below the surface from December through April. Plants are damaged by a lack of water during dry periods in summer and fall of some years. This soil has moderate shrink-swell potential in the subsoil.

This soil is used mostly for cultivated crops. A small acreage is used as pastureland, woodland, or homesites.

This soil is well suited to cultivated crops and has few limitations affecting this use. Suitable crops are cotton, corn, soybeans, grain sorghum, wheat, and vegetables (fig. 3). All irrigation systems are suitable for this soil. It is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. A tillage pan can form as a result of excessive cultivation, but it can be broken up by subsoiling when the soil is dry. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Most crops respond well to fertilizer and lime, which improve fertility and reduce the level of

Figure 3.—Cotton is one of the main crops grown on Rilla silt loam.

exchangeable aluminum in the root zone.

This soil is well suited to pasture and has few limitations affecting this use. Suitable pasture plants are common bermudagrass, improved bermudagrass, tall fescue, bahiagrass, white clover, winterpeas, and ryegrass. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum production of forage.

This soil is well suited to woodland, but because it is also suited to cropland, most areas have been cleared for use as cropland or pastureland. This soil has few limitations affecting production of timber and has high potential for production of hardwood trees. Suitable trees to plant are eastern cottonwood and American sycamore.

This soil is well suited to habitat for openland and woodland wildlife. Habitat can be improved by establishing vegetation or encouraging the growth of existing plants, such as fruit-producing trees and shrubs.

This soil is moderately well suited to urban development. The main limitations are moderate shrink-swell potential, low strength as it affects roads, moderate permeability, and wetness. Flooding is a hazard in areas of included soils that are not protected by levees. Buildings constructed in low places or areas unprotected from flooding can be placed on mounds of soil material to raise them above expected flood levels. Excess water can be removed by using shallow ditches and providing the proper grade for drainage. Roads should be designed to offset the limited ability of the soil to support a load. The moderate permeability and the high water table increase the possibility that septic tank absorption fields will fail. The moderate permeability limitation can be overcome by increasing the size of the absorption field.

This Rilla soil is in capability class I. The woodland ordination symbol is 9A.

Rk—Rilla-Hebert silt loams, gently undulating. These well drained and somewhat poorly drained soils are on low parallel ridges and swales on flood plains of the Ouachita and Boeuf Rivers. The well drained Rilla soil is on convex ridges that are 3 to 5 feet high and 50 to 200 feet wide. The somewhat poorly drained Hebert soil is in concave swales that are 50 to 200 feet wide. These soils are so intermingled that mapping them separately is not practical at the selected scale. The map unit is about 45 percent Rilla soil and about 40 percent Hebert soil. The areas range from about 100 to 800 acres. The Rilla soil has slopes that range from 1 to 3 percent, and the Hebert soil has slopes of less than 1 percent.

Typically, the Rilla soil has a dark brown, strongly acid silt loam surface layer about 6 inches thick. The subsurface layer is brown, strongly acid silt loam to a depth of about 12 inches. The subsoil to a depth of about 54 inches is reddish brown, mottled, strongly acid silty clay loam. The substratum to a depth of about 60 inches is reddish brown, mottled, medium acid clay loam.

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

Typically, the Hebert soil has a surface layer of dark grayish brown, medium acid silt loam about 4 inches thick. The subsurface layer is light brownish gray, strongly acid silt loam to a depth of about 14 inches. The subsoil extends to a depth of about 45 inches. It is light brownish gray, mottled, strongly acid silt loam in the upper part; brown, mottled, strongly acid silty clay loam in the middle part; and reddish brown, mottled, strongly acid loam in the lower part. The underlying material to a depth of about 72 inches is reddish brown, mottled, slightly acid silt loam.

Water and air move through this Hebert soil at a moderately slow rate, and water runs slowly off the surface. A seasonal high water table is about 1.5 to 3.0 feet below the surface from December through April. Plants are damaged by a lack of water during dry periods in summer and fall of some years. The surface layer of this soil remains wet for long periods after heavy rains. The shrink-swell potential is moderate in the subsoil.

Included with this soil in mapping are a few small areas of Gallion and Sterlington soils. Gallion soils are in positions similar to those of Rilla soil and are more alkaline in the subsoil. Sterlington soils are in higher positions and contain less clay in the subsoil. Also included are small areas of soils similar to the Hebert soil except that they have a clay surface layer. Also included in low and unprotected places are Rilla and Hebert soils that are subject to rare flooding. The included soils make up about 15 percent of the map unit.

The Rilla and Hebert soils are used mainly for cultivated crops or pastureland. A small acreage is used as woodland or homesites.

The soils in this map unit are moderately well suited to cultivated crops, and mainly soybeans, cotton, corn, grain sorghum, and wheat are grown. The main limitations are wetness in the swales, medium fertility, and the irregular topography. Erosion is a slight hazard in areas of the Rilla soil. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Irregular slopes hinder tillage operations. These soils are friable and easy to keep in good tilth. They can be worked throughout a wide range of moisture content. A tillage pan can form as a result of excessive cultivation, but it can be broken up by subsoiling when the soil is dry. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Most crops respond well to additions of fertilizer and lime, which improve fertility and reduce the levels of exchangeable aluminum.

The soils in this map unit are moderately well suited to pasture. Wetness and only medium fertility are the main limitations. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, tall fescue, white clover, winterpeas, and ryegrass. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum production of forage.

These soils are well suited to woodland, but because they are also suited to cropland, most areas have been cleared for use as cropland or pastureland. These soils have few limitations affecting the production and harvesting of timber. Suitable trees to plant are eastern cottonwood and American sycamore.

The soils in this map unit are well suited to habitat for openland and woodland wildlife. Habitat can be improved by planting appropriate vegetation or by promoting the natural establishment of desirable plants.

The soils in this map unit are moderately well suited to urban development. The main limitations are wetness, low strength as it affects roads, moderate and moderately slow permeability, and the moderate shrink-swell potential. Flooding is a hazard in some low places. In inadequately protected areas, homes can be built on properly designed mounds of soil material to raise them above expected flood levels. Drainage should be provided around homesites. 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. Foundations of buildings can be designed to overcome the effects of shrinking and swelling. Lagoons or self-contained sewage disposal units can be used to dispose of sewage properly.

The Rilla soil is in capability subclass IIe. The woodland ordination symbol is 9A. The Hebert soil is in capability subclass IIw, and the woodland ordination symbol is 8A.

Ru—Ruston fine sandy loam, 3 to 8 percent slopes. This moderately sloping, well drained soil is on ridgetops and side slopes on the uplands. The areas generally are oblong and range from 5 to 80 acres.

Typically, this soil has a dark brown, medium acid fine sandy loam surface layer about 3 inches thick. The subsurface layer to a depth of about 8 inches is brown, medium acid fine sandy loam. The subsoil to a depth of about 84 inches is yellowish red, very strongly acid sandy clay loam in the upper part; yellowish red and light yellowish brown, strongly acid fine sandy loam in the middle part; and mottled yellowish red and light brownish gray, very strongly acid sandy clay loam in the lower part.

Included with this soil in mapping are a few small areas of Sacul and Savannah soils. Sacul soils are on lower side slopes and have a clayey subsoil. Savannah soils are in positions similar to those of the Ruston soil, and they have a fragipan. Also included are a few small areas of soils similar to the Ruston soil except that they have more clay in the upper part of the subsoil. The included soils make up about 15 percent of the map unit.

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

This soil is used mostly as woodland. A small acreage is used for homesites.

This soil is well suited to woodland and has few limitations affecting woodland use and management. Suitable trees to plant are loblolly pine and longleaf pine. Other common trees are shortleaf pine, southern red oak, white oak, sweetgum, and post oak. Site preparation, such as chopping, burning, herbicide application, and bedding, should reduce debris and immediate plant competition and facilitate mechanical planting. Planting trees on the contour helps to control erosion.

This soil is well suited to urban development; however, the hazard of erosion is increased if the soil is left exposed during site development. This soil has slight limitations affecting building sites and moderate limitations affecting local roads and streets and most sanitary facilities. Seepage is a problem if this soil is used for sewage lagoons or sanitary landfills, and moderate permeability is a limitation affecting the performance of septic tank absorption fields. This limitation can be overcome by increasing the size of the absorption field. Roads can be designed to overcome the limited ability of the soil to support a load.

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

This soil is moderately well suited to cultivated crops. The main limitations are steepness of slope, low fertility, and high levels of exchangeable aluminum within the root zone. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. The risk of sheet and rill erosion on the steeper slopes can be reduced by gradient terraces and contour farming. Using conservation tillage and returning all crop residue to the soil improve fertility, maintain the content of organic matter, and reduce erosion. Crops respond well to additions of fertilizer and lime, which improve fertility and reduce the levels of exchangeable aluminum.

This soil is well suited to pasture. Steepness of slope and low fertility are the main limitations. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, ball clover, crimson clover, and ryegrass. Seedbed preparation should be on the contour or across the slope where practical. Grasses and legumes grow well if adequate fertilizer and lime are used.

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

SC—Sacul fine sandy loam, moderately sloping. This moderately sloping, moderately well drained soil is on ridgetops and side slopes on the uplands. Most areas are crossed by well-defined drainageways. Fewer observations were made in this map unit than in others because steepness of slope is a major limitation affecting the use and management of this soil. The detail in mapping, however, is adequate for the expected use of the soil. The areas are irregular in shape and range from 15 to several thousand acres. Slopes generally are long and range from 3 to 12 percent.

Typically, this soil has a dark grayish brown, strongly acid fine sandy loam surface layer about 1 inch thick. The subsurface layer to a depth of about 6 inches is light yellowish brown, strongly acid fine sandy loam. The subsoil extends to a depth of about 60 inches. It is red, very strongly acid clay in the upper part and light brownish gray, mottled, very strongly acid sandy clay loam in the middle and lower parts.

Included with this soil in mapping are many small and medium-size areas of Frizzell, Guyton, Ruston, and Savannah soils. These soils are loamy throughout. Frizzell and Savannah soils are in lower positions than the Sacul soil. Guyton soils are in drainageways. Ruston soils are in higher positions. Included are small areas of Sacul soils that have slopes of less than 3 percent or slopes steeper than 12 percent. Also included are soils similar to the Sacul soil except that they have a subsoil that is loamy in the upper part. The included soils make up about 25 percent of the map unit.

Water and air move through the Sacul soil at a slow rate, and water runs rapidly off the surface. This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to crops. A seasonal high water table is 2 to 4 feet below the surface from December through April. Plants generally are damaged by a lack of water during dry periods in summer and fall of most years. This soil has high shrink-swell potential in the subsoil.

This soil is used mostly as woodland. A small acreage is used for pasture or homesites.

This soil is well suited to woodland and has moderately high potential for the production of loblolly pine and shortleaf pine. The main concerns in producing and harvesting timber are the clayey subsoil and a slight erosion hazard. When wet or moist, unsurfaced roads and skid trails are slippery and may be impassable during rainy periods. Management that minimizes the risk of erosion is essential in harvesting timber. Harvesting during dry seasons and locating skid trails, log landings, and haul roads properly and within limiting grades reduce erosion. Roads and landings can be protected from erosion by constructing diversions and by seeding cuts and fills. Skid trails and firebreaks are subject to rilling and gullying unless adequate water bars are provided or they are protected by plant cover, or both.

This soil is well suited to habitat for woodland wildlife. Habitat can be improved by planting appropriate vegetation, by maintaining existing plant cover, or by promoting the natural establishment of desirable plants. Every three years, prescribed burning rotated among several small tracts of land can increase the amount of palatable deer browse and seed-producing plants for quail and turkey. Many areas of this soil are suitable for small ponds, which can provide valuable habitat for fish, waterfowl, and furbearers, such as nutria, muskrat, and mink.

This soil is somewhat poorly suited to pasture, mainly because of a severe erosion hazard and low fertility. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, ball clover, and crimson clover. Annual cool-season grasses, such as ryegrass or wheat, are suitable for winter forage. Fertilizer and lime are needed for optimum growth of grasses and legumes. Seedbed preparation should be on the contour or across the slope where practical. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition.

This Sacul soil is not suited to cultivated crops. The hazard of erosion generally is too severe; however, the gently sloping areas can be used as cropland if special practices are used to control erosion. The main limitations are low fertility and potentially toxic levels of exchangeable aluminum within the root zone. Most crops respond well to additions of lime and fertilizer, which improve fertility and reduce the levels of aluminum.

This soil is poorly suited to urban development and has severe limitations affecting building sites, local roads and streets, and most sanitary facilities. The main limitations are steepness of slope, wetness, slow permeability, high shrink-swell potential, and low strength as it affects roads. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed. Buildings, roads, and streets should be designed to overcome the shrinking and swelling of the subsoil. Septic tank absorption fields do not function properly because of wetness and slow permeability. Properly designed lagoons or self-contained sewage disposal units can be used to dispose of sewage properly.

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

SH—Savannah-Sacul association, gently sloping. These soils are moderately well drained. The Savannah soil is on ridgetops and side slopes, and the Sacul soil is on side slopes. Well-defined drainageways cross the map unit in most places. Fewer observations were made than in other map units. The detail in mapping, however, is adequate for the expected use of these soils. The areas are irregular in shape and generally parallel the major streams on the uplands. The soils are in a regular and repeating pattern on the landscape, but their proportions vary from one area to another. Areas are large and are about 60 percent Savannah soil and 15 percent Sacul soil. Slopes are long, smooth, and convex and range from 1 to 5 percent.

Typically, the Savannah soil has a brown, very strongly acid fine sandy loam surface layer about 9 inches thick. The subsoil extends to a depth of 72 inches. It is, in sequence downward, strong brown, mottled, strongly acid sandy clay loam; yellowish brown, strongly acid loam; and yellowish brown, mottled, strongly acid loam that is a firm and brittle fragipan.

Water and air move through the upper part of the Savannah soil at a moderate rate and through the fragipan at a moderately slow rate. Runoff is medium, and the hazard of water erosion is moderate. This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to crops. A seasonal high water table is about 1.5 to 3.0 feet below the surface from January through March. Plants generally are damaged by a lack of water during dry periods in summer and fall of some years. The surface layer dries quickly after rains. This soil has low shrink-swell potential.

Typically, the Sacul soil has a dark grayish brown, strongly acid fine sandy loam surface layer about 1 inch thick. The subsurface layer to a depth of about 9 inches is brown, very strongly acid fine sandy loam. The subsoil to a depth of about 64 inches is yellowish red, mottled, very strongly acid silty clay and clay in the upper part and light brownish gray, mottled, very strongly acid sandy clay loam in the lower part.

Water and air move through the Sacul soil at a slow rate, and water runs off the surface at a medium rate. This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to crops. A seasonal high water table is 2 to 4 feet below the surface from December through April. Plants generally are damaged by a lack of water during dry periods in summer and fall of most years. Root penetration is limited by the fragipan. This soil has high shrink-swell potential in the subsoil.

Included with these soils in mapping are a few small areas of Frizzell, Guyton, Prentiss, and Ruston soils. Frizzell soils are in lower positions than the Savannah and Sacul soils. Frizzell soils are loamy throughout and do not have a fragipan. Guyton soils are in drainageways and are grayish throughout. Prentiss soils are in lower positions than the Savannah soil and have less clay in the subsoil. Ruston soils are in higher positions and have redder hues, do not have a fragipan, and are well drained. In narrow drainageways are loamy soils that have a brownish subsoil. Included on side slopes are small areas of soils that are similar to the Sacul soil except that they have a subsoil that is loamy in the upper part. The included soils make up about 25 percent of the map unit.

The Savannah and Sacul soils are used mostly as woodland. A small acreage is used for pasture or homesites.

The soils in this map unit are well suited to woodland and have moderately high potential for the production of loblolly pine. The main concerns in producing and harvesting timber are moderate limitations in the use of equipment caused by wetness and a slight erosion hazard caused by steepness of slope. The hazard of windthrow is moderate in areas of the Savannah soil because of the limited rooting depth. Roads and landings can be protected from erosion by constructing diversions and by seeding cuts and fills. Conventional methods of harvesting timber generally are suitable, but the soils can be compacted if they are wet when heavy equipment is used. Undesirable plants reduce adequate natural or artificial reforestation without intensive site preparation and maintenance.

These soils are well suited to pasture. The main limitations are low fertility and steepness of slope. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, ball clover, crimson clover, and ryegrass. Seedbed preparation should be on the contour or across the slope, where practical, to control erosion. Fertilizer and lime are needed for optimum production of forage. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Periodic mowing and clipping helps to maintain uniform growth, discourages selective grazing, and reduces clumpy growth.

These soils are moderately well suited to cultivated crops, such as corn, grain sorghum, and wheat. The main limitations are low fertility, steepness of slope, and potentially toxic levels of exchangeable aluminum within the root zone. A tillage pan forms easily if these soils are tilled when wet, but it can be broken up by chiseling or subsoiling. Using conservation tillage and returning all crop residue to the soil maintain organic matter content, conserve moisture, and reduce erosion. Crops respond well to additions of lime and fertilizer, which improve fertility and reduce the levels of exchangeable aluminum.

The soils in this map unit are moderately well suited to urban development. The main limitations are wetness, moderately slow and slow permeability, high shrink-swell potential, and low strength as it affects roads. Septic tank absorption fields do not function properly during rainy periods because of wetness and moderately slow and slow permeability. Lagoons or self-contained sewage disposal units can be used to dispose of sewage properly. Roads and buildings should be designed to offset the shrinking and swelling of the Sacul soil, and roads should be designed to offset the limited ability of the Sacul soil to support a load.

These soils are well suited to habitat for woodland and openland wildlife. Habitat can be improved by planting appropriate vegetation, by maintaining existing plant cover, or by promoting the natural establishment of desirable plants. Every three years, prescribed burning rotated among several small tracts of land can increase the amount of palatable deer browse and seed-producing plants for quail and turkey. Habitat for woodland wildlife can be improved by leaving den- and mast-producing trees along drainageways when harvesting timber and during site preparation for tree planting.

These Savannah and Sacul soils are in capability subclass IIe. The woodland ordination symbol is 9W for Savannah soil and 8C for Sacul soil.

St—Sterlington silt loam. This level, well drained soil is in high positions on natural levees on the flood plains of the Ouachita and Boeuf Rivers. It is protected from flooding in most places. The areas are irregular in shape and range from 10 to 200 acres. Slopes range from 0 to 2 percent.

Typically, this soil has a brown, medium acid silt loam surface layer about 7 inches thick. The subsurface layer to a depth of about 11 inches is dark brown, strongly acid silt loam. The subsoil extends to a depth of about 53 inches. It is strong brown, very strongly acid very fine sandy loam in the upper part; strong brown and light brown, very strongly acid very fine sandy loam in the middle part; and reddish brown, mottled, very strongly acid loam in the lower part. The substratum to a depth of about 80 inches is reddish brown, strongly acid very fine sandy loam.

Included with this soil in mapping are a few small areas of Gallion, Hebert, and Rilla soils. These soils have more clay in the subsoil than the Sterlington soil. Gallion and Rilla soils are in positions similar to those of the Sterlington soil, and Hebert soils are in lower positions. Also included are small to large areas of the Sterlington soil that are subject to rare or occasional flooding. The included soils make up about 15 percent of the map unit.

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

This soil is used mostly for cultivated crops. A small acreage is used for pasture or homesites.

This soil is well suited to cultivated crops and has few limitations affecting this use. Suitable crops are cotton, soybeans, corn, wheat, grain sorghum, and vegetables. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. When the soil is wet, a tillage pan can form as a result of excessive cultivation. It can be broken up by subsoiling when the soil is dry. Maintaining crop residue on or near the surface reduces runoff and helps to maintain soil tilth and organic matter content. Most crops respond to additions of fertilizer and lime, which improve fertility and offset the potentially toxic effects of the exchangeable aluminum in the root zone.

This soil is well suited to pasture and has few limitations affecting this use. Suitable pasture plants are improved bermudagrass, common bermudagrass, bahiagrass, white clover, winterpeas, and ryegrass. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Fertilizer and lime are needed for optimum production of forage.

This soil is well suited to woodland, but because it is also suited to cropland, most areas have been cleared for crops or pasture. Eastern cottonwood can be planted for commercial timber production. Potential productivity is high, and the soil has few management problems.

In most areas, this soil is well suited to urban development. Some low areas of included soils are subject to flooding and are poorly suited. In most areas, this soil has slight limitations affecting building sites, local roads and streets, and most sanitary facilities. Moderate permeability is a limitation if this soil is used for septic tank absorption fields. In inadequately protected areas, homes can be built on properly designed mounds of soil material to raise them above expected flood levels.

This soil is well suited to habitat for openland wildlife. Habitat can be improved by leaving vegetated areas bordering fields.

This Sterlington soil is in capability class I. The woodland ordination symbol is 3A.

Tp—Tippah silt loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on convex ridgetops and side slopes on the uplands. The areas are irregular in shape and range from 5 to 450 acres. Slopes generally are long, smooth, and convex.

Typically, this soil has a light yellowish brown, strongly acid silt loam surface layer about 5 inches thick. The subsoil extends to a depth of about 60 inches. It is yellowish red, very strongly acid silty clay loam in the upper part; strong brown, mottled, strongly acid silty clay loam in the middle part; and mottled, yellowish brown, yellowish red, and light brownish gray, strongly acid and very strongly acid silty clay and clay in the lower part.

Included with this soil in mapping are a few small areas of Bayoudan, Falkner, and Providence soils. Bayoudan soils are on lower parts of slopes than the Tippah soil and are clayey throughout. Falkner soils are on broad ridgetops, and they are wetter than the Tippah soil and have a subsoil that is less red. Providence soils are in positions similar to those of the Tippah soil, and they have a fragipan. Also included are small areas of Tippah soils that have slopes steeper than 5 percent. The included soils make up about 15 percent of the map unit.

Water and air move through the Tippah soil at a slow rate. Runoff is medium, and the hazard of erosion is moderate. This soil has medium fertility and high levels of exchangeable aluminum that are potentially toxic to crops. A seasonal high water table is about 2.0 to 2.5 feet below the surface from December through April. The surface layer dries quickly after rains. This soil has high shrink-swell potential in the lower part of the subsoil.

This soil is used mostly as woodland. A small acreage is used for pasture, crops, or homesites.

The Tippah soil is well suited to woodland and has high potential for the production of loblolly pine and hardwoods. Other common trees are shortleaf pine, southern red oak, white oak, sweetgum, and hickory. This soil has few limitations affecting the production and harvesting of timber. Roads and landings can be protected from erosion by constructing diversions and by seeding cuts and fills. Conventional methods of harvesting timber generally are suitable, but the soil can be compacted if it is wet and heavy equipment is used. Soil compaction can be avoided by using specialized equipment during wet seasons or by logging during the drier seasons. After harvesting, reforestation must be carefully managed to reduce competition from undesirable understory plants. Site preparation, such as chopping, burning, herbicide application, and bedding, can reduce debris and immediate plant competition and facilitate mechanical planting.

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

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

This soil is moderately well suited to most cultivated crops, and mainly soybeans, cotton, corn, grain sorghum, and wheat are grown. This soil is limited mainly by medium fertility, potentially toxic levels of exchangeable aluminum in the root zone, and a moderate erosion hazard. It is friable and easy to keep in good tilth and can be worked throughout a wide range of moisture content. A tillage pan can form as a result of excessive cultivation, but it can be broken up by subsoiling when the soil is dry. Using conservation tillage and returning all crop residue to the soil or regularly adding other organic matter improve fertility and help maintain soil tilth and content of organic matter. Most crops respond well to additions of lime and fertilizer, which improve fertility and reduce the levels of aluminum. Erosion can be controlled if fall grain or winter pasture grasses are seeded early, stubble-mulch tillage is used, and tillage and seeding are on the contour or across the slope. Also, waterways should be shaped and seeded to perennial grass.

This soil is poorly suited to urban development and has severe limitations affecting building sites, local roads and streets, and most sanitary facilities. The main limitations are wetness, slow permeability, high shrink-swell potential, and low strength as it affects roads. Slow permeability and the high water table increase the possibility that septic tank absorption fields will fail. Lagoons or self-contained sewage disposal units can be used to dispose of sewage properly. Properly designing foundations and footings and diverting runoff away from buildings help to prevent structural damage as a result of shrinking and swelling. Roads should be designed to offset the limited ability of the soil to support a load.

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

YO—Yorktown clay, frequently flooded. This very poorly drained soil is in abandoned channels on the flood plains of the Ouachita and Boeuf Rivers. Fewer observations were made than in other map units because ponding and frequent flooding are major concerns in the use and management of the soil. The detail in mapping, however, is adequate for the expected use of the soil. The areas generally are oval in shape and range from 10 to 400 acres. Slopes are less than 1 percent.

Typically, the surface is covered with a mat of very dark grayish brown, very strongly acid muck that is about 3 inches thick. The surface layer is gray, very strongly acid clay about 7 inches thick. The subsoil extends to a depth of about 72 inches. It is dark gray, mottled, very strongly acid clay in the upper part; mottled gray, dark gray, and greenish gray, neutral clay in the middle part; and reddish brown, mottled, mildly alkaline clay in the lower part.

Included with this soil in mapping are a few small and medium-sized areas of Alligator and Perry soils that are in higher positions than the Yorktown soil and are dry enough to crack to a depth of 20 inches or more in most years. Also included are many small areas of soils that are similar to the Yorktown soil except that they have layers of organic material as much as 3 feet thick over the mineral soil. The included soils make up about 25 percent of the map unit.

Water and air move through the Yorktown soil at a very slow rate. This soil is ponded or flooded most of the time by at least 6 inches of water, and it is wet throughout the year. During dry periods, the water table can be as much as 0.5 foot below the surface. This soil has very high shrink-swell potential, but it seldom dries enough to shrink and crack.

This Yorktown soil is used as woodland and habitat for wetland wildlife.

This soil is moderately well suited to habitat for wetland wildlife and typically provides habitat for ducks, beaver, nutria, mink, and other species. Habitat for wetland wildlife can be improved by constructing shallow ponds to provide open-water areas.

This soil is poorly suited to woodland. Baldcypress, green ash, water hickory, and water tupelo can be grown, but managing the soil for timber production is very difficult because of wetness caused by ponding and flooding. Trees can be harvested only by using specialized equipment.

This soil is not suited to cropland, pastureland, or urban development. It is too wet from ponding and flooding for these uses.

This Yorktown soil is in capability subclass VIIw. The woodland ordination symbol is 3W.

Prime Farmland

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

Soils that have limitations, such as a high water table or flooding, may qualify as prime farmland if these limitations are overcome by such measures as drainage or flood control. In table 6, the measures needed to overcome the limitations of a map unit, if any, are shown in parentheses after the map unit name. Onsite evaluation is necessary to determine if the limitations have been overcome by the corrective measures.

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 specific land uses on productivity and on the environment in the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature.

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

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

Crops and Pasture

Richard C. Aycock, 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 information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

About 68,000 acres in Caldwell Parish was used for agriculture in 1982, according to the Census of Agriculture. Of this total, about 38,500 acres was used for crops, mainly cotton and soybeans. About 9,400 acres was used for improved pasture and hay production, and about 13,000 acres was used as native pasture, rangeland, and woodland pasture. From 1978 to 1982 the amount of farmland and the average acreage per farm have remained relatively steady.

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

Pasture and hayland. Perennial grasses or legumes or mixtures of these are grown for pasture and hay. The mixture generally consists of either a summer or a winter perennial grass and a suitable legume. In addition, many farmers seed small grains or ryegrass in the fall for winter and spring forage. Excess grass in summer is harvested as hay for the winter.

Common and improved bermudagrass and Pensacola bahiagrass are the most commonly grown summer perennials. Improved bermudagrass and Pensacola bahiagrass 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 fertilizer, particularly nitrogen.

Livestock producers grazing cattle on cool-season grasses that are growing on soils that have high percentage of aluminum saturation should be aware of the potential for grass tetany. Grass tetany is a complex metabolic disorder resulting from mineral imbalances in diets of ruminant animals in temperate regions. Grass tetany is most common during cool, wet conditions and when cool-season grasses are growing. Animals that consume these grasses can eventually die. Mature females in late stages of pregnancy and early lactation are most commonly affected because they have the greatest magnesium requirements and the lowest levels of magnesium in the blood stream. High levels of aluminum saturation in unlimed soils block the uptake of calcium, magnesium, and phosphorus by the forage plants. Animals that have grass tetany become calcium deficient, phosphorus deficient, or both. Treatment includes injections of magnesium, calcium, and phosphorus solution into the blood stream. Depending on soil test recommendations, calcitic or dolimitic limestone should be applied to pastures that have a past history of grass tetany.

Proper grazing is essential for high quality forage, stand survival, and erosion control. Brush and weed control, fertilizer, lime, and pasture renovation 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 from these areas if they 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.

Fertilization and liming. The soils of Caldwell Parish range from extremely acid to slightly acid in the surface layer. Levels of phosphorus and potassium range from very low to high, most of the soils being in the very low to low range. Most soils being used for row crops are low in content of organic matter and in available nitrogen.

Most of the soils in the parish contain quantities of exchangeable aluminum that are potentially toxic to some plants. On acid soils, crop failure results because high levels of exchangeable aluminum prevent plant root uptake of phosphorus. Excessive levels of manganese also have been reported to cause reduced cotton yields. Applying lime is probably the most common method of reducing aluminum and manganese levels in the soil.

Some secondary and micronutrient deficiencies also have been noted in Caldwell Parish. Sulphur deficiency has been noted in the parish because of the increased use of high analysis fertilizer on soils that are low in content of organic matter. On coarse-textured soils that have been recently limed, adding boron generally increases cotton yields. Molybdenum increases soybean yields on unlimed soils. Soils low in zinc or those limed to a pH of 6.5 or more benefit from the addition of zinc for rice production.

Crops and pastures in Caldwell Parish generally respond to a complete fertilizer. The kind and amount of fertilizer or lime needed depends on the kind of crop, 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. The amount of lime and fertilizer needed should be determined on the basis of soil test results.

A soil sample for laboratory testing should consist of a single soil phase and should represent no more than 20 acres. Samples from cropland should be taken at a depth of from 5 to 7 inches. Pastures should be sampled at a depth of 2 to 4 inches. Samples should be taken from several places in the field and mixed thoroughly. About one pint of soil should be removed for laboratory analysis. If samples are being taken for a field where no-till planting is anticipated, the sample should be taken from the upper 2 inches of topsoil. Information on collecting soil samples, as well as containers for the samples, can be obtained from the Cooperative Extension Service.

Organic matter content. Organic matter is an important source of nitrogen for crops. Fertilizer nitrogen added to the soil makes up only a fraction of the total nitrogen that a crop uses. The rest must come from organic matter in the soil. Organic matter also influences the rate and amount of water intake and the amount of water the soil is able to store. Organic matter improves soil tilth and reduces surface crusting, increases water infiltration into the soil, and reduces runoff.

Organic matter levels in the soils of Caldwell Parish range from low on continuous cropland to moderately high in woodland and other areas of native vegetation.

The level of organic matter can be maintained or improved by growing crops that produce extensive root systems and an abundance of foliage, such as corn, grain sorghum, rice, and small grains. The organic matter content can be maintained by leaving crop residue on the soil surface, by growing perennial grasses and legumes in rotation with other crops, and by adding barnyard manure.

Favorable organic matter levels in soils promote crop maturity and increase the effectiveness of herbicides while reducing herbicide injury to crops.

Soil tillage. Soils should be tilled only enough to prepare a seedbed and to control weeds. Excessive tillage destroys soil structure, accelerates organic matter decomposition, and increases surface crusting.

A compacted layer, generally known as a traffic pan or plowpan, sometimes develops just below the plow layer in loamy soils. This condition occurs where soils are plowed at the same depth continuously or where they are plowed when the soil is too wet. This problem can be avoided by not plowing when the soil is wet, by varying the depth of plowing, or by breaking up the plowpan by subsoiling or chiseling. Chisel plows and subsoilers break up traffic pans while leaving about 75 percent of the surface plant residue in place. This plant residue protects the soil from beating rains, thereby helping to control erosion, reduce runoff and surface crusting, and increase infiltration.

Clayey soils tend to become cloddy if they are plowed when they are too wet or too dry; thus, planting is delayed until the next rain moistens the clods and they can be broken up to prepare a good seedbed. Reducing tillage or using conservation tillage on clayey soils helps to maintain tilth. Tillage implements that stir the surface and leave crop residue in place can be used to improve soil tilth.

Drainage. Many soils in the parish need surface drainage to make them more suitable for crops. Surface wetness is the single most limiting factor to crop production on soils of the flood plains. The soils in high positions on natural levees and those in nearly level areas on uplands are drained by a gravity drainage system consisting of row and field drains. The clayey soils in low positions on natural levees are drained by a gravity drainage system consisting of a network of main and lateral ditches and field drains. The success of drainage systems depends on the availability of adequate outlets. Improved drainage systems incorporate precision land grading and land smoothing with fewer open ditches. Larger and more uniformly shaped fields are created and are more suited to the use of modern, multirow farm machinery.

The bottom lands in Caldwell Parish are protected from flooding by levees along the Ouachita River. Many fields, however, are not protected from backwater flooding from the Boeuf River and Bayou Lafourche or from runoff from higher elevations.

Water for plant growth. In Caldwell Parish, rainfall is heavy in winter and spring. In many years, however, sufficient water is not available in summer when it is needed for optimum plant growth. This rainfall pattern favors the growth of early-maturing crops.

Irrigated acres in the parish has increased from 1,300 acres in 1978 to 8,600 acres in 1986. Rice acreage has increased considerably during this time. Furrow irrigation is used to grow cotton in nearly level soils, and traveling sprinkler and center-pivot systems are used where the soils are too undulating for landgrading. More than 70 percent of the water used for irrigation comes from surface water. Water that is suitable for irrigation generally is plentiful in Caldwell Parish.

Cropping system. The sequence of crops grown in a cropping system should keep the soil covered as much of the year as possible. A good cropping system includes a legume for nitrogen, a cultivated crop to aid in weed control, a deep-rooted crop to utilize subsoil fertility and maintain subsoil permeability, and a close-growing crop to help maintain organic matter content.

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 annual forages than the cropping systems of cash-crop farms. Cotton is grown continuously or in rotation with soybeans, corn, or grain sorghum on most of the loamy soils in the survey area. Soybeans are grown continuously or in rotation with rice or grain sorghum on the clayey soils. A small acreage is double cropped to soybeans and small grains.

Control of erosion. Erosion is a major hazard on many of the upland soils of Caldwell Parish. It is an especially serious problem on soils where woodland has been clearcut and where woodland or pasture has been converted to cropland. Sloping soils are highly susceptible to erosion when left without plant cover for extended periods. If the surface layer of the soil is eroded away, most of the available plant nutrients and organic matter are also lost. Soil erosion also results in sedimentation of drainage systems and pollution of streams by sediment, nutrients, and pesticides.

Sheet and rill erosion is a concern on sloping soils on the bottom lands. Small gullies form easily in undulating soils, in soils along high-bank streams, and in soils in drainage ditches.

Cropping systems in which a plant cover is maintained on the soil for extended periods help to control soil erosion. Legume or grass cover crops help to control erosion, increase the content of organic matter and nitrogen in the soils, and improve tilth. Terraces, diversions, and grassed waterways; conservation tillage; contour farming; and cropping systems that rotate grass or close-growing crops with row crops help to control erosion on cropland and pasture. Constructing water-control structures in drainageways to vary the water levels can prevent gullying.

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

Yields Per Acre

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

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

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

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

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

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

Land Capability Classification

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

In the capability system, soils generally are 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. There are no class VIII soils in Caldwell Parish.

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*.

Woodland Management and Productivity

Carl V. Thompson, Jr., 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 forest resources in Caldwell Parish. The soils interpretations in this section provide forest land owners, foresters, forest managers, and agricultural workers with the soils information and data they need to properly manage forest resources.

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

The ability of a soil to supply moisture and nutrients to trees is strongly related to soil texture, structure, and depth. Soils with a sandy surface layer, such as Larue soils, generally are less fertile and lower in available water capacity than clayey soils. Aeration is often impeded in clay soils, particularly under wet conditions. Slope position strongly influences species composition as well as growth of an individual tree.

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

Forest resources. The topography and vegetation in Caldwell Parish varies from the piney woods in the north, west-central, and southwest sections to the bottom land hardwoods along the Ouachita River in the northeast. The dominant forest species are loblolly pine and shortleaf pine on the higher sites; sweetgum, red oak, white oak, elm, pecan, green ash, willow, and sycamore in the stream and river bottoms; and baldcypress and tupelo gum (water tupelo) in the swamps.

Caldwell Parish was once a vast virgin forest of pine woods in the northeast and southwest and oak-gum-cypress in the area northeast of the Ouachita River. Today, no virgin forests are in the parish. Most were cut during the "cut out-get out" period around the turn of the century. The timber barons of that time stripped both the upland pine and bottom land oak-gum-cypress forests of commercial trees. These trees supported the large sawmills at Clarks and smaller ones at other sites in the area. Very few attempts at artificial regeneration were made at the time, and the second growth forests were strictly a product of nature.

The second growth forest was largely unmanaged and subject to periodic wildfires. Harvesting was done with little or no thought of selective cutting or regeneration until the late 1940's and early 1950's. During this period, several events took place that set the stage for improved forest management and reforestation. Effective fire protection was provided by the Office of Forestry, Louisiana Department of Natural Resources (then known as the Louisiana Forestry Commission). The Office of Forestry increased operations of their pine seedling nurseries, making pine seedlings more readily available for planting the cut-over land. At last, timber and land values began to increase, thus providing an incentive to landowners to bring their property into production. Today, most of the upland forest land in Caldwell Parish is once again productively growing commercial timber, although a substantial part is now specifically in urban development, pastureland, cropland, and other nonforest uses. Most of the bottom land along the Ouachita River remains in pasture and crops.

Caldwell Parish has about 253,600 acres of commercial forests representing about 74 percent of the total land area *(20)*. Commercial forest land is defined as that producing or capable of producing at least 20 cubic feet of industrial wood per acre per year and not withdrawn from timber use. Between 1974 and 1980, the commercial forest areas decreased by about 66,300 acres. The cleared land was converted mostly to cropland and pastureland. Other uses are urban land and transmission and transportation corridors. The conversion of cleared land reversed between 1980 and 1984, when the forest land acreage in Caldwell Parish increased by 35,700 acres, mainly the result of landowners converting marginal cropland and pastureland to forest land.

The forest land in Caldwell Parish will probably stabilize at the present acreage. Only minor fluctuations are expected in the future because of small changes in land use.

About 41.9 percent of the commercial forest land in Caldwell Parish is owned by the forest industry, 6.9 percent is owned by private farms, 32.6 percent is in miscellaneous private ownership, and 18.6 percent is public forest land. About 16.3 percent of the public forest land is owned by the State, and 2.3 percent is owned by the parish and municipal governments.

The parish is divided into two major land resource areas (MLRA's): Western Coastal Plain and Southern Mississippi Valley Alluvium. Both MLRA's support substantial acreages of commercial forest; however, commercial forest is mostly in the Western Coastal Plain MLRA.

The dominant trees in the Western Coastal Plain MLRA are loblolly pine, shortleaf pine and associated sweetgum, longleaf pine, southern red oak, white oak, water oak, post oak, black cherry, elm, and red maple. The Southern Mississippi Valley Alluvium MLRA has ash, cottonwood, elm, and sycamore on well drained soils, and ash, elm, gum, baldcypress, water oak, pecan, hackberry, willow oak, and Drummond red maple on poorly drained soils.

Commercial forests may be further divided into forest types based on tree species, site quality, or age *(20)*. 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 *oak-gum-cypress* forest type makes up 33 percent of the forest land in Caldwell Parish. This type is composed of bottom land forests of tupelo, blackgum, sweetgum, oak, and baldcypress, singly or in combination. Associated trees include cottonwood, black willow, ash, hackberry, maple, and elm.

The *loblolly-shortleaf* pine forest type makes up 30 percent of the forest land. Loblolly pine generally is dominant except on drier sites. About 31 percent of the loblolly-shortleaf pine forest type is planted, and 69 percent is natural. 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 more moist sites, sweetgum, red maple, water oak, and willow oak can be mixed with pines. Ash and American beech are associated with this forest type in fertile, well drained coves and along stream bottoms.

The *oak-hickory* forest type makes up 23 percent of the forest land. Upland oaks or hickory, singly or in combination, make up most of the stocking. Where pines make up 25 to 50 percent of the stocking, the stand is classified as oak-pine. Common associated trees include elm and maple.

The *oak-pine* forest type makes up about 14 percent of the forest land. 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 type are mainly 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. On the more moist and more fertile sites, the trees are white oak, southern red oak, and blackjack oak. Blackgum, winged elm, red maple, and various hickories are associated with the oak-pine type on both of these broad site classifications.

The forest land in Caldwell Parish, by physiographic site, is 98 percent mesic and 2 percent hydric. Physiographic site is defined as a classification of forest land according to the availability of moisture for tree growth. A mesic site is one that has moderate moisture. A hydric site is one that has an abundance or an overabundance of moisture.

The marketable timber volume is about 49 percent pine and 51 percent hardwood. About 67 percent of the forest acreage is in sawtimber, 16 percent is in saplings and seedlings, and 12 percent is in pole timber. About 5 percent of the commercial forest land in Caldwell Parish is classified as "non-stocked."

Most of the more productive sites are in pasture or crops. Consequently, only 5 percent of the forest land produces 165 cubic feet or more of wood per acre. About 35 percent produces 120 to 165 cubic feet per acre, 23 percent produces 85 to 120 cubic feet, 35 percent produces 50 to 85 cubic feet, and 2 percent produces less than 50 cubic feet *(20)*.

The importance of timber production to the economy of the parish is significant. Most of the upland pine sites that are privately owned and in tracts of 500 acres or less are producing well below potential. These tracts would benefit if stands were improved by thinning out mature trees and undesirable species. The forests owned by the forest industry are highly productive. Almost all of the bottom land tracts are producing at only a fraction of potential. Protection from grazing, fire, insects, and diseases; tree planting; and timber stand improvement are needed to improve stands in both upland and bottom land forests.

Foresters with the Soil Conservation Service, Louisiana Office of Forestry, Louisiana Cooperative Extension Service, forest industry, or private consultants can help determine specific forest management needs.

Environmental values. Other values associated with forest lands include wildlife habitat, recreation, natural beauty, and conservation of soil and water.

The commercial forest land of Caldwell 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. Trees 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 forest land. 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 forests, cattle grazing can be a compatible secondary use. Grazing is not recommended in hardwood forests. Grasses, legumes, forbs, and many woody browse species in the understory are grazable if properly managed to supplement a forest enterprise without damage to the wood crop. In fact, on most pine forest land, grazing is beneficial to the forest land 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 forest land and livestock program depends primarily on the degree and time of grazing of the forage plants. Intensity of grazing should be gauged toward maintaining adequate cover for soil protection and maintaining or improving the quantity and quality of trees and forage vegetation.

Forage production varies according to the type of forest 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 plant community on these soils will reproduce itself as long as the environment does not change.

Research has proven 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 forest grazing management is to keep the forage in excellent or good condition. If this is done, water is conserved, yields are improved, and the soils are protected.

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 *T* indicates a soil that has, within the root zone, excessive alkalinity, acidity, sodium salts, or other toxic substances that limit or impede development of desirable trees. 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 *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, T, C, and S.

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 *windthrow hazard* consider the likelihood of trees being uprooted by the wind. Restricted rooting depth is the main reason for windthrow. Rooting depth can be restricted by a high water table, fragipan, or bedrock, or by a combination of such factors as soil wetness, texture, structure, and depth. The risk is *slight* if strong winds cause trees to break but do not uproot them; *moderate* if strong winds cause an occasional tree to be blown over and many trees to break; and *severe* if moderate or strong winds commonly blow trees over. Ratings of *moderate* or *severe* indicate the need for care in thinning or possibly not thinning. Specialized equipment may be needed to avoid damage to shallow root systems in partial cutting operations. A plan for periodic salvage of windthrown trees and the maintenance of a road and trail system may be needed.

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 feet 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 30 years of age 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 for the soil survey of Caldwell Parish *(4, 5, 6, 23)*.

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. Cubic feet can be converted to board feet by multiplying by a factor of about 5. 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 570 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

Caldwell Parish has many areas of scenic and historic interest. Several homes and buildings in the parish are on the Federal Register of Historic Places. Several public recreation areas are maintained by the U.S. Army Corps of Engineers and the State of Louisiana. These areas provide opportunities for hiking, sightseeing, picnicking, camping, swimming, boating, fishing, and hunting. Public areas available for recreation include an area west of the Columbia locks and dams on the Ouachita River, accessible from Louisiana Highways 4 and 846; an area on the Ouachita River in Columbia; an area east of the Columbia locks and dams at Riverton; an area on the Boeuf River at Louisiana Highway 4; and the Boeuf Wildlife Management Area. The Boeuf Wildlife Management Area has two campgrounds and about 38,444 acres that can be used for camping, hunting, fishing, and other outdoor activities.

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 or boulders can greatly increase the cost of constructing campsites.

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

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

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

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

Wildlife Habitat

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

Caldwell Parish is predominantly rural and in forest land. It is about 74 percent forest land, 16 percent cropland and pastureland, and 10 percent water and miscellaneous land uses. The upland pine forests, bottom land hardwood forests, and open agricultural land in the parish support a large and varied population of game and nongame animals.

The bottom land hardwood forests along the Ouachita River provide the most productive habitat for wildlife in the parish. The alluvial soils in this area support a hardwood plant community made up mainly of Nuttall oak, water oak, persimmon, water hickory, elm, overcup oak, sugarberry, and willow oak. Wildlife using these hardwood forests include white-tailed deer, swamp rabbit, fox squirrel, beaver, coyote, mink, fox, turkey, raccoon, wood duck, and many nongame birds and animals. Because of the continuing threat of further land clearing for cropland, special efforts are needed to save the remaining stands of bottom land hardwoods for use by wildlife.

About 40,000 acres of bottom land hardwood forests is on the narrow flood plains of streams that drain the uplands. These forests also provide valuable habitat for wildlife. Their value as habitat for wildlife is especially high because of the diversity in food and cover they provide to wildlife species using the adjacent pine forests of the uplands. These forests have a high potential as habitat for wild turkey. Water for wildlife is available throughout the year in most of these bottom land areas.

About 30,000 acres of hardwood forests is also on the uplands of the parish. Hilly to very steep topography characterize most of these forested areas. Typical overstory trees include white oak, southern red oak, water oak, and sweetgum. Squirrels are especially abundant in these forests when the mast crop is good.

The rest of the uplands is mainly in pine forest. The forest stands are mainly loblolly pine, shortleaf pine, and associated hardwoods. Most of the pine forest is intensively managed for timber production. Wildlife management is a secondary objective; however, because leasing land to hunting clubs provides the potential for additional income, management for wildlife habitat is becoming more important (fig. 4). Interest by the forest industry, private landowners, and hunters is increasing for multiple use and management of the forest land.

About 51,000 acres of open agricultural land in the parish provides poor to moderate habitat for wildlife. Species commonly using agricultural land include mourning dove, bobwhite quail, cottontail, swamp rabbit, woodcock, and numerous small, nongame birds and animals. The shortage of fall and winter cover is the main problem affecting wildlife. In addition, the absence of habitat diversity limits the numbers and kinds of wildlife that can use the agricultural land. Major crops include soybeans, cotton, grain sorghum, corn, and winter wheat.

The many private ponds, public lakes, rivers, and bayous of the parish support low to high populations of fish, such as bluegill, largemouth bass, white bass, white and black crappie, green sunfish, striped bass, channel catfish, buffalo, gar, carp, shad, and several species of shiner. The main water bodies supporting fish are the Ouachita River, Bayou Lafourche Cutoff, Boeuf River, Horseshoe Lake, Castor Creek, and the many farm ponds.

The state-owned Boeuf Wildlife Management Area in the eastern part of the parish covers 38,403 acres. It is managed for optimum wildlife production. It provides a significant opportunity for hunting and other outdoor recreational pursuits.

Endangered and threatened species residing in Caldwell Parish are the bald eagle, red-cockaded woodpecker, and the American alligator.

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

Figure 4.—This pine plantation and its emergent native vegetation on Savannah-Sacul association, gently sloping, provide excellent cover and a source of food for wildlife.

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, oats, and grain sorghum.

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

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

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

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

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

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

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

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

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

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

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

Engineering

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

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

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

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

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

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

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

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

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and 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 soil texture and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

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

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

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

Sanitary Facilities

Table 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, and flooding affect absorption of the effluent.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel 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, flooding, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope can 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 water table, slope, and flooding affect both types of landfill. Texture, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

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

Soil texture, wetness, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils 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 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 and slopes of 15 to 25 percent. 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, 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), and the thickness of suitable material. Acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

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

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

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

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They 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 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 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; embankments, dikes, and levees; and aquifer-fed ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

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

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to 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 organic matter or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

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

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

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

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

Soil Properties

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

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

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

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

Engineering Index Properties

Table 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 earthmoving operations.

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

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

Water Features

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

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

The four hydrologic soil groups are:

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

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

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

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

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

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

Soil Fertility Levels

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

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

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

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

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

Quantity factor. This is the amount of an element in the soil that is readily available for uptake by plants. To determine the quantity factor, the available supply of an element is removed from the soil using a suitable extractant and is analyzed.

Intensity factor. This is the concentration of an element species in the soil moisture. It is a measure of the availability of an element for uptake by plant roots. Two soils with identical quantities of an element's available supply but with different element intensity factors will differ in element availability to the plant.

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

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. Rate of replenishment of the available supply and intensity factors by weathering reactions, fertilizer additions, and transport by mass flow and diffusion.

These soil factors are interdependent. The magnitude of the factors and the interactions among them will control crop response. The relative importance of each factor changes from soil to soil, crop to crop, and environment to environment. 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 the soil for crop and animal nutrition and protects the environment against the buildup of potentially toxic levels of essential and nonessential elements. Current soil tests measure only one soil factor, the available supply of nutrients in the surface layer or plow layer. Where crop production is clearly limited by the available supply of one or more nutrients in the plow layer, existing soil tests generally can 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 on management practices and soil use.

The underlying layers are less subject to change or change very slowly as a result of alteration of the plow layer. The properties of the subsoil 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.

Although the soil's available nutrient supply is only one factor affecting crop production, it is important. Information on the available nutrient supply in the subsoil allows evaluation of the native fertility levels of the soil.

Soils were sampled during the soil survey and analyzed for pH; organic carbon 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. The methods used in obtaining the data are listed below. The codes in parentheses refer to published methods *(22)*. More detailed information on chemical analyses of soils is available *(1, 10, 11, 17, 18)*.

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

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

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

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

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

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

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.

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

The second type includes soils that have relatively low levels of available nutrients in the surface layer, but these levels generally increase with depth. These soils have relatively fertile parent material but are older soils that have been subjected to weathering over a longer period or to more intense weathering. Crops grown in these soils can exhibit deficiency symptoms early in the growing season if the levels of available nutrients in the surface horizon are low enough. If the crop roots are able to penetrate to the more fertile subsoil, deficiency symptoms often disappear.

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 are older soils that have been subjected to more intense weathering over a longer period. The higher nutrient levels in the surface layer generally are a result of adding fertilizer to 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 are older soils that have been subjected to intense weathering over a long period. These soils have not accumulated nutrients in the surface layer as a result of fertilizing or biocycling.

Soil properties, such as pH and acidity, can also show the general distribution patterns described above. These distributions are a 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 fixed ammonium compounds. These forms of nitrogen are unavailable for plant uptake, but they can be converted to readily available ammonium and nitrate species.

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

Despite the lack of an adequate nitrogen soil test, the amounts of readily available ammonium- and nitrate-nitrogen in soils, the amount of organic nitrogen, the rate of mineralization of organic nitrogen to available forms, and the rate of conversion of fixed ammonium-nitrogen to available forms 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 Caldwell Parish are unknown, no assessment of the nitrogen fertility status of these soils can be given.

Phosphorus. Phosphorus exists in the soil as discrete solid phase minerals, such as hydroxyapatite, variscite, and strengite; as occluded or coprecipitated phosphorus in other minerals; as retained phosphorus on mineral surfaces, such as carbonates, metal oxides, and layer silicates; and in organic compounds. Because most of the phosphorus in soils is unavailable for plant uptake, the availability of phosphorus in the soil is an important factor in controlling phosphorus uptake by plants.

The Bray 2 extractant tends to extract more phosphorus than the more commonly used Bray 1, Mehlich I, and Olsen extractants. The Bray 2 extractant provides an estimate of the plant available supply of phosphorus in soils. According to the soil test interpretation guidelines used in Louisiana, the Bray 2 extractable phosphorus content of most of the soils in Caldwell Parish is very low. The very low levels of available phosphorus are a limiting factor in crop production. The soils require continual additions of fertilizer phosphorus to build up and maintain adequate levels of available phosphorus for sustained crop production.

The Bayoudan, Brimstone, Falkner, Frizzell, Gore, Guyton, Iuka, Larue, Prentiss, Providence, Sacul, Savannah, Smithdale, and Tippah soils have very low levels of extractable phosphorus throughout the soil profile. The Cahaba soil has a high level of extractable phosphorus in the surface layer, most likely a result of the recent addition of fertilizer phosphorus. The Alligator, Gallion, Rilla, and Sterlington soils have variable amounts of phosphorus, but these levels are in the medium to high range. The extractable phosphorus content of the Forestdale, Gore, Hebert, Portland, Ouachita, and Yorktown soils increases with depth and ranges from medium to high according to soil test interpretation guidelines. The subsoil of the Gallion and Rilla soils can be a significant source of available phosphorus to plants as the roots extend through the profile. Addition of fertilizer phosphorus is necessary, however, to maintain sustained crop production since subsoil nutrient reserves may be depleted.

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. The exchangeable form of potassium in soils is replaced by other cations and is generally readily available for plant uptake. To become available to plants, the other forms of potassium must be converted to the exchangeable form via weathering reactions.

The exchangeable potassium content of the soils is an estimate of the plant available supply of potassium. According to soil test interpretation guidelines, the available supply of potassium in most of the soils of Caldwell Parish is in the very low, low, or medium range depending on the soil texture. Exchangeable potassium levels generally are low in the upper part of the Larue soils that formed in unconsolidated sands and sandy loam parent material, but the levels may increase slightly with depth, as in the Ruston soils and the lower part of the Larue soils, as clay content increases. This indicates a general lack of micaceous minerals, which are a source of exchangeable potassium during weathering. The exchangeable potassium content of the Bayoudan soils that developed from unconsolidated acid clays generally remains about the same or increases with depth. Increases in exchangeable potassium with depth can be associated with increasing clay content. The exchangeable potassium content of the Cahaba, Frizzell, Guyton, Iuka, Prentiss, Smithdale, Ouachita, and Sacul soils is generally low throughout the soil profile. The exchangeable potassium content in the Forestdale, Perry, Portland, and Yorktown soils is much higher than that of most of the other soils in the parish because of a higher clay content, but according to soil test interpretation guidelines, it is still in the low to medium range depending on the soil texture. The soils that have a relatively low clay content, such as the Sterlington soils, generally have low amounts of exchangeable potassium. The higher levels of exchangeable potassium generally are in the loamy and clayey soil horizons. Higher levels are also in soils where fertilizer potassium has been applied.

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 if the soils have a sufficient amount of clay to hold the potassium. Exchangeable potassium levels can be maintained by adding enough fertilizer potassium to make up for that removed by crops, the fixation of exchangeable potassium to nonexchangeable potassium, and leaching. Some soils in Caldwell Parish, such as the Larue soils, do not have a sufficient amount of clay in the root zone, and therefore, a sufficiently high cation-exchange capacity to maintain adequate quantities of available potassium for sustained crop production. These soils require more frequent additions of potassium because of leaching.

Magnesium. Magnesium exists 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; 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 Caldwell Parish is low, medium, or high, depending upon soil texture. Generally, the exchangeable magnesium content of the soils on uplands, such as the Bayoudan soils, increases with depth. This increase is associated with an increasing clay content in the subsoil. In the Falkner and Gore soils, the exchangeable magnesium content greatly increases from the surface layer to the subsoil. Among the soils formed in alluvium, the exchangeable magnesium levels generally increase with depth, or the levels remain about the same through the soil profile, such as in the Rilla and Forestdale soils.

Medium exchangeable magnesium levels are adequate for crop production, especially where the plant roots can exploit the high levels that are in the subsoil. Because magnesium deficiencies in some plants are possible if levels are low, additions of fertilizer magnesium can be beneficial on some of the soils.

Calcium. Calcium exists as exchangeable calcium associated with negatively charged sites on clay mineral surfaces and as structural calcium in mineral crystal lattices. Exchangeable calcium is generally available for plant uptake while structural calcium is not.

According to soil test interpretation guidelines, the exchangeable calcium levels in the soils of Caldwell Parish are low, medium, or high, depending on soil texture. Calcium deficiencies in plants are extremely rare. Calcium is normally added to soil by liming, which corrects problems associated with soil acidity.

Calcium is normally the most plentiful exchangeable cation in soils; however, in the subsoil of Gore, Providence, Ruston, Sacul, Smithdale, and Tippah soils, the exchangeable magnesium levels are higher than the exchangeable calcium levels. In the other soils, the exchangeable calcium levels are higher than or about the same as the exchangeable magnesium levels.

High levels of exchangeable calcium in the surface layer are normally associated with higher pH levels than are in the subsoil. The higher levels are probably the result of applications of lime to control soil acidity. Higher levels in the subsoil generally are associated with higher clay content or with free carbonates when pH levels are high.

Organic matter. The organic matter content of a soil greatly influences other soil properties. High organic matter levels in mineral soils are desirable, and low levels can lead to many problems. Increasing the organic matter content of a soil can greatly improve the soil's structure, drainage, and other physical properties. It can also increase moisture-holding capacity, cation-exchange capacity, and nitrogen content.

Increasing organic matter content is difficult because organic matter is continually subjected to microbial degradation. This is especially true in Louisiana where higher temperatures increase microbial activity, thereby increasing the degradation rate. The rate of breakdown of organic matter 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. Management practices that promote soil erosion lead to a further decrease.

If no degradation of organic matter occurs, 10 tons of organic matter are needed to raise the organic matter content of the top 6 inches of soil by just 1 percent. Since breakdown of organic matter does occur in the soil, several decades of adding large amounts of organic matter to the soil are needed to produce a small increase in the organic matter content. Conservation tillage and cover crops slowly increase the organic matter content over time, or at least prevent further declines.

The organic matter content of most of the soils in Caldwell Parish is low. It decreases sharply with depth because fresh organic matter is confined to the surface layer. The 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 primary sodium minerals are readily soluble and generally are not strongly retained by soil, 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 restriced drainage in the subsoil, and soils on the Coastal Marsh have significant amounts of sodium. High levels of exchangeable sodium are associated with undesirable physical properties, such as poor structure, slow permeability, and restricted drainage.

Although many soils in Caldwell Parish have more exchangeable sodium than exchangeable potassium, only the Brimstone soils have excessive levels of exchangeable sodium in the root zone. Elevated levels of exchangeable sodium are in the subsoil of the Gore, Guyton, Forestdale, and Frizzell soils.

pH, exchangeable aluminum and hydrogen, 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 with soil surfaces. Soil 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 convert exchangeable aluminum to nonexchangeable polymeric hydrolysis species. High levels of organic matter can also alleviate aluminum toxicity.

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

Acidity from hydrolysis of neutral salt exchangeable aluminum plus neutral salt exchangeable hydrogen from pH-dependent exchange sites make 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 equilibration with buffers followed by estimation of acidity from changes in buffer pH.

Many of the soils of Caldwell Parish have a low pH, significant quantities of exchangeable aluminum, and have high levels of total acidity. Examples are the Frizzell, Guyton, Savannah, and Sacul soils. The exchangeable aluminum levels are high enough to limit crop production. High levels of exchangeable aluminum in the surface layer can be reduced by liming, but no economical methods are available to neutralize soil acidity at depth. Exchangeable aluminum levels can be reduced by applying gypsum so that calcium leaches through the soil profile and exchanges with the 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 soil surfaces. Permanent charge cation-exchange sites occur because a net negative charge develops on a mineral surface from substitution of ions within the crystal lattice. A negative charge developed from ionization of surface hydroxyl groups on minerals and organic matter produces pH-dependent cation-exchange sites.

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 salts 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 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 generally is 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 includes all of the pH-dependent cation-exchange capacity up to pH 8.2. If a soil has no pH-dependent exchange sites or the pH of the soil is about 8.2, then the effective and sum cation-exchange capacity is 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 many of the soils of Caldwell Parish. The exceptions are soils that have a low clay content and low total acidity and soils that have a high clay content. In these soils, permanent-charge cation-exchange capacity is dominant. Since the pH-dependent cation-exchange capacity increases with pH, liming results in a greater storage capacity for nutrient cations, such as potassium, magnesium, and calcium.

Physical and Chemical Analyses of Selected Soils

The results of physical analysis of several typical pedons in the survey area are given in table 19 and the results of chemical analysis in table 20. Results of mineralogy analysis are given in table 21. The data are for soils sampled at carefully selected sites. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." Soil samples were analyzed by the National Soil Survey Laboratory, Soil Conservation Service, and the the Soil Characterization Laboratory, Louisiana Agricultural Experiment Station.

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an oven-dry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods *(22)*.

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

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

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

Water retained—pressure extraction, percentage of oven-dry weight of less than 2 mm material; $\frac{1}{3}$ or $\frac{1}{10}$ ($\frac{3}{10}$) bar (4B1C), 15 bars (4B2).

Water-retention difference—between $\frac{1}{3}$ bar and 15 bars for less than 2 mm material (4C1).

Moist bulk density—of less than 2 mm material, saran-coated clods (4A1).

Field moist and oven dry—of less than 2 mm material, saran-coated clods (4A3a) and (4A1h).

Linear extensibility—change in clod dimension based on less than 2 mm material (4D).

Organic carbon—dichromate, ferric sulfate titration (6A1a).

Extractable cations—ammonium acetate pH 7.0, uncorrected; calcium (6N2), magnesium (6O2), sodium (6P2), potassium (6Q2).

Extractable acidity—barium chloride-triethanolamine I (6H1a).

Cation-exchange capacity—ammonium acetate, pH 7.0 (5A1b).

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

Reaction (pH)—1:1 water dilution (8C1a).

Reaction (pH)—potassium chloride (8C1c).

Reaction (pH)—calcium chloride (8C1e).

Aluminum—potassium chloride extraction (6G).

Iron—dithionate-citrate extract (6C2b).

Iron—sodium dithionate extract (6C1).

Available phosphorus—(method of reporting laboratory) Bray No. 1 and No. 2.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(21)*. 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 Alfisol.

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

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludalfs (*Hapl*, meaning minimal horizonation, plus *udalf*, the suborder of the Alfisol that has an udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludalfs. The formative elements and adjectives used in forming the classification name of the soil in this survey and their explanation of meaning are shown in table 23.

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 fine-silty, mixed, nonacid, thermic Typic Hapludalfs.

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

Soil Series and Their Morphology

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

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (19)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (21)*. 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."

Alligator Series

The Alligator series consists of poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are on broad flats and in depressional areas on alluvial plains. They are subject to frequent flooding and have a seasonal high water table. Slope is 0 to 1 percent. Soils of the Alligator series are very fine, montmorillonitic, acid, thermic Vertic Haplaquepts.

Alligator soils commonly are near Hebert and Perry soils. Hebert soils are in higher positions than Alligator soils and are loamy throughout. Perry soils are in slightly higher positions and have a nonacid control section.

Typical pedon of Alligator clay, frequently flooded; about 9 miles southeast of Columbia, 4.9 miles south of the intersection of Highways 559 and 4, east 1.2 miles and south 0.7 mile, 209 yards north on pipeline, 15 yards east of pipeline in woods; NW¼NW¼ sec. 22, T. 12 N., R. 5 E.

Ap—0 to 4 inches; dark grayish brown (10YR 4/2) clay; weak fine subangular blocky structure; plastic and sticky; many fine roots; very strongly acid; abrupt smooth boundary.

Bg1—4 to 23 inches; gray (10YR 5/1) clay; many fine and medium prominent yellowish red (5YR 5/6) mottles; weak medium subangular blocky structure; plastic and sticky; common fine roots; few slickensides; very strongly acid; clear wavy boundary.

Bg2—23 to 40 inches; gray (10YR 5/1) clay; few fine prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; plastic and sticky; few fine roots; few medium slickensides; very strongly acid; clear wavy boundary.

Cg—40 to 60 inches; gray (10YR 5/1) clay; common fine prominent dark yellowish brown (10YR 4/4) mottles; massive; plastic and sticky; slightly acid.

Thickness of the solum ranges from 40 to 60 inches. Reaction of the upper 40 inches of the profile is strongly acid or very strongly acid. Reaction of the profile below a depth of 40 inches ranges from very strongly acid to neutral. Cracks 1 to 5 centimeters wide develop to a depth of 20 inches in most years.

The A or Ap horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. Thickness ranges from 4 to 10 inches.

The Bg horizon has hue of 10YR, value of 6, and chroma of 1 or 2; or it has hue of 4 or 5 and chroma of 1. Mottles in shades of brown and yellow range from few to many. Texture is clay or silty clay.

The Cg horizon has colors similar to those of the Bg horizon. Texture is clay, silty clay, or silty clay loam.

Bayoudan Series

The Bayoudan series consists of moderately well drained, very slowly permeable soils that formed in clayey marine sediment of Tertiary age. Slope ranges from 3 to 40 percent. Soils of the Bayoudan series are very fine, montmorillonitic, thermic Aquentic Chromuderts.

Bayoudan soils commonly are near Alligator, Falkner, Guyton, Perry, and Tippah soils. Alligator and Perry soils are on the flood plain of the Ouachita River. Alligator soils are gray throughout the subsoil. Perry soils are gray in the upper part of the solum and reddish in the lower part. Falkner and Tippah soils are mainly on ridgetops at higher elevations than the Bayoudan soils and they are fine-silty. Guyton soils are on the flood plains of small streams and are fine-silty.

Typical pedon of Bayoudan clay, 8 to 40 percent slopes; about 10.8 miles southeast of Columbia, 1.4 miles east on logging road from intersection of logging roads in sec. 12, T. 11 N., R. 4 E., 30 feet south of logging road and 30 feet east of log loading site; SE¼SE¼ sec. 7, T. 11 N., R. 5 E.

A1—0 to 2 inches; very dark grayish brown (10YR 3/2) clay; weak medium granular structure; firm, very sticky and very plastic; common medium and fine roots; very strongly acid; abrupt wavy boundary.

A2—2 to 5 inches; brown (10YR 4/3) clay; moderate medium subangular blocky structure; firm, very sticky and very plastic; common medium and fine roots; very strongly acid; clear smooth boundary.

Bw1—5 to 10 inches; strong brown (7.5YR 5/6) clay; moderate medium subangular blocky structure; firm, very sticky and very plastic; common fine and medium roots; few intersecting slickensides; extremely acid; clear smooth boundary.

Bw2—10 to 16 inches; strong brown (7.5YR 5/6) clay; moderate medium subangular blocky structure; firm, very sticky and very plastic; common fine and medium roots and few coarse roots; few intersecting slickensides; extremely acid; clear smooth boundary.

Bw3—16 to 25 inches; light olive brown (2.5Y 5/4) and yellowish brown (10YR 5/8) clay; weak medium subangular blocky structure; firm, very sticky and very plastic; common fine and medium roots and few coarse roots; few intersecting slickensides; extremely acid; clear smooth boundary.

By1—25 to 36 inches; olive (5Y 5/3) clay; moderate very coarse blocky structure; firm, very sticky and very plastic; common fine and medium roots and few coarse roots; few fine gypsum crystals; common intersecting slickensides; extremely acid; gradual smooth boundary.

By2—36 to 72 inches; grayish brown (2.5Y 5/2) clay; moderate very coarse blocky structure; firm, very sticky and very plastic; common fine and medium roots and few coarse roots; few fine gypsum crystals; common intersecting slickensides; slightly acid.

Thickness of the solum is more than 60 inches. Intersecting slickensides range from few to many. The particle-size control section is commonly more than 80 percent clay. The effective cation-exchange capacity is 20 to 50 percent saturated with exchangeable aluminum within a depth of 30 inches.

The A1 and A2 horizons have hue of 10YR, value of 2 to 5, and chroma of 1 to 4. The combined thickness of the A1 and A2 horizons ranges from 2 to 5 inches. Reaction ranges from very strongly acid to slightly acid.

The upper part of the Bw horizon has hue of 2.5YR, 5YR, 7.5YR, or 10YR, value of 4 to 5, and chroma of 6 to 8. The lower part has the same range in colors as that of the upper part, or it has hue of 2.5Y or 5Y, value of 4 to 6, and chroma of 2 or 4. Mottles range from none to many and from olive to red. Reaction of the Bw horizon ranges from extremely acid to strongly acid.

The By horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 2 to 4. Mottles range from none to common and from olive to brown. Crystals of gypsum range from few to many; concretions of carbonates and marine fossils are in the By horizon in some pedons. Reaction ranges from extremely acid to moderately alkaline.

Brimstone Series

The Brimstone series consists of poorly drained, slowly permeable soils that are high in exchangeable sodium. These soils formed in loamy sediment of late Pleistocene age. They are on stream terraces. They are subject to rare flooding and have a seasonal high water table. Slope is less than 1 percent. Soils of the Brimstone series are fine-silty, siliceous, thermic Glossic Natraqualfs.

The Brimstone soils are taxadjuncts to the Brimstone series because the reaction of the An, Eng, and Btng/E horizons is higher than is typical for the series. This difference does not significantly affect the use and management of these soils.

Brimstone soils commonly are near Cahaba, Frizzell, Guyton, Prentiss, and Savannah soils. Cahaba, Frizzell, Prentiss, and Savannah soils are in higher positions than the Brimstone soils and do not have a high content of sodium in the subsoil. Cahaba soils are fine-loamy and have a reddish subsoil. Frizzell soils are coarse-silty. Prentiss and Savannah soils have a fragipan. Guyton soils are in positions similar to those of the Brimstone soils and do not have a high content of sodium in the subsoil.

Typical pedon of Brimstone very fine sandy loam in an area of Brimstone-Prentiss association, 0 to 3 percent slopes; about 7 miles west of Columbia, 1.9 miles south of the intersection of Highway 4 and Highway 846, about 0.3 mile west, 41 yards south of fence; NE¼NE¼ sec. 19, T. 13 N., R. 3 E.

An—0 to 7 inches; grayish brown (10YR 5/2) very fine sandy loam; common medium distinct dark yellowish brown (10YR 4/6) mottles; weak medium granular structure; friable; common fine and medium roots; strongly alkaline; clear smooth boundary.

Eng—7 to 21 inches; light brownish gray (10YR 6/2) very fine sandy loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; very friable; common fine and medium roots; common fine and medium pores; common fine and medium black concretions; strongly alkaline; clear irregular boundary.

Btng/E—21 to 35 inches; about 70 percent grayish brown (10YR 5/2) silty clay loam (Btng); about 30 percent light brownish gray (10YR 6/2) silt loam (E) in tongues between prisms; common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; firm; common fine and medium roots; common fine and medium pores; common thin discontinuous clay films on vertical faces of peds; common fine and medium black concretions; strongly alkaline; gradual wavy boundary.

Btng1—35 to 45 inches; light brownish gray (2.5Y 6/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm; common fine and medium roots; common fine and medium pores; common thin discontinuous clay films on vertical faces of peds;

common fine and medium black concretions; moderately alkaline; clear smooth boundary.

Btng2—45 to 62 inches; light brownish gray (2.5Y 6/2) silty clay loam; many medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; common fine and medium roots; common fine and medium pores; few thin discontinuous clay films on vertical faces of peds; common fine and medium black concretions; mildly alkaline; clear smooth boundary.

C—62 to 85 inches; gray (N 6/0) fine sandy loam; few greenish gray (5GY 5/1) mottles; friable; moderately alkaline.

Thickness of the solum ranges from 40 to 100 inches. Exchangeable sodium percentage ranges from 15 to 30 within 6 inches of the top of the natric horizon and within 16 inches of the soil surface.

The An horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. Thickness ranges from 4 to 7 inches. Reaction ranges from very strongly acid to strongly alkaline.

The Eng horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. Texture is silt loam or very fine sandy loam. Tongues of the E horizon extend into the Btng horizon. Thickness of the Eng horizon ranges from 6 to 20 inches. Reaction ranges from medium acid to strongly alkaline.

The Btng horizon and the Btng part of the Btng/E horizon have hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 or 2. Mottles are in shades of brown or gray. Texture is silt loam or silty clay loam. Reaction ranges from neutral to strongly alkaline. Concretions of carbonates range from none to common. Some pedons have a BCg horizon that is similar to the Btng horizon in range of color and texture.

The 2C horizon is grayish fine sandy loam or sandy loam. Reaction ranges from neutral to moderately alkaline.

Cadeville Series

The Cadeville series consists of moderately well drained, very slowly permeable soils that formed in marine sediment of Tertiary age. These soils are on uplands. Slope ranges from 5 to 60 percent. Soils of the Cadeville series are fine, mixed, thermic Albaquic Hapludalfs.

Cadeville soils commonly are near Olla, Ruston, and Savannah soils. Olla soils are in positions similar to those of the Cadeville soils, and they are fine-loamy. Ruston and Savannah soils typically are on ridgetops and are fine-loamy. In addition, the Savannah soils have a fragipan.

Typical pedon of Cadeville very fine sandy loam, in an area of Olla-Cadeville association steep; about 9.5 miles north of Columbia, 0.3 mile north of Fellowship Cemetery on Highway 846 to gravel road, right 2.4 miles to north section line of section 9, west about 400 feet from gravel road; NW¼NE¼ sec. 9, T. 14 N., R. 3 E.

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

Bt1—3 to 8 inches; yellowish red (5YR 5/6) clay; moderate medium subangular blocky structure; firm, plastic and sticky; common fine roots; shiny ped faces; extremely acid; clear smooth boundary.

Bt2—8 to 18 inches; yellowish red (5YR 5/6) clay; common medium distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm, very plastic and very sticky; common fine roots; shiny ped faces; extremely acid; clear smooth boundary.

Btg—18 to 32 inches; light brownish gray (2.5Y 6/2) clay; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm, very plastic and very sticky; shiny ped faces; extremely acid; clear smooth boundary.

Cg—32 to 60 inches; light brownish gray (2.5Y 6/2) clay; weak coarse platy structure; firm, very plastic and very sticky; few strata of fine sandy loam 0.25 to 0.75 inches thick; extremely acid.

Thickness of the solum ranges from 30 to 60 inches. Mottles that have chroma of 2 or less are within 10 inches of the upper 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 hue of 10YR, value of 3 to 5, and chroma of 2 to 4. It is 2 to 6 inches thick. Reaction ranges from extremely acid to medium acid.

The Bt1 horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 3 to 6. Texture is sandy clay loam, clay loam, silty clay loam, clay, or silty clay. Reaction ranges from extremely acid to strongly acid.

The Bt2 horizon has hue of 5YR, value of 4 or 5, and chroma of 3 to 8; or hue of 2.5YR, value of 4 or 5, and chroma of 4 to 8. Texture is silty clay loam, silty clay, or clay. Reaction ranges from extremely acid to strongly acid.

The Btg and Cg horizons are mottled in shades of gray, brown, red, or yellow. Texture is silty clay loam, silty clay, or clay. Reaction ranges from extremely acid to strongly acid.

Cahaba Series

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

Cahaba soils commonly are near Brimstone, Frizzell, Guyton, and Prentiss soils. Brimstone and Guyton soils are in lower positions than the Cahaba soils and are fine-silty and grayish throughout. Frizzell soils are in slightly lower positions and are coarse-silty. Prentiss soils are in slightly lower positions and are coarse-loamy and have a fragipan.

Typical pedon of Cahaba fine sandy loam, 1 to 3 percent slopes; about 11.5 miles southwest of Columbia, west 2.4 miles from Castor Creek on Highway 506, right on paved road 1 mile to farm road at homesite, right on field road 0.3 mile to hay field, 65 yards north of gate and 10 yards east of field road; NW¼NE¼ sec. 15, T. 12 N., R. 2 E.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; many fine roots and few medium roots; few fine pores; strongly acid; clear smooth boundary.

Bt1—6 to 26 inches; yellowish red (5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; friable; common fine roots; few fine pores; many thin discontinuous clay films on vertical faces of peds; strongly acid; gradual smooth boundary.

Bt2—26 to 44 inches; yellowish red (5YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable; common fine roots; few fine pores; common thin discontinuous clay films on vertical faces of peds; strongly acid; gradual smooth boundary.

BC—44 to 53 inches; strong brown (7.5YR 5/6) fine sandy loam; weak medium subangular blocky structure; friable; few fine pores; few thin discontinuous clay films on vertical faces of peds; strongly acid; gradual smooth boundary.

C—53 to 62 inches; yellowish brown (10YR 5/4) fine sandy loam; massive; very friable; very strongly acid.

Thickness of the solum ranges from 36 to 60 inches. Reaction throughout the profile ranges from very strongly acid to medium acid.

The Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. Thickness ranges from 4 to 8 inches.

Some pedons have an E horizon that has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 4; or hue of 7.5YR, value of 5, and chroma of 6 or 8.

The Bt horizon has hue of 5YR, 2.5YR, or 10R, value of 4 or 5, and chroma of 6 or 8. Texture is sandy clay loam, loam, or clay loam. Clay content ranges from 18 to 35 percent. Silt content ranges from 20 to 50 percent.

The BC horizon is strong brown, yellowish red, or red. Texture is sandy loam or fine sandy loam. The BC horizon is mottled in shades of yellow or brown in some pedons.

The C horizon ranges in color from yellowish brown to red and is commonly interbedded or stratified with textures of sand, loamy sand, and fine sandy loam. In some pedons, it is mottled in shades of yellow, brown, or gray.

Falkner Series

The Falkner series consists of somewhat poorly drained, slowly permeable soils that formed in loess of Pleistocene age and the underlying clayey sediments of Tertiary age. These soils are on uplands and stream terraces. They have a seasonal high water table. Slope ranges from 0 to 2 percent. Soils of the Falkner series are fine-silty, siliceous, thermic Aquic Paleudalfs.

Falkner soils commonly are near Bayoudan, Cadeville, Gore, Guyton, Providence, and Tippah soils. Bayoudan and Gore soils are on side slopes, and Cadeville soils are at lower elevations. Bayoudan, Cadeville, and Gore soils are clayey throughout the subsoil. Guyton soils are in narrow drainageways and are grayish throughout. Providence and Tippah soils are in positions similar to those of the Falkner soils. Providence soils have a fragipan. Tippah soils have mixed mineralogy.

Typical pedon of Falkner silt loam; about 8.3 miles southeast of Columbia, 1.1 miles north of intersection of roads in section 36, T. 12 N., R. 4 E., 0.4 mile southwest on logging road, 45 feet north of the logging road and 60 feet west of woods trail; SW¼SE¼ sec. 25, T. 12 N., R. 4 E.

A—0 to 5 inches; brown (10YR 5/3) silt loam; weak medium subangular blocky structure; very friable; common fine and medium roots; few fine pores; very strongly acid; clear smooth boundary.

Bt1—5 to 12 inches; yellowish brown (10YR 5/6) silty clay loam; few fine distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; common fine and medium roots; few fine pores; few faint discontinuous clay films on vertical faces of peds; extremely acid; gradual smooth boundary.

Bt2—12 to 22 inches; yellowish brown (10YR 5/6) silty clay loam; few medium distinct grayish brown (10YR 5/2) mottles and few fine distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; common fine and medium roots and few coarse roots; few fine pores; few faint discontinuous clay films on vertical faces of peds; few thin silt coatings on vertical faces of some peds in lower part of horizon; very strongly acid; clear smooth boundary.

2Btg1—22 to 29 inches; mottled light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) clay; few fine distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm, very plastic and very sticky; common fine and medium roots and few coarse roots; shiny ped faces; few thin silt coatings on vertical faces of some peds in upper part of horizon; extremely acid; clear smooth boundary.

2Btg2—29 to 43 inches; mottled light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) clay; moderate medium subangular blocky structure; firm, very plastic and very sticky; common fine and medium roots and few coarse roots; shiny ped faces; very strongly acid; gradual smooth boundary.

2Bt—43 to 63 inches; brownish yellow (10YR 6/6) clay; moderate medium subangular blocky structure; firm, very sticky and very plastic; common fine and medium roots and few coarse roots; shiny ped faces; few black stains on faces of some peds; medium acid.

Thickness of the silty upper part of the solum ranges from 15 to 35 inches. Total thickness of the solum is more than 60 inches. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum within a depth of 30 inches. Content of clay in the upper 20 inches of the Bt horizon ranges from 20 to 35 percent. Reaction throughout the solum ranges from extremely acid to medium acid.

The A horizon has hue of 10YR, value of 5 or 6, and chroma 3 or 4. Thickness ranges from 4 to 8 inches.

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

The upper part of the Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6. In some pedons, this horizon contains a few gray mottles. Texture is silt loam or silty clay loam.

The lower part of the Bt horizon has matrix colors similar to those of the Bt1 horizon and contains few to many grayish mottles; or the horizon is mottled gray, red, brown, or yellow. Texture is silt loam or silty clay loam.

The 2Bt horizon has hue of 2.5YR, 5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 1 to 6. It has few to many fine to coarse mottles of yellow, brown, gray, or red; or the horizon is mottled in shades of gray, brown, red, or yellow. Texture is silty clay or clay.

Forestdale Series

The Forestdale series consists of poorly drained, very slowly permeable soils that formed in recent alluvium and the underlying sediment of late Pleistocene age. The soils are on low stream terraces. They are subject to occasional flooding, and they have a seasonal high water table. Slope is less than 1 percent. Soils of the Forestdale series are fine, montmorillonitic, thermic Typic Ochraqualfs.

The Forestdale soils in Caldwell Parish are taxadjuncts to the Forestdale series because they have older soil material in the lower part of the solum. This difference, however, does not significantly affect the use and management of the soils.

Forestdale soils commonly are near Alligator and Perry soils. The Alligator and Perry soils are in lower positions than the Forestdale soils and have a very fine-textured particle-size control section.

Typical pedon of Forestdale silty clay loam, occasionally flooded; about 8 miles east of Columbia, 0.4 mile west of the Boeuf River on south side of Highway 4, about 10 steps south of fence and 18 steps west of gate post on fence; SW¼SW¼ sec. 26, T. 13 N., R. 5 E.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium granular structure; firm; common fine and medium roots; very strongly acid; clear smooth boundary.

Btg1—4 to 12 inches; gray (10YR 5/1) clay; many medium prominent strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm, very sticky and very plastic; common fine and medium roots and few coarse roots; shiny ped faces; very strongly acid; clear smooth boundary.

Btg2—12 to 22 inches; light brownish gray (2.5Y 6/2) clay; common medium prominent strong brown (7.5YR 5/6 and 5/8) mottles; moderate medium subangular blocky structure; firm, very sticky and very plastic; common fine and medium roots; shiny ped faces; very strongly acid; abrupt smooth boundary.

2Btg3—22 to 28 inches; brown (7.5YR 5/2) clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; few fine pores; common fine and medium roots; common thin discontinuous clay films on vertical ped faces; common fine and medium soft black concretions; very strongly acid; gradual smooth boundary.

2Bt1—28 to 61 inches; brown (7.5YR 5/4) clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; firm; few fine pores; few fine and medium roots; common fine and medium soft black concretions; few fine concretions of calcium carbonate; common thin discontinuous clay films on vertical faces of peds; slightly acid; gradual smooth boundary.

2Bt2—61 to 87 inches; brown (7.5YR 5/4) sandy clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; firm; few fine pores; few fine hard concretions of calcium carbonate; common thin discontinuous clay films on vertical faces of peds; neutral.

Thickness of the solum ranges from 40 to 80 inches or more. The effective cation-exchange capacity is 20 to 50 percent saturated with exchangeable aluminum within a depth of 30 inches.

The A horizon has hue of 10YR, value of 3 to 6, and chroma of 2. Where the value is 4 or 5, the chroma is 1. Thickness of the A horizon ranges from 4 to 10 inches. Reaction ranges from very strongly acid to medium acid.

The Btg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. Where the value is 4 or 5, the chroma is 1. Mottles of red, yellow, or brown range from few to common. Texture is clay, silty clay, or silty clay loam. Clay content of the upper 20 inches of the Btg horizon ranges from 35 to 60 percent. Reaction of the Btg1 and Btg2 horizons ranges from very strongly acid to medium acid.

The 2Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 4. Texture is silt loam, silty clay loam, clay loam, or sandy clay loam. Reaction ranges from very strongly acid to mildly alkaline.

Frizzell Series

The Frizzell series consists of moderately well drained, slowly permeable soils that formed in sediment of late Pleistocene age. These soils are on low stream terraces. Slope ranges from 0 to 2 percent. Soils of the Frizzell series are coarse-silty, siliceous, thermic Glossaquic Hapludalfs.

Frizzell soils commonly are near Cadeville, Cahaba, Falkner, Guyton, Prentiss, Providence, and Savannah soils. Cadeville soils are on uplands and have a clayey subsoil. Cahaba and Falkner soils are in higher positions than the Frizzell soils. Cahaba soils are fine-loamy and have a reddish subsoil. Falkner soils are fine-silty and are underlain by clay. Guyton soils are in lower positions than the Frizzell soils and are fine-silty and grayish throughout. Prentiss, Providence, and Savannah soils are in higher positions and have a fragipan.

Typical pedon of Frizzell silt loam, in an area of Frizzell-Guyton-Providence association, 0 to 2 percent slopes; about 12 miles west of Columbia, north 1.9 miles on Highway 506 from Sardis Church, then left on gravel road 0.4 mile to pipeline, 23 steps south of center of road on east side of pipeline; SW¼W¼ sec. 4, T. 12 N., R. 2 E.

A—0 to 4 inches; brown (10YR 5/3) silt loam; few medium distinct yellowish brown (10YR 5/6) mottles; weak medium granular structure; very friable; common fine and medium roots; very strongly acid; clear smooth boundary.

B/E1—4 to 18 inches; yellowish brown (10YR 5/4) loam (Bt); few medium prominent yellowish red (5YR 5/6) mottles and few fine distinct grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; very friable; about 30 percent vertical streaks and pockets (interfingers) of pale brown (10YR 6/3) very fine sandy loam (E); common fine and medium roots; few fine pores in the Bt material and common fine and medium pores in the E material; common thin discontinuous clay films on vertical faces of peds; few fine soft brown and black concretions; very strongly acid; clear smooth boundary.

B/E2—18 to 35 inches; yellowish brown (10YR 5/6) silt loam (Bt); common medium distinct strong brown

(7.5YR 5/6) mottles and few medium distinct grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; about 20 percent vertical streaks and pockets of light gray (10YR 7/2) silt loam (E); common fine and medium roots; common fine pores; common thin discontinuous clay films on vertical faces of peds; few fine soft brown and black concretions; strongly acid; clear smooth boundary.

Bt1—35 to 51 inches; yellowish brown (10YR 5/6) silty clay loam; many medium distinct grayish brown (10YR 5/2) mottles and many medium faint yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; friable; common fine roots; few fine pores; common thin discontinuous clay films on vertical faces of peds; few fine brown and black concretions; very strongly acid; gradual smooth boundary.

Bt2—51 to 72 inches; yellowish brown (10YR 5/6) loam; few medium distinct strong brown (7.5YR 5/6) mottles; weak moderate subangular blocky structure; friable; common fine roots; few fine pores; common thin discontinuous clay films on vertical faces of peds; few fine brown and black concretions; common vertical seams of light brownish gray (10YR 6/2) clay loam between major structural breaks; very strongly acid.

Thickness of the solum ranges from 60 to 80 inches. Base saturation in the Bt2 horizon is 35 to 60 percent. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum within 30 inches of the soil surface. Reaction throughout the profile is very strongly acid or strongly acid except where lime has been added to the soil.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. Thickness ranges from 2 to 4 inches.

The Bt part of the B/E horizon has hue of 10YR, value of 5 or 6, and chroma of 3 to 6. The E part has hue of 10YR, value of 5 to 7, and chroma of l to 3. Texture of both the Bt and E parts of the B/E horizon is silt loam or loam. The B/E horizon has common to many mottles in shades of gray. The E part of the B/E horizon is less clayey than the Bt part and occurs as interfingers that make up 5 percent or more of the horizon.

The Bt horizon has hue of 10YR, value of 4 to 6, and chroma of 3 to 6. Texture is silt loam, silty clay loam, loam, or clay loam. Mottles in shades of brown or gray range from few to many.

Some pedons have a C horizon. Texture is yellowish brown to gray silt loam, silty clay loam, loam, or clay loam. Grayish mottles range from few to many.

Gallion Series

The Gallion series consists of well drained, moderately permeable soils that formed in loamy alluvium. These soils are on natural levees of the Ouachita River and in abandoned channels of the Arkansas River. Slope ranges from 0 to 1 percent. Soils of the Gallion series are fine-silty, mixed, thermic Typic Hapludalfs.

Gallion soils commonly are near Hebert, Perry, Sterlington, and Rilla soils. Hebert and Perry soils are in lower positions than the Gallion soils. Hebert soils have a subsoil that has grayish ped coatings. Perry soils have a very fine-textured particle-size control section. Rilla and Sterlington soils are in positions similar to those of the Gallion soils. Rilla soils are more acid throughout the profile than the Gallion soils. Sterlington soils are coarse-silty.

Typical pedon of Gallion silt loam; about 4 miles northeast of Columbia, 18 steps northwest of Highway 133; NE¼SW¼ sec. 29, T. 14 N., R. 5 E.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam; weak medium granular structure; very friable; common fine roots; neutral; abrupt smooth boundary.

A—5 to 9 inches; dark brown (10YR 4/3) silt loam; weak medium subangular blocky structure; very friable; common fine roots; few fine pores; neutral; gradual smooth boundary.

Bt1—9 to 23 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; few fine pores; common thin continuous clay films on vertical faces of peds; neutral; clear smooth boundary.

Bt2—23 to 31 inches; dark brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; very friable; common fine roots; few fine pores; common thin discontinuous clay films on vertical faces of peds; slightly acid; clear smooth boundary.

BC—31 to 46 inches; strong brown (7.5YR 5/6) very fine sandy loam; weak medium subangular blocky structure; very friable; common fine roots; few fine pores; few thin discontinuous clay films on vertical faces of peds; neutral; gradual smooth boundary.

C—46 to 64 inches; strong brown (7.5YR 5/6) very fine sandy loam; massive; very friable; neutral.

Thickness of the solum ranges from 40 to 60 inches. The Ap and A horizons have hue of 10YR, value of 4 or 5, and chroma of 2 to 4. Total thickness is 6 to 12 inches. Reaction ranges from medium acid to neutral.

The Bt horizon has hue of 7.5YR or 5YR, value of 3 to 5, and chroma of 3 to 6. Texture is silt loam or silty clay loam. Reaction ranges from medium acid to mildly alkaline.

The BC and C horizons have colors similar to those of the Bt horizon. Texture is silt loam, loam, very fine sandy loam, or silty clay loam. Concretions of carbonates range from none to common in the BC and C horizons. Reaction ranges from medium acid to moderately alkaline.

Gore Series

The Gore series consists of moderately well drained, very slowly permeable soils that formed in sediment of Pleistocene age. These soils are on uplands. Slope ranges from 2 to 5 percent. Soils of the Gore series are fine, mixed, thermic Vertic Paleudalfs.

These soils are taxadjuncts to the Gore series because the reaction of the Ap, Bt1, and Bt2 horizons is slightly lower and the color of brown in the BC horizon is not typical for the series. These differences do not significantly affect the use and management of these soils.

Gore soils commonly are near Falkner soils. Falkner soils are in higher positions and are fine-silty.

Typical pedon of Gore silt loam, 2 to 5 percent slopes; about 4.8 miles northeast of Columbia on Highway 138, about 0.5 mile northeast of bridge over Old Channel, then southeast about 0.3 mile in field, 175 feet southeast of tree line; SW¼SW¼ sec. 36, T. 14 N., R. 4 E.

Ap—0 to 6 inches; brown (10YR 4/3) silt loam; weak medium granular structure; friable; few fine roots; extremely acid; abrupt smooth boundary.

Bt1—6 to 14 inches; reddish brown (5YR 5/4) clay; few fine prominent yellowish red (5YR 5/6) mottles and few fine distinct brown (7.5YR 5/4) mottles; moderate medium subangular blocky structure; firm, very plastic and very sticky; few fine roots; shiny ped faces; extremely acid; clear smooth boundary.

Bt2—14 to 28 inches; reddish brown (5YR 5/4) clay; common fine prominent strong brown (7.5YR 5/6) mottles and common fine faint light brownish gray mottles; moderate medium subangular blocky structure; firm, very plastic and very sticky; few fine roots; shiny ped faces; extremely acid; gradual smooth boundary.

Bt3—28 to 40 inches; reddish brown (5YR 5/4) clay; moderate medium subangular blocky structure; firm, very plastic and very sticky; few fine roots; common faint discontinuous clay films on faces of peds; few black stains on ped faces; very strongly acid; gradual smooth boundary.

BC—40 to 71 inches; brown (10YR 4/3) silty clay; common medium distinct yellowish brown (10YR 5/6) and grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; firm, plastic and sticky; few fine roots; neutral.

Thickness of the solum ranges from 60 to 80 inches. The effective cation-exchange capacity is 20 to 50 percent saturated with exchangeable aluminum within a depth of 30 inches.

The Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 3. Thickness ranges from 2 to 6 inches. Reaction ranges from extremely acid to medium acid.

The upper part of the Bt horizon has hue of 5YR, value of 3 to 5, and chroma of 4 to 6. The lower part has hue of 7.5YR, value of 5 or 6, and chroma of 4 or 6. Mottles in shades of red, brown, or gray range from none to common. Texture of the Bt horizon is clay or silty clay. Reaction ranges from extremely acid to medium acid.

The BC horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. Mottles in shades of brown or gray range from few to many. Texture is clay or silty clay. Reaction ranges from very strongly acid to neutral.

Guyton Series

The Guyton series consists of poorly drained, slowly permeable soils that formed in loamy sediment of Late Pleistocene age. These soils are on low stream terraces and flood plains. They are subject to rare or frequent flooding and have a seasonal high water table. Slope is less than 1 percent. The soils of the Guyton series are fine-silty, siliceous, thermic Typic Glossaqualfs.

Guyton soils commonly are near Brimstone, Cadeville, Cahaba, Falkner, Frizzell, Iuka, Ouachita, and Providence soils. Brimstone soils are on stream terraces in positions similar to those of the Guyton soils and they have a high content of sodium in the subsoil. Cadeville, Cahaba, Falkner, Frizzell, and Providence soils are in higher positions. Cadeville soils have a clayey subsoil. Cahaba soils are fine-loamy and have a reddish subsoil. Falkner soils are clayey in the lower part of the subsoil. Frizzell soils are coarse-silty, and Providence soils have a fragipan. Iuka and Ouachita soils are on flood plains in positions higher than those of the Guyton soils, and they have a browner subsoil.

Typical pedon of Guyton silt loam, in an area of Guyton and Ouachita silt loams, frequently flooded; about 8 miles south of Columbia, 2.6 miles southeast on Highway 126 from Holum Baptist Church to Black Bayou, left 0.9 mile on parish road, 37 yards east of road culverts and 44 yards north of road; NE¼SW¼ sec. 34, T. 11 N., R. 4 E.

A—0 to 4 inches; grayish brown (10YR 5/2) silt loam; common fine distinct brown (7.5YR 5/4) mottles; weak medium granular structure; very friable; common fine and medium roots; few fine pores; few fine and medium black and brown concretions; extremely acid; clear smooth boundary.

Eg1—4 to 16 inches; grayish brown (10YR 5/2) silt loam; common fine distinct yellowish brown (10YR 5/6) mottles; massive; very friable; common fine and medium roots; few fine pores; few fine and medium concretions; extremely acid; gradual smooth boundary.

Eg2—16 to 24 inches; light brownish gray (10YR 6/2) silt loam; few fine distinct light olive brown (2.5Y 5/4) mottles; massive; very friable; common fine and medium roots; few fine pores; few fine and medium concretions; extremely acid; clear irregular boundary.

B/E—24 to 46 inches; grayish brown (10YR 5/2) silty clay loam (Bt); few fine distinct brown (7.5YR 5/4) mottles; weak medium subangular blocky structure; very friable; common fine and medium roots; few fine pores; few fine and medium concretions; common distinct discontinuous clay films on vertical faces of peds; common tongues of light brownish gray (10YR 6/2) silt loam (E); 15 to 25 percent tongues that are 0.5 to 2.0 inches wide; very strongly acid; gradual smooth boundary.

Btg1—46 to 62 inches; grayish brown (10YR 5/2) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; very friable; common fine and medium roots; few fine pores; few fine and medium concretions; few distinct discontinuous clay films on vertical faces of peds; very strongly acid.

Thickness of the solum ranges from 50 to 80 inches or more. Content of sand, dominantly very fine, is 10 to 40 percent in the particle-size control section. Exchangeable sodium percentage ranges from about 10 to 40 in the lower part of the solum. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum within a depth of 30 inches.

The A or Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. Thickness ranges from 2 to 7 inches. Reaction ranges from extremely acid to medium acid except where lime has been added to the soil.

The E horizon and E part of the B/E horizon have hue of 10YR, value of 5 to 7, and chroma of 1 or 2. Mottles in shades of brown or yellow range from few to many. Thickness of the E horizon ranges from 12 to 24 inches. Reaction ranges from extremely acid to medium acid.

The Btg1 horizon and the Bt part of the B/E horizon have hue of 10YR, value of 5 or 6, and chroma of 1 or 2. The Btg2 horizon has colors similar to those of the Btg1 horizon and has chroma of 3 or 4. Texture is silt loam or silty clay loam. Mottles in shades of brown range from few to many. Reaction ranges from extremely acid to medium acid.

Hebert Series

The Hebert series consists of somewhat poorly drained, moderately slowly permeable soils that formed in loamy alluvium. These soils are on flood plains, and low areas are subject to flooding. The soils have a seasonal high water table. Slope ranges from 0 to 5 percent. Soils of the Hebert series are fine-silty, mixed, thermic Aeric Ochraqualfs.

Hebert soils in map unit Hh are taxadjuncts to the Hebert series because they have grayish colors throughout the solum. This difference, however, does not affect the use and management of the soils.

Hebert soils commonly are near Gallion, Perry, Portland, Rilla, Sterlington, and Yorktown soils. Gallion, Rilla, and Sterlington soils are in higher positions than the Hebert soils, and Perry, Portland, and Yorktown soils are in lower positions. Gallion, Rilla, and Sterlington soils do not have grayish coatings on faces of peds in the subsoil. In addition, Sterlington soils are coarse-silty. Perry, Portland, and Yorktown soils have a clayey subsoil.

Typical pedon of Hebert silt loam; about 5.5 miles northeast of Columbia, 1.6 miles south of church on Highway 848, west 0.2 mile on field road at Ford's Grocery, 17 yards south of field road in hay meadow; NE¼NW¼ sec. 5, T. 13 N., R. 5 E.

Ap—0 to 6 inches; brown (10YR 5/3) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; very friable;

common fine roots; slightly acid; abrupt smooth boundary.

Bt1—6 to 13 inches; light brownish gray (10YR 6/2) clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; very friable; common fine roots; slightly acid; abrupt wavy boundary.

Bt2—13 to 21 inches; pale brown (10YR 6/3) silt loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; very friable; common fine roots; light brownish gray (10YR 6/2) silt coatings on faces of peds; medium acid; abrupt wavy boundary.

Bt3—21 to 35 inches; reddish brown (5YR 5/4) silt loam; common fine and medium distinct yellowish red (5YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine roots; common distinct grayish brown (10YR 5/2) clay films on vertical faces of peds; common faint light brownish gray (10YR 6/2) silt coatings on faces of peds; strongly acid; clear smooth boundary.

Bt4—35 to 44 inches; reddish brown (5YR 5/4) silt loam; common medium distinct yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine roots; common distinct grayish brown (10YR 5/2) clay films on vertical faces of peds; few faint light brownish gray (10YR 6/2) silt coatings on faces of peds; medium acid; clear smooth boundary.

Bt5—44 to 54 inches; reddish brown (5YR 5/4) silt loam; few fine distinct strong brown (7.5YR 5/6) and reddish brown (5YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine roots; common distinct grayish brown (10YR 5/2) clay films on vertical faces of peds; few faint light brownish gray (10YR 6/2) silt coatings on faces of peds; medium acid; clear smooth boundary.

BC—54 to 72 inches; reddish brown (5YR 5/4) silty clay loam; weak medium subangular blocky structure; friable; few faint clay films on vertical faces of peds; medium acid.

Thickness of the solum ranges from 36 to 72 inches.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. Thickness ranges from 4 to 8 inches. Reaction ranges from extremely acid to neutral.

Some pedons have an E horizon that has hue of 10YR, value of 5 to 7, and chroma of 1 to 3. Texture is silt loam or loam. Thickness ranges from 0 to 10 inches. Reaction ranges from very strongly acid to slightly acid.

The Bt horizon has hue of 10YR, 7.5YR, or 5YR, value of 4 to 6, and chroma of 2 to 4. Texture is silt loam, loam, clay loam, or silty clay loam. Typically, peds have silt coatings as thick as 1 millimeter. Coated peds have chroma of 1 or 2. Reaction ranges from very strongly acid to slightly acid.

The BC and C horizons have the same range in colors as the Bt horizon. Texture is very fine sandy loam, silt loam, or silty clay loam. Reaction ranges from strongly acid to mildly alkaline.

Iuka Series

The Iuka series consists of moderately well drained, moderately permeable soils that formed in loamy alluvium. These soils are on flood plains. They are subject to frequent flooding and have a seasonal high water table. Slope is less than 1 percent. The soils of the Iuka series are coarse-loamy, siliceous, acid, thermic Aquic Udifluvents.

Iuka soils commonly are near Guyton soils. Guyton soils are in lower positions on the flood plain than the Iuka soils, and they have a grayish subsoil and underlying material. In addition, Guyton soils are fine-silty.

Typical pedon of Iuka fine sandy loam, frequently flooded; about 3.5 miles northwest of Columbia, north 1.4 miles from Kountry Korner grocery on Highway 846 to gravel road, then right 2.4 miles on gravel road to creek bottom, south of gravel road 38 yards in field by black walnut tree; SW¼NW¼ sec. 1, T. 13 N., R. 3 E.

Ap—0 to 4 inches; brown (10YR 4/3) fine sandy loam; weak medium granular structure; very friable; common fine and medium roots; strongly acid; clear smooth boundary.

A—4 to 10 inches; yellowish brown (10YR 5/4) fine sandy loam; massive; very friable; common fine roots; strongly acid; gradual smooth boundary.

C1—10 to 29 inches; brown (10YR 5/3) fine sandy loam; common medium distinct grayish brown (10YR 5/2) mottles; massive; very friable; common fine roots; medium acid; gradual smooth boundary.

C2—29 to 60 inches; light yellowish brown (10YR 6/4) fine sandy loam; common medium distinct grayish brown (10YR 5/2) mottles; massive; very friable; common fine roots; medium acid.

Reaction ranges from very strongly acid to medium acid except where lime has been added to the soil. Thin bedding planes are in most pedons.

The Ap and A horizons have hue of 10YR, value of 4 to 6, and chroma of 2 to 4. Combined thickness of the

Ap and A horizons ranges from 5 to 12 inches. Clay content of the particle-size control section ranges from 10 to 18 percent. Some pedons have a buried A horizon within a depth of 20 inches.

The C1 horizon has hue of 10YR, value of 4 to 6, and chroma of 3 to 6; or 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 C2 horizon has colors similar to those of the C1 horizon; or it is mottled in shades of gray, brown, or red; or it is mainly gray with brown, red, or yellow mottles. Texture is sandy loam, fine sandy loam, loam, or silt loam.

Larue Series

The Larue series consists of well drained, moderately permeable soils that formed in loamy sediment of Pleistocene age. These soils are on uplands. Slope ranges from 5 to 30 percent. Soils of the Larue series are loamy, siliceous, thermic Arenic Paleudalfs.

Larue soils commonly are near Cadeville, Guyton, Savannah, and Smithdale soils. Cadeville, Savannah, and Smithdale soils are in positions similar to those of the Larue soils. Guyton soils are on flood plains and are fine-silty. Cadeville soils have a fine-textured particle-size control section. Savannah soils have a fragipan. Smithdale soils do not have a sandy surface and subsurface layer.

Typical pedon of Larue loamy fine sand, in an area of Larue-Smithdale association, moderately steep; about 13 miles northwest of Columbia, 1.2 miles west on gravel road from Highway 846, north on gravel road 0.6 mile to intersection, 25 yards east of intersection on pipeline and 5 yards north of pipeline; SW¼SE¼ sec. 23, T. 15 N., R. 2 E.

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

E—10 to 29 inches; light yellowish brown (10YR 6/4) loamy fine sand; weak fine granular structure; very friable; few fine and medium roots; medium acid; abrupt smooth boundary.

Bt1—29 to 40 inches; red (2.5YR 4/6) sandy clay loam; weak medium subangular blocky structure; friable; common thin discontinuous clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—40 to 72 inches; yellowish red (5YR 5/6) loam; few fine faint strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few thin discontinuous clay films on vertical faces of peds; few fine roots; few thin streaks of pale brown (10YR 6/3) loamy fine sand; strongly acid.

Thickness of the solum is more than 60 inches. The effective cation-exchange capacity is 20 to 50 percent saturated with exchangeable aluminum within 30 inches of the soil surface. Reaction ranges from strongly acid to slightly acid.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. Thickness ranges from 4 to 12 inches.

The E horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 to 6. Texture is loamy fine sand or fine sand. Thickness ranges from 14 to 30 inches.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. Texture is loam, sandy clay loam, clay loam, or sandy loam. Sandy loam is only in the lower part of the Bt horizon.

Olla Series

The Olla series consists of well drained, moderately permeable soils that formed in loamy sediment of Tertiary age. These soils are on uplands. Slope ranges from 15 to 60 percent. Soils of the Olla series are fine-loamy, siliceous, thermic Typic Hapludults.

Olla soils commonly are near Bayoudan, Cadeville, Iuka, Ruston, and Savannah soils. Bayoudan and Cadeville soils are in positions similar to those of the Olla soils and have a clayey subsoil. Iuka soils are in drainageways. They are coarse-loamy and do not have an argillic horizon. Ruston soils have slopes of 8 percent or less and have a reddish subsoil that has a bisequum. Savannah soils have gentle slopes and a fragipan.

Typical pedon of Olla fine sandy loam, in an area of Olla-Cadeville association, steep; about 2 miles southwest of Columbia, 1.8 miles west on Highway 4 from junction with Highway 165 to pipeline crossing, 350 feet north of Highway 4 on pipeline, 55 feet east of pipeline in woods; SW¼NE¼ sec. 25, T. 13 N., R. 3 E.

A—0 to 6 inches; brown (10YR 5/3) fine sandy loam; weak medium subangular blocky structure; very friable; many fine and medium roots and few coarse roots; few fine pores; extremely acid; clear wavy boundary.

Bt1—6 to 16 inches; strong brown (7.5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; many fine and medium roots and few coarse roots; few fine pores; common thin continuous clay films on faces of peds and in pores; very strongly acid; gradual smooth boundary.

Bt2—16 to 24 inches; strong brown (7.5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; common fine roots and few medium and coarse roots; few fine pores; common thin continuous clay films on faces of peds and in pores; very strongly acid, clear smooth boundary.

Bt3—24 to 38 inches; yellowish brown (10YR 5/6) fine sandy loam; few medium distinct pale brown (10YR 6/3) mottles and few coarse distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; very friable; common fine roots and few medium and coarse roots; few fine pores; few faint thin discontinuous clay films on faces of peds; very strongly acid; gradual smooth boundary.

BC—38 to 64 inches; light yellowish brown (10YR 6/4) fine sandy loam; few fine distinct light brownish gray (10YR 6/2) mottles and common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; very friable; horizontal streaks of strong brown iron concentrations; common fine roots and few medium roots; few faint thin discontinuous clay films on faces of peds; few fine pores; very strongly acid; clear wavy boundary.

C—64 to 74 inches; light yellowish brown (10YR 6/4) stratified very fine sandy loam, silt loam, and clay; weak medium platy structure; very friable; few fine roots; few fine pores; very strongly acid.

Thickness of the solum ranges from about 30 to 60 inches. The weighted average of the clay content in the particle-size control section ranges from 20 to 35 percent. Ironstone fragments make up from 0 to 5 percent of the solum. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. Thickness ranges from 3 to 8 inches. Reaction ranges from extremely acid to medium acid.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 to 8. Mottles that have chroma of 3 to 6 range from none to common. The upper part of the Bt horizon is sandy clay loam, loam, or clay loam. The lower part is sandy loam, fine sandy loam, or loam. Reaction ranges from extremely acid to strongly acid. Some pedons have thin subhorizons of sandy clay in the Bt horizon.

The BC horizon has hue of 10YR or 7.5Y, value of 5 or 6, and chroma of 3 to 6. Texture is fine sandy loam, sandy loam, or loam. Some pedons have thin layers of clay loam, sandy clay loam, or clay. Reaction ranges from extremely acid to strongly acid.

The C horizon has hue of 10YR, value of 5 to 7, and chroma of 2 to 4; or it has hue of 2.5Y, value of 5 or 6, and chroma of 2 to 4. Texture is stratified sand, very fine sandy loam, fine sandy loam, silt loam, sandy clay, or clay. Reaction ranges from extremely acid to strongly acid.

Ouachita Series

The Ouachita series consists of well drained, moderately slowly permeable soils that formed in loamy alluvium. These soils are on flood plains and are subject to frequent flooding. Slope is generally less than 1 percent. The soils of the Ouachita series are fine-silty, siliceous, thermic Fluventic Dystrochrepts.

Ouachita soils commonly are near the Brimstone, Cahaba, Frizzell, and Guyton soils. Brimstone, Cahaba, and Frizzell soils are in higher positions than the Ouachita soils. Brimstone soils have a high content of sodium in the subsoil. Cahaba soils are fine-loamy, and Frizzell soils are coarse-silty. Guyton soils are on stream terraces and flood plains. They are grayish throughout and have a thick subsurface layer that tongues into the subsoil.

Typical pedon of Ouachita silt loam, in an area of Guyton and Ouachita soils, frequently flooded; about 10.5 miles south of Columbia, 0.9 mile west on gravel road from Highway 506 at Pine Grove Church, 24 yards south of bridge, 47 yards southeast of road; SE¼NE¼ sec. 11, T. 11 N., R. 3 E.

Ap—0 to 7 inches; brown (10YR 5/3) silt loam; weak fine subangular blocky structure; very friable; many fine roots; many fine pores; very strongly acid; clear smooth boundary.

Bw1—7 to 21 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; very friable; many fine roots; common fine pores; few fine rounded concretions; very strongly acid; gradual smooth boundary.

Bw2—21 to 41 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; very friable; common fine pores; very strongly acid; gradual smooth boundary.

Bw3—41 to 65 inches; pale brown (10YR 6/3) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles and many fine distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; very friable; common fine pores; strongly acid; clear smooth boundary.

C—65 to 72 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; strongly acid.

Thickness of the solum ranges from 40 to about 80 inches. The effective cation exchange capacity is 50 percent or more saturated with exchangeable aluminum within a depth of 30 inches. Reaction throughout the profile is very strongly acid or strongly acid except where lime has been added to the soil.

The A or Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. Thickness ranges from 5 to 20 inches.

The Bw horizon has hue of 10YR, value of 4 to 6, and chroma of 3 to 8. Some pedons have mottles with chroma of less than 2 below a depth of 24 inches. Texture is silt loam, loam, silty clay loam, or clay loam. The Bw horizon contains 18 to 30 percent clay and less than 15 percent sand that is coarser than very fine.

The C horizon is brownish. Texture is silt loam, silty clay loam, fine sandy loam, or loamy fine sand.

Perry Series

The Perry series consists of poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are in low positions on natural levees. They have a seasonal high water table. Areas not protected are subject to flooding. Slope ranges from 0 to 3 percent. Soils of the Perry series are very fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts.

The Perry soils commonly are near Alligator, Gallion, Hebert, Portland, and Rilla soils. Alligator soils are in slightly lower positions than the Perry soils and are grayish throughout. Gallion, Hebert, and Rilla soils are in higher positions and are loamy throughout. Portland soils are in slightly higher positions than the Perry soils and have a subsoil that is reddish in the upper part.

Typical pedon of Perry clay, occasionally flooded; about 6 miles north of Columbia, 0.9 mile west of Bayou Lafourche, 1.4 miles east of Cane Hill, 17 yards north of field road; SW¼NW¼ sec. 34, T. 14 N., R. 4 E.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) clay; weak fine subangular blocky structure; sticky and plastic; many fine roots; medium acid; abrupt smooth boundary.

Bg1—5 to 11 inches; gray (10YR 5/1) clay; many fine prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; sticky and plastic; few fine roots; few slickensides; very strongly acid; clear wavy boundary.

Bg2—11 to 19 inches; gray (10YR 5/1) clay; many fine and medium prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; sticky and plastic; few fine roots; common slickensides; strongly acid; clear wavy boundary.

2BC—19 to 46 inches; reddish brown (5YR 4/3) clay; weak medium subangular blocky structure; sticky and plastic; common slickensides; common medium concretions of carbonates; moderately alkaline; clear wavy boundary.

2C—46 to 60 inches; reddish brown (5YR 4/3) clay; massive; sticky and plastic; many concretions of carbonates; moderately alkaline.

Thickness of the solum ranges from 36 to 60 inches. Cracks 0.25 to 0.75 inch wide form to a depth of 20 inches or more in most years.

The Ap horizon has hue of 10YR, value of 3 to 6, and chroma of 1 or 2. Texture is clay or silty clay loam. Thickness ranges from 4 to 9 inches. Reaction ranges from very strongly acid to medium acid.

The Bg horizon has hue of 10YR, value of 4 to 6, and chroma of 1. Mottles in shades of brown range from few to many. Texture is clay or silty clay. Reaction ranges from strongly acid to neutral.

The 2BC horizon has hue of 5YR, value of 3 or 4, and chroma of 2 to 4. Reaction ranges from slightly acid to moderately alkaline.

The 2C horizon has hue of 5YR, 10YR, or 7.5YR, value of 4 or 5, and chroma of 1 to 4. It is calcareous and contains few to many concretions of carbonates. Reaction ranges from slightly acid to moderately alkaline.

Portland Series

The Portland series consists of poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are in low positions on natural levees. They have a seasonal high water table and are subject to flooding. Slope ranges from 0 to 1 percent. Soils of the Portland series are very fine, mixed, nonacid, thermic Vertic Haplaquepts.

Portland soils in Caldwell Parish are taxadjuncts to the Portland series because the reaction of the A and Bw1 horizons is less acid than allowed in the series. This difference does not significantly affect use and management of these soils.

Portland soils commonly are near Alligator, Gallion, Hebert, Perry, and Rilla soils. Alligator and Perry soils are in slightly lower positions than the Portland soils and are grayish in the upper part of the subsoil. Gallion, Hebert, and Rilla soils are in higher positions and are loamy throughout.

Typical pedon of Portland clay; about 7.5 miles north of Columbia, north 1.5 miles on gravel road from Highway 847 at Cane Hill, west 0.75 mile on field road to intersection, north 100 steps from intersection, 12 yards west of field road; SW¼NW¼ sec. 9, T. 14 N., R. 4 E.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) clay; massive; very sticky and very plastic; few fine roots; neutral; abrupt smooth boundary.

Bw1—5 to 14 inches; dark brown (7.5YR 4/4) clay; few fine distinct grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; very sticky and very plastic; few fine roots; neutral; clear smooth boundary.

Bw2—14 to 28 inches; reddish brown (5YR 4/4) clay; weak medium subangular blocky structure; very sticky and very plastic; common fine concretions of carbonates; moderately alkaline; gradual smooth boundary.

Bw3—28 to 52 inches; reddish brown (5YR 4/4) clay; weak medium subangular blocky structure; very sticky and very plastic; common fine and medium concretions of carbonates; few slickensides; moderately alkaline; clear smooth boundary.

C—52 to 72 inches; dark brown (10YR 4/3) clay; common medium prominent reddish brown (5YR 5/4) mottles; massive; very sticky and very plastic; few slickensides; moderately alkaline.

Thickness of the solum ranges from 40 to 72 inches or more. The content of clay in the particle-size control section ranges from 60 to 85 percent. The soil has cracks 1 to 2 inches wide extending to a depth of 2 to 3 feet or more during dry periods in most years. Slickensides range from few to common in the Bg horizon.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 to 4. Texture is silty clay loam or clay. Thickness ranges from 4 to 12 inches. Reaction ranges from very strongly acid to neutral.

The Bw horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 3 or 4. Mottles that have chroma of 2 or less range from few to common. Texture is clay or silty clay. Reaction ranges from very strongly acid to neutral in the upper part of the horizon and from slightly acid to moderately alkaline in the lower part.

The C horizon is grayish or brownish. Texture is clay or silty clay. It is stratified in some pedons. Calcareous concretions range from none to common. Reaction ranges from slightly acid to moderately alkaline.

Prentiss Series

The Prentiss series consists of moderately well drained, moderately permeable soils that have a fragipan. These soils are on low stream terraces near major streams. They formed in loamy sediment of late Pleistocene age. These soils have a seasonal high water table. Slope ranges from 0 to 3 percent. Soils of the Prentiss series are coarse-loamy, siliceous, thermic Glossic Fragiudults.

The Prentiss soils in Caldwell Parish are taxadjuncts to the Prentiss series because they have an argillic horizon and do not have the glossic properties required for Glossic Fragiudults. These differences do not affect the use and management of these soils.

Prentiss soils commonly are near Brimstone, Cahaba, Frizzell, Guyton, and Savannah soils. Brimstone and Guyton soils are in lower positions than the Prentiss soils, and they are fine-silty and do not have a fragipan. Cahaba, Frizzell, and Savannah soils are in higher positions. Cahaba and Savannah soils are fine-loamy. In addition, Cahaba soils do not have a fragipan. Frizzell soils do not have a fragipan.

Typical pedon of Prentiss fine sandy loam, in an area of Brimstone-Prentiss association, 0 to 3 percent slopes; about 6.5 miles west of Columbia, 0.9 mile west of Crossroads Church on Highway 126, north on gravel road 2.2 miles, west on woods trail 0.5 mile, south 0.25 mile; NW¼NE¼ sec. 19, T. 13 N., R. 3 E.

Ap—0 to 5 inches; brown (10YR 5/3) fine sandy loam; weak medium granular and weak medium subangular blocky structure; very friable; common fine and medium roots; common fine distinct strong brown (7.5YR 5/6) stains along root channels; strongly acid; clear smooth boundary.

Bw1—5 to 16 inches; yellowish brown (10YR 5/4) loam; weak medium subangular blocky structure; very friable; common fine and medium roots; few fine pores; few fine and medium black concretions; very strongly acid; clear smooth boundary.

Bw2—16 to 24 inches; yellowish brown (10YR 5/6) loam; common medium distinct brown (10YR 5/3) and pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; very friable; common fine and medium roots; few fine pores; few fine and medium black concretions; strongly acid; gradual smooth boundary.

Btx1—24 to 37 inches; yellowish brown (10YR 5/6) loam; common medium faint yellowish brown (10YR

5/4) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm and brittle; seams of grayish brown (10YR 5/2) very fine sandy loam ¼ to 1½ inches wide between prisms; few fine roots in seams; few fine pores; few fine and medium black concretions; few thin discontinuous clay films on vertical faces of peds; strongly acid; gradual smooth boundary.

Btx2—37 to 51 inches; yellowish brown (10YR 5/4) loam; few medium distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm and brittle; seams of grayish brown (10YR 5/2) very fine sandy loam ¼ to ¾ inch wide between prisms; few fine roots in seams; few fine pores; few fine and medium black concretions; few thin discontinuous clay films on faces of peds; strongly acid; gradual smooth boundary.

Btx3—51 to 64 inches; yellowish brown (10YR 5/4) loam; common medium distinct grayish brown (10YR 5/2) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm and brittle seams of grayish brown (10YR 5/2) silt loam ¼ to ⅛ inch wide between prisms; few fine roots in seams; few fine pores; few fine and medium black concretions; few thin discontinuous clay films on faces of peds; strongly acid; clear smooth boundary.

C—64 to 84 inches; stratified yellowish brown (10YR 5/4) loam and light brownish gray (10YR 6/2) very fine sandy loam; common medium faint yellowish brown (10YR 5/6) mottles; massive; very friable; very strongly acid.

Thickness of the solum is 60 inches or more. Depth to the fragipan ranges from 20 to 32 inches. Reaction throughout the profile is very strongly acid or strongly acid except where lime has been added to the soil. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum within a depth of 30 inches.

The A or Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3; or value of 4 and chroma of 1; or value of 5 and chroma of 6. Thickness ranges from 5 to 8 inches.

The Bw horizon has hue of 10YR, value of 5 or 6, and chroma of 3, 4, or 6; or hue of 2.5Y, value of 5 or 6, and chroma of 4 or 6. Texture is loam, fine sandy loam, sandy loam, or silt loam. Mottles that have chroma of 2 or less are 16 inches or more below the surface.

The Btx horizon has colors similar to those of the Bw horizon, or it is mottled in shades of brown, yellow, red, and gray. Texture is loam, sandy loam, or fine sandy loam. Most pedons contain few to many iron and manganese concretions.

The C horizon typically is stratified loam, very fine sandy loam, fine sandy loam, or sandy loam. Some pedons do not have a C horizon.

Providence Series

The Providence series consists of moderately well drained, moderately slowly permeable soils that have a fragipan. These soils formed in a thin mantle of loess and the underlying loamy sediment. They are on uplands and on low stream terraces. These soils have a seasonal high water table. Slope ranges from 0 to 5 percent. Soils of the Providence series are fine-silty, mixed, thermic Typic Fragiudalfs.

Providence soils commonly are near Falkner, Frizzell, Guyton, Sacul, Savannah, and Tippah soils. Falkner, Sacul, Savannah, and Tippah soils are in positions similar to those of the Providence soils. Frizzell and Guyton soils are in lower positions. Of these soils, only the Savannah soils have a fragipan. Savannah soils are fine-loamy.

Typical pedon of Providence silt loam, 1 to 5 percent slopes; about 9 miles south of Columbia, 0.6 mile south on gravel road from Little Star Cemetery on Highway 849, west about 400 feet, 45 yards southeast of gate on fence row; NW¼NE¼ sec. 6, T. 11 N., R. 4 E.

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

E—2 to 6 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; common fine faint yellowish brown mottles; friable; many fine and medium roots; very strongly acid; gradual smooth boundary.

Bt1—6 to 16 inches; strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common fine and medium roots; common fine pores; common distinct discontinuous clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt2—16 to 24 inches; yellowish brown (10YR 5/6) silt loam; common medium faint yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; friable; common fine and medium roots; common fine pores; common distinct discontinuous clay films on faces of peds; very strongly acid; clear wavy boundary.

Btx1—24 to 30 inches; yellowish brown (10YR 5/6) silty clay loam; few medium faint yellowish brown (10YR 5/4) mottles; moderate fine and medium prismatic structure parting to moderate medium subangular blocky; very firm and brittle; wedges of mottled yellowish brown (10YR 5/4 and 5/6) and brown (10YR 5/3) separate the prisms and decrease in width with depth; 25 to 60 percent brittle material that commonly increases with depth; common fine roots between prisms; common fine and medium pores; common faint discontinuous clay films on faces of peds in brittle parts; few fine concretions; very strongly acid; gradual smooth boundary.

Btx2—30 to 49 inches; yellowish brown (10YR 5/8) silty clay loam; common medium distinct yellowish brown (10YR 5/4) mottles; strong coarse prismatic structure parting to moderate medium subangular blocky; very firm and brittle; 65 to 85 percent prisms 4 to 6 inches in diameter; seams of yellowish brown (10YR 5/4) friable silt loam ¼ to ¾ inch wide between prisms; few fine roots between prisms; common fine pores; few fine concretions; common faint discontinuous clay films on faces of peds; very strongly acid; gradual smooth boundary.

2Btx3—49 to 54 inches; yellowish brown (10YR 5/6) clay loam; few fine prominent yellowish red (5YR 5/6) mottles; strong coarse prismatic structure parting to moderate medium subangular blocky; firm and brittle; 60 to 75 percent prisms 4 to 6 inches in diameter; seams of yellowish brown (10YR 5/4) friable silt loam ⅛ to ½ inch wide between prisms; few fine roots between prisms; common fine pores; few fine concretions; common faint discontinuous clay films on faces of peds; few fine concretions; very strongly acid; gradual smooth boundary.

2Bt—54 to 72 inches; yellowish brown (10YR 5/6) loam; common medium prominent yellowish red (5YR 4/6) mottles; moderate medium subangular blocky structure; few faint discontinuous clay films on faces of peds; few thin light brownish gray (10YR 6/2) silt coatings on faces of some peds; very strongly acid.

Depth to the fragipan ranges from 18 to 38 inches. The effective cation-exchange capacity is 20 to 50 percent saturated with exchangeable aluminum within a depth of 30 inches. Reaction throughout the profile ranges from very strongly acid to medium acid except where lime has been added to the soil.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 1, 2, or 3. Thickness ranges from 1 to 5 inches. Some pedons have an Ap or A2 horizon that has hue of 10YR, value of 3 to 5, and chroma of 3 to 6.

The E horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. Thickness ranges from 4 to 7 inches. Some pedons do not have an E horizon.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8; or hue of 5YR, value of 4 or 5, and chroma of 6 to 8. Texture is silt loam or silty clay loam.

The Btx and 2Btx horizons have hue of 10YR, 7.5YR, or 5YR, value of 4 or 5, and chroma of 6 to 8. Mottles in shades of brown, gray, or red range from few to many. In some pedons, the Btx and 2Btx horizons are mottled in shades of brown, gray, or red. Texture of the Btx horizon is silty clay loam or silt loam. Texture of the 2Btx horizon is clay loam, sandy clay loam, silt loam, silty clay loam, or sandy loam.

The 2Bt horizon ranges in color from red to gray, and it commonly is mottled. Texture is sandy loam, silt loam, loam, sandy clay loam, or clay loam.

Rilla Series

The Rilla series consists of well drained, moderately permeable soils that formed in loamy alluvium. These soils are on natural levees along the Boeuf and Ouachita Rivers. These soils have a seasonal high water table. Slope ranges from 0 to 3 percent. Soils of the Rilla series are fine-silty, mixed, thermic Typic Hapludalfs.

Rilla soils commonly are near Gallion, Hebert, Perry, Portland, and Sterlington soils. Gallion soils are in positions similar to those of the Rilla soils and have a more alkaline subsoil. Hebert, Perry, and Portland soils are in lower positions. Hebert soils have a subsoil that is grayish in the upper part. Perry and Portland soils have a very fine-textured particle-size control section. Sterlington soils are in higher positions and are coarse-silty.

Typical pedon of Rilla silt loam; about 2 miles south of Hebert, 1,600 feet east of Highway 848, about 10 yards west of field road; NW¼SW¼ sec. 34, T. 14 N., R. 5 E.

Ap—0 to 6 inches; dark brown (10YR 4/3) silt loam; weak medium granular structure; very friable; common fine roots; strongly acid; abrupt smooth boundary.

E—6 to 10 inches; brown (10YR 5/3) silt loam, weak medium subangular blocky structure; very friable; common fine roots; strongly acid; clear smooth boundary.

Bt1—10 to 18 inches; dark brown (7.5YR 4/4) silty clay loam; few medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; common fine roots; few fine pores; common thin continuous dark brown (10YR 4/3) clay films on faces of peds; few thin silt coatings on faces of peds; very strongly acid; gradual smooth boundary.

Bt2—18 to 29 inches; dark brown (7.5YR 4/4) silt loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; very friable; common fine roots; few fine pores; common thin discontinuous clay films on faces of peds; few thin silt coatings on faces of peds; very strongly acid; gradual smooth boundary.

Bt3—29 to 48 inches; brown (7.5YR 5/4) silt loam; few medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; very friable; common fine roots; few fine pores; common thin discontinuous clay films on faces of peds; common thin silt coatings on faces of peds; very strongly acid; gradual smooth boundary.

Bt4—48 to 56 inches; brown (7.5YR 5/4) silt loam; few medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; very friable; common fine roots; few fine pores; few thin discontinuous clay films on vertical faces of peds; very strongly acid; gradual smooth boundary.

C—56 to 68 inches; brown (7.5YR 5/4) loam; few medium distinct strong brown (7.5YR 5/6) mottles; massive; very friable; few fine roots; very strongly acid.

Thickness of the solum ranges from 40 to 60 inches. The effective cation-exchange capacity is 20 to 50 percent saturated with exchangeable aluminum to a depth of about 30 inches.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. Thickness of the Ap horizon ranges from 4 to 6 inches. Reaction ranges from very strongly acid to neutral.

The E horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 3. Texture is silt loam, loam, or very fine sandy loam. Thickness ranges from 2 to 10 inches. Reaction ranges from very strongly acid to neutral.

The Bt horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. Texture is silt loam, silty clay loam, or clay loam. Reaction ranges from extremely acid to strongly acid.

Some pedons have a BC horizon that has hue of 5YR, value of 4 or 5, and chroma of 4 to 6. Texture is silt loam, loam, silty clay loam, or clay loam. Reaction ranges from very strongly acid to slightly acid.

The C horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. Texture is silty clay loam, loam, or clay loam. Reaction ranges from very strongly acid to moderately alkaline.

Ruston Series

The Ruston series consists of well drained, moderately permeable soils that formed in loamy marine or fluvial sediment of Pleistocene age. These soils are on uplands. Slope ranges from 3 to 8 percent. Soils of the Ruston series are fine-loamy, siliceous, thermic Typic Paleudults.

Ruston soils commonly are near Guyton, Larue, Sacul, Savannah, and Smithdale soils. Guyton soils are in narrow drainageways, and they are fine-silty and grayish throughout. Larue and Savannah soils are in positions similar to those of the Ruston soils. Larue soils have a sandy surface and subsurface layer. Savannah soils have a fragipan. Sacul soils are on lower side slopes and have a fine-textured particle-size control section. Smithdale soils are on convex side slopes, and the subsoil does not have a bisequum.

Typical pedon of Ruston fine sandy loam, 3 to 8 percent slopes; about 6.5 miles northwest of Columbia, 1.2 miles northwest on Highway 4 from Kountry Korner grocery to Mt. Pleasant Church, right 0.15 mile to north end of cemetery, then 12 yards from road along cemetery fence; SE¼NE¼ sec. 5, T. 13 N., R. 3 E.

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

E—3 to 8 inches; brown (10YR 5/3) fine sandy loam; massive; very friable; many fine and medium roots; medium acid; clear smooth boundary.

Bt1—8 to 25 inches; yellowish red (5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; common fine and medium roots; few fine pores; common thin continuous clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt2—25 to 49 inches; yellowish red (5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; common fine roots; few fine pores; common thin discontinuous clay films on faces of peds; very strongly acid; gradual smooth boundary.

B/E—49 to 68 inches; yellowish red (5YR 5/6) fine sandy loam (Bt); massive; very friable; about 35 percent 0.5- to 1.5-inch pockets of light yellowish brown (10YR 6/4) fine sandy loam (E); strongly acid; clear smooth boundary.

B't1—68 to 84 inches; mottled red (2.5YR 4/8), yellowish red (5YR 5/6), and light brownish gray (10YR 6/2) sandy clay loam; weak medium subangular blocky structure; friable; few fine roots; common thin discontinuous clay films on faces of peds; very strongly acid.

Thickness of the solum is 60 inches or more. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum.

The A and E horizons have hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 4. The A horizon is 3 to 6 inches thick. Texture of the E horizon is fine sandy loam, very fine sandy loam, or loamy fine sand. The E horizon is 2 to 10 inches thick. Reaction of the A and E horizons ranges from very strongly acid to slightly acid.

The Bt and B't horizons and the Bt part of the B/E horizon have hue of 5YR or 2.5YR, value of 4 to 6, and chroma of 4 to 8. Texture is sandy clay loam, loam, fine sandy loam, or clay loam. The composite texture of the B/E horizon is fine sandy loam or loam. The B't horizon typically is mottled in shades of gray, brown, red, or yellow. Reaction ranges from very strongly acid to medium acid.

The E part of the B/E horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. It occurs in streaks and pockets that make up as much as 50 percent of the horizon. Texture is fine sandy loam, loamy sand, or sandy loam.

Sacul Series

The Sacul series consists of moderately well drained, slowly permeable soils that formed in loamy and clayey sediment of Tertiary age. These soils are on uplands. They have a seasonal high water table. Slope ranges from 1 to 12 percent. The soils of the Sacul series are clayey, mixed, thermic Aquic Hapludults.

Sacul soils commonly are near the Frizzell, Guyton, Olla, Prentiss, Ruston, and Savannah soils. Frizzell and Savannah soils are in lower positions than the Sacul soils. Frizzell soils are coarse-silty, and Savannah soils are fine-loamy. Guyton soils are in drainageways and are fine-silty. Olla soils are in positions similar to those of the Sacul soils and they are fine-loamy. Prentiss soils are on low stream terraces and are coarse-loamy. Ruston soils are on narrow ridgetops and are fine-loamy.

Typical pedon of Sacul fine sandy loam, moderately sloping; about 4 miles west of Columbia, 4.2 miles west on Highway 4 from intersection with Highway 165, about 0.1 mile east of intersection with gravel road in road cut on south side of Highway 4; SW¼SE¼ sec. 15, T. 13 N., R. 3 E.

A—0 to 1 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; many fine roots; strongly acid; abrupt smooth boundary.

E—1 to 6 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak medium subangular blocky structure; very friable; common fine and few medium roots; strongly acid; abrupt smooth boundary.

Bt1—6 to 18 inches; red (2.5YR 5/6) clay; moderate medium subangular blocky structure; firm, very plastic and very sticky; common distinct clay films on faces of peds; common fine and medium roots; few medium pores; very strongly acid; clear smooth boundary.

Bt2—18 to 25 inches; red (2.5YR 5/6) clay; many fine prominent light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm, very sticky and very plastic; few fine roots; common distinct clay films on faces of peds; very strongly acid; gradual smooth boundary.

Btg1—25 to 36 inches; light brownish gray (10YR 6/2) sandy clay loam; many fine, medium, and coarse prominent red (2.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; common distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

Btg2—36 to 52 inches; light brownish gray (2.5Y 6/2) sandy clay loam; common coarse prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; common faint clay films on faces of peds; very strongly acid; gradual smooth boundary.

BC—52 to 60 inches; light brownish gray (2.5Y 6/2) sandy clay loam; common coarse prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; very strongly acid.

Thickness of the solum ranges from 40 to 72 inches or more. Reaction throughout the profile ranges from extremely acid to strongly acid. Fragments of ironstone range from 1 to 10 percent, by volume. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum within a depth of 30 inches.

The Ap or A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. Thickness ranges from 1 to 4 inches.

The E horizon has hue of 10YR, value of 4 to 6, and chroma of 3 or 4. Texture is fine sandy loam, loam, or sandy loam. Thickness ranges from 4 to 10 inches.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8. The lower part of the horizon has few or common mottles in shades of gray. Texture is clay or silty clay.

The Btg and BC horizons are mottled in shades of brown, red, and gray. Texture is clay loam, sandy clay loam, or silt loam.

Some pedons have a C horizon. It is mottled red, yellow, and gray and it is stratified. Texture is clay loam, sandy clay loam, or sandy loam.

Savannah Series

The Savannah series consists of moderately well drained, moderately slowly permeable soils that have a fragipan. These soils formed in loamy sediment of Late Pleistocene age. They are on uplands. These soils have a seasonal high water table. Slope ranges from 1 to 5 percent. Soils of the Savannah series are fine-loamy, siliceous, thermic Typic Fragiudults.

Savannah soils commonly are near Cadeville, Frizzell, Guyton, Prentiss, Ruston, and Sacul soils. Of these soils, only the Prentiss soils have a fragipan. Cadeville soils are in both higher and lower positions than the Savannah soils. Frizzell, Guyton, and Prentiss soils are in lower positions. Prentiss soils are coarse-loamy. Ruston soils are in positions similar to those of the Savannah soils. Sacul soils are on side slopes at a lower elevation.

Typical pedon of Savannah fine sandy loam, in an area of Savannah-Sacul association, gently sloping; about 9 miles west of Columbia, 1.2 miles west on first parish road after crossing Castor Creek on Highway 126, about 15 yards south of center of gravel road and 45 yards west of logging road intersection; NE¼SE¼ sec. 26, T. 13 N., R. 2 E.

A—0 to 9 inches; brown (10YR 5/3) fine sandy loam; weak medium granular structure; very friable; common fine and medium roots; few fine black concretions; very strongly acid; clear smooth boundary.

Bt1—9 to 20 inches; strong brown (7.5YR 5/6) sandy clay loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; friable; common fine and medium roots; few fine pores; few fine, medium, and coarse concretions; common thin discontinuous clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—20 to 29 inches; yellowish brown (10YR 5/6) loam; weak medium subangular blocky structure; friable; few fine and medium roots; few fine pores; few fine and medium concretions; common thin discontinuous clay films on faces of peds; strongly acid; clear wavy boundary.

Btx1—29 to 44 inches; yellowish brown (10YR 5/6) loam; few medium faint strong brown (7.5YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm and brittle; few fine roots in seams between prisms; common fine pores; few fine and medium concretions; common thin discontinuous clay films on faces of peds; seams of pale brown (10YR 6/3) very fine sandy loam ¼ to 1 inch wide between prisms; strongly acid; clear wavy boundary.

Btx2—44 to 55 inches; yellowish brown (10YR 5/6) loam; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm and brittle; few fine roots in seams between prisms; common fine pores; few fine and medium concretions; common thin discontinuous clay films on faces of peds; seams of grayish brown (10YR 5/2) very fine sandy loam ⅛ to ½ inch wide between prisms; strongly acid; clear wavy boundary.

Btx3—55 to 72 inches; yellowish brown (10YR 5/6) loam; common medium faint strong brown (7.5YR 5/6) mottles and few fine distinct grayish brown (10YR 5/2) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm and brittle; few fine roots in seams between prisms; common fine pores; few thin discontinuous clay films on faces of peds; seams of grayish brown (10YR 5/2) silt loam ⅛ to ½ inch wide between prisms; strongly acid.

Thickness of the solum ranges from 50 inches to more than 80 inches. Depth to the fragipan ranges from 16 to 38 inches. Reaction throughout the profile is very strongly acid or strongly acid except where lime has been added to the soil. Some pedons have a few small quartz pebbles throughout the solum. The effective cation-exchange capacity 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, and chroma of 2 or 3; or value of 5 and chroma of 3, 4, or 6; or value of 6 and chroma of 3; or hue of 2.5Y, value of 4, and chroma of 2; or value of 5 and chroma of 4 or 6. Texture is loam, fine sandy loam, or sandy loam. Thickness ranges from 5 to 10 inches.

Some pedons have an E horizon that ranges in thickness from 2 to 6 inches. It has colors and textures similar to those of the A horizon.

The Bt horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 5, and chroma of 4, 6, or 8. Texture is sandy clay loam, clay loam, or loam. Clay content ranges from 18 to 32 percent, and silt content ranges from 20 to 50 percent. Mottles in shades of brown range from none to common.

The Btx horizon is mottled in shades of yellow, brown, red, or gray; or it has hue of 10YR, value 5, and chroma 4 to 8. Mottles are in shades of gray. Texture is sandy clay loam, clay loam, or loam.

Smithdale Series

The Smithdale series consists of well drained, moderately permeable soils that formed in loamy marine or fluvial sediment of Pleistocene age. These soils are on uplands. Slope ranges from 12 to 30 percent. Soils of the Smithdale series are fine-loamy, siliceous, thermic Typic Hapludults.

Smithdale soils commonly are near Cadeville, Guyton, Larue, Ruston, and Savannah soils. Cadeville, Larue, Ruston, and Savannah soils are in positions similar to those of the Smithdale soils. Guyton soils are in drainageways and are fine-silty. Cadeville soils have a fine-textured particle-size control section. Larue soils are sandy to a depth of 20 to 40 inches. Ruston soils do not have a subsoil that has a bisequum. Savannah soils have a fragipan.

Typical pedon of Smithdale fine sandy loam, in an area of Larue-Smithdale association, moderately steep; about 13 miles northwest of Columbia, 1.6 miles west of Highway 846 on gravel road, 0.7 mile north on gravel road to oil well location, 30 yards east of pump station in road cut: SE¼SE¼ sec. 23, T. 15 N., R. 2 E.

A—0 to 7 inches; brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable; common fine and medium roots; strongly acid; clear wavy boundary.

E—7 to 14 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak medium granular structure; very friable; common fine and medium roots; strongly acid; clear wavy boundary.

Bt1—14 to 38 inches; yellowish red (5YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable; few fine, medium, and coarse roots; many thin continuous red clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt2—38 to 59 inches; yellowish red (5YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable; few fine, medium, and coarse roots; common thin discontinuous red clay films on faces of peds; few fine white (10YR 8/2) kaolinite blebs; very strongly acid; gradual smooth boundary.

Bt3—59 to 83 inches; yellowish red (5YR 5/8) loam; weak medium subangular blocky structure; friable; few fine and medium roots; common thin discontinuous clay films on faces of peds; few streaks of pale brown (10YR 6/3) sand; few fine white (10YR 8/2) kaolinite blebs; very strongly acid; gradual smooth boundary.

Bt4—83 to 95 inches; yellowish red (5YR 5/6) loam; weak medium subangular blocky structure; friable; few fine roots; common thin discontinuous clay films on faces of peds; few fine white (10YR 8/2) kaolinite blebs; few pockets and streaks of very pale brown (10YR 7/3) sand; very strongly acid.

Thickness of the solum ranges from 60 inches to more than 100 inches. Reaction throughout the profile is very strongly acid or strongly acid except where lime has been added to the soil. The effective cation-exchange capacity 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, and chroma of 1 to 3. Some pedons have an Ap horizon that has hue of 10YR, value of 4 or 5, and chroma of 2 to 6. Thickness of the A or Ap horizon ranges from 2 to 10 inches.

The E horizon has hue of 10YR, value of 5 or 6, and chroma of 2 to 4. Texture is fine sandy loam, sandy loam, or loamy sand. Thickness ranges from 2 to 8 inches. Some pedons do not have an E horizon.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. Texture is sandy clay loam, clay loam, or loam in the upper part and sandy loam or loam in the lower part. Pockets of very pale brown to brownish yellow sand are in the lower part of the Bt horizon in most pedons.

Sterlington Series

The Sterlington series consists of well drained, moderately permeable soils that formed in loamy alluvium. These soils are on natural levees of major streams and distributaries. Slope ranges from 0 to 2 percent. Soils of the Sterlington series are coarse-silty, mixed, thermic Typic Hapludalfs.

Sterlington soils in Caldwell Parish are taxadjuncts to the Sterlington series because the reaction of the Bt horizon is slightly lower than allowed for the series. This difference, however, does not significantly affect the use and management of the soils.

Sterlington soils commonly are near Gallion, Hebert, and Rilla soils. Gallion and Rilla soils are in positions similar to those of the Sterlington soils and they are fine-silty. Hebert soils are in lower positions and are fine-silty.

Typical pedon of Sterlington silt loam; about 2.2 miles north of Columbia, about 0.6 mile east of Davis Lake, 18 feet east of Bell Bayou in a field; SE¼NW¼ sec. 3, T. 13 N., R. 4 E.

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

A—7 to 10 inches; dark brown (10YR 4/3) silt loam; weak medium subangular blocky structure; very friable; few fine roots; strongly acid; clear smooth boundary.

Bt—10 to 23 inches; strong brown (7.5YR 5/6) very fine sandy loam; weak medium subangular blocky structure; very friable; few fine roots; few fine pores; few thin discontinuous clay films on faces of peds; very strongly acid; clear smooth boundary.

B/E—23 to 30 inches; strong brown (7.5YR 5/6) (Bt); and light brown (7.5YR 6/4) (E) very fine sandy loam; about 25 percent E material; weak medium subangular blocky structure; very friable; few fine roots; few fine pores; very strongly acid; clear smooth boundary.

B't—30 to 53 inches; reddish brown (5YR 5/4) loam; few fine distinct yellowish red (5YR 5/6) mottles; weak medium subangular blocky structure; very friable; few fine roots; few fine pores; few fine concretions; few thin discontinuous clay films on faces of peds; few thin silt coatings on vertical faces of peds; very strongly acid; clear smooth boundary.

C—53 to 80 inches; reddish brown (5YR 5/4) very fine sandy loam; massive; few fine roots; strongly acid.

Thickness of the solum ranges from 36 to 60 inches. The effective cation-exchange capacity is 20 to 50 percent saturated with exchangeable aluminum within a depth of 30 inches.

The Ap and A horizons have hue of 10YR, value of 3 or 4, and chroma of 2 or 3; or value of 5 and chroma of 3. Texture of the A horizon is fine sandy loam, very fine sandy loam, or silt loam. Reaction in the Ap and A horizons ranges from very strongly acid to medium acid except where lime has been added to the soil.

The Bt horizon and the Bt part of the B/E horizon have hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6. At least one subhorizon has hue of 5YR. Reaction ranges from very strongly acid to slightly acid. Subhorizons contain ped coatings and pockets of E material that make up less than 30 percent of the horizon. The E material has colors with chroma of 3 or more. It has value that is 1 or 2 units higher or chroma that is 1 or 2 units lower than those in the Bt horizon. Texture of the Bt and B/E horizons is loam, silt loam, or very fine sandy loam.

The C horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6. Texture is very fine sandy loam, silt loam, loam, or silty clay loam. Reaction ranges from strongly acid to moderately alkaline.

Tippah Series

The Tippah series consists of moderately well drained, slowly permeable soils that formed in a thin mantle of loess and the underlying clayey sediment. These soils are on uplands. They have a seasonal high water table. Slope ranges from 1 to 5 percent. The soils of the Tippah series are fine-silty, mixed, thermic Aquic Paleudalfs.

Tippah soils commonly are near Bayoudan, Falkner, and Providence soils. Bayoudan soils are on lower side slopes and are clayey throughout the solum. Falkner soils are on less convex slopes than the Tippah soils, and they are wetter and have a subsoil that has hue of 10YR or 2.5Y. Providence soils are in positions similar to those of the Tippah soils, and they have a fragipan.

Typical pedon of Tippah silt loam, 1 to 5 percent slopes; about 12 miles southwest of Columbia, 0.8 mile south on Highway 165 from intersection of Highway 843 at Sam's Place, left on gravel road 0.25 mile, right on woods road about 0.2 mile to intersection, 129 feet south of intersection, and 9 feet west of woods road; SW¼NW¼ sec. 9, T. 11 N., R. 3 E.

A—0 to 5 inches; light yellowish brown (10YR 6/4) silt loam; weak fine subangular blocky structure; very friable; common fine roots; common fine pores;

strongly acid; clear smooth boundary.

Bt1—5 to 15 inches; yellowish red (5YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; common distinct clay films on faces of peds; common fine pores; very strongly acid; gradual smooth boundary.

Bt2—15 to 26 inches; strong brown (7.5YR 5/6) silty clay loam; common fine and medium distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; few fine roots; common distinct clay films on faces of peds; common fine pores; strongly acid; gradual smooth boundary.

Bt3—26 to 34 inches; strong brown (7.5YR 5/6) silty clay loam; many medium prominent light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable; few fine roots; common distinct clay films on faces of peds; common fine pores; strongly acid; abrupt smooth boundary.

2Bt4—34 to 45 inches; mottled yellowish brown (10YR 5/6), yellowish red (5YR 5/8), and brown (10YR 5/3) silty clay; few medium distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm, plastic and sticky; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.

2Bt5—45 to 60 inches; mottled yellowish brown (10YR 5/6), yellowish red (5YR 5/6), and light brownish gray (10YR 6/2) clay; firm, very plastic and very sticky; moderate medium subangular blocky structure; few faint clay films on faces of peds; very strongly acid.

Thickness of the solum is 60 inches or more. Reaction throughout the profile ranges from very strongly acid to medium acid. The effective cation-exchange capacity is 50 percent or more saturated with exchangeable aluminum within a depth of 30 inches.

The Ap horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 6. Undisturbed pedons have an A horizon that has hue of 10YR, value of 3 to 5, and chroma of 1 to 3. Where the value is 3, the A horizon is less than 6 inches thick. Thickness of the Ap or A horizon ranges from 2 to 8 inches.

Some pedons have an E horizon that has hue of 10YR, value of 4 to 6, and chroma of 2 to 6. Texture is silt loam or loam. Thickness ranges from 2 to 8 inches.

The Bt horizon has hue of 5YR, value of 4 or 5, and chroma of 4 to 6; or hue of 7.5YR, value of 5, and chroma of 6 to 8. The lower part of the Bt horizon has mottles in shades of brown, gray, or yellow. Mottles that have chroma of 2 or less are within 30 inches of the soil surface. Texture is silty clay loam or silt loam.

The 2Bt horizon has a matrix ranging from red to gray. Mottles are in shades of red, gray, brown, or yellow. Texture is silty clay or clay.

Yorktown Series

The Yorktown series consists of very poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are in old channels on flood plains. They are ponded most of the time and are frequently flooded. Slope is less than 1 percent. Soils of the Yorktown series are very fine, montmorillonitic, nonacid, thermic Typic Fluvaquents.

The Yorktown soils in Caldwell Parish are taxadjuncts to the Yorktown series because the reaction of the A and Bg1 horizons is slightly lower than allowed in the range in characteristics for the series. This difference, however, does not significantly affect the use and management of the soils.

Yorktown soils commonly are near Alligator, Gallion, Hebert, Perry, Rilla, and Sterlington soils. All of these soils are in higher positions on the flood plain than the Yorktown soils. Alligator and Perry soils crack to a depth of 20 inches or more. Gallion, Hebert, Rilla, and Sterlington soils are loamy throughout.

Typical pedon of Yorktown clay, frequently flooded; about 5.5 miles east of Columbia, 3.5 miles south from intersection at Highway 848 in sec. 29, T. 14 N., R. 5 E., 120 feet east of gravel road in cypress-tupelo brake; NE¼NW¼ sec. 8, T. 13 N., R. 5 E.

Oa—0 to 3 inches; very dark grayish brown (10YR 3/2) muck; very fluid; common fine and medium roots and few coarse roots; very strongly acid; abrupt smooth boundary.

A—3 to 10 inches; gray (5Y 5/1) clay; structureless; firm, very sticky and very plastic; common fine and medium roots and few coarse roots; very strongly acid; gradual smooth boundary.

Bg1—10 to 23 inches; dark gray (N 4/0) clay; few fine prominent strong brown (7.5YR 5/6) mottles; massive; firm, very sticky and very plastic; common fine and medium roots and few coarse roots; few pieces of partly decayed wood; very strongly acid; gradual smooth boundary.

Bg2—23 to 38 inches; gray (5Y 5/1) clay; common medium prominent strong brown (7.5YR 5/6) mottles; massive; firm, very sticky and very plastic; common fine and medium roots and few coarse roots; few pieces of partly decayed wood; neutral; gradual smooth boundary.

Bg3—38 to 59 inches; mottled gray (N 5/0), dark gray (N 4/0), and greenish gray (5BG 5/1) clay; massive; firm, very plastic and very sticky; common fine and medium roots and few coarse roots; few pieces of partly decayed wood; neutral; abrupt smooth boundary.

BC—59 to 72 inches; reddish brown (5YR 4/4) clay; common medium prominent gray (N 5/0) mottles; massive; firm, very sticky and very plastic; common fine and medium roots and few coarse roots; few fine concretions of carbonates; few shiny pressure faces; mildly alkaline.

Thickness of the solum ranges from 50 to 80 inches. Depth to the BC horizon ranges from 40 to 60 inches. Clay content in the particle-size control section ranges from 60 to 85 percent.

The A horizon has hue of 5Y, value of 4 to 6, and chroma of 1; hue of 10YR, value of 4 to 6, and chroma of 1 or 2; hue of 2.5Y, value of 5, and chroma of 2; or it is neutral and has value of 4 to 6. Thickness of the A horizon ranges from 4 to 10 inches. Reaction ranges from very strongly acid to neutral. A thin mat of partly decayed plant material is on the surface of most pedons.

The Bg1 and Bg2 horizons have hue of 5Y, value of 4 to 6, and chroma of 1; hue of 10YR, value of 4 to 6, and chroma of 1; or they are neutral and have value of 4 or 5. Few to many fine or medium mottles having hue of 5YR, value of 4 or 5, and chroma of 6 or 8 are in the Bg1 and Bg2 horizons. Reaction in the Bg1 horizon ranges from very strongly acid to neutral. Reaction ranges from medium acid to neutral in the Bg2 horizon.

The Bg3 horizon has hue of 5G, 5BG, 5Y, or 10YR, value of 5 or 6, and chroma of 1; or it has hue of 10YR or 5Y, value of 4, and chroma of 1; or it is neutral and has value of 4 or 5. Reddish and brownish mottles range from common to many and fine to coarse. Fine or medium weakly cemented black and strong brown bodies range from none to many. Reaction of the Bg3 horizon ranges from medium acid to neutral.

The BC horizon has hue of 5YR, value of 3 to 5, and chroma of 3 or 4; or hue of 2.5YR, value of 3 or 4, and chroma of 4. Mottles in shades of gray range from few to many. Greenish gray root channel fillings range from none to common. Reaction of the BC horizon is mildly alkaline or moderately alkaline.

Formation of the Soils

In this section, the processes and factors of soil formation are discussed and related to the soils in Caldwell Parish.

Processes of Soil Formation

The processes of soil formation influence the kind and degree of development of soil horizons. The factors of soil formation—parent material, climate, living organisms, relief, and time—determine the rate and relative effectiveness of different processes.

Soil-forming processes are those that result in the 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 *(16)*. Many processes take place simultaneously; for example, in this parish, the accumulation of organic matter, development of soil structure, formation and translocation of clay, and leaching of bases from some soil horizons. Some soil-forming processes that apply to the soils in Caldwell Parish are discussed in the following paragraphs.

Organic matter accumulates, is partly decomposed, and mixes 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 layers. Decomposition and mixing of organic matter into the soil are caused mainly by the activity of living organisms. Many of the more stable products of decomposition remain as finely divided material that gives dark color to the soil, increases the available water-holding and cation-exchange capacities, contributes to granulation, and serves as a source of plant nutrients. In Caldwell Parish, converting woodland and pasture areas to cropland has caused a reduction in the content of organic matter in many of the soils.

The addition of alluvial sediment on the surface has helped in forming some soils in the parish. Added sediment provides new parent material for soil formation. Often, new material accumulates faster than the processes of soil formation can appreciably alter it. The evident depositional strata in the Iuka soils are a result of accumulation. Alluvial sediment is also being added in flooded areas of the Alligator, Forestdale, Guyton, Hebert, Ouachita, Perry, and Yorktown soils.

Plant roots and living organisms are effective agents in rearranging soil material into secondary aggregates. Decomposed products or organic residue, secretions of organisms, clays, and oxides of elements, such as iron, that form during soil development help stabilize structural aggregates.

Alternate wetting and drying and shrinking and swelling also help to develop structural aggregates, particularly in soils that have high content of clay, such as Portland soils.

The poorly drained and very poorly drained soils in the parish have horizons in which reduction and segregation of iron and manganese compounds take place. Reducing conditions prevail for long periods in poorly aerated horizons. Consequently, the relatively soluble reduced forms of iron and manganese predominate over the less soluble oxidized forms. Reduced forms of these elements result in gray colors in the subsoil of the Alligator, Forestdale, and Guyton soils. In the more soluble reduced forms, iron and manganese can be removed from the soil or translocated from one position to another within the soil by water. Browner mottles in predominantly gray horizons indicate segregation and concentration of oxidized iron compounds in the soil. An anomaly in Caldwell Parish is the gray in the Bayoudan soils. The Bayoudan soils formed in gray parent material, and they are not now in a wet, reducing environment.

Water moving through soil has leached soluble bases and any free carbonates that may have been initially present in some layers of most of the soils. The effects of leaching are least pronounced in the Perry, Portland, and Yorktown soils. The soils have developed in relatively young parent material that initially had free calcium carbonate. In most places, pedons of these soils have free calcium carbonate in the lower part of the profile. All of the other soils in the parish, except the Brimstone soils, are typically acid throughout. The Brimstone soils are moderately alkaline or strongly alkaline in the subsoil because sodium salts, rather than carbonates, have accumulated in the subsoil.

The formation, translocation, and accumulation of clay are processes that have helped develop all of the soils in the parish except for the Alligator, Bayoudan, Iuka, Ouachita, Perry, Portland, and Yorktown soils. Silicon and aluminum, released as a result of weathering of pyroxenes, amphiboles, and feldspar, can recombine with the components of water to form secondary clay minerals, such as kaolinite. Layer silicate minerals, such as mica and montmorillonite, can also weather to form other clay minerals, such as vermiculite or kaolinite. Horizons of secondary accumulation of clay result largely from translocation of clays from upper to lower horizons. As water moves downward, it can carry small amounts of clay in suspension. This clay is deposited, and it accumulates at the depths 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. Secondary accumulation of calcium carbonate occurs in the lower part of the solum in some of the soils. Carbonates dissolved from overlying horizons have been translocated to this depth by water and redeposited. Calcium carbonate is present in the lower part of the Perry, Portland, and Yorktown soils in most locations.

Factors of Soil Formation

Soil is produced by soil-forming processes acting on material deposited or accumulated by geologic forces.

The characteristics of the soil at any given point are determined by the physical properties and the chemical and mineralogical composition of the parent material, the climate during the formation of the soil from the parent material, the plant and animal life on and in the soil, the relief, and the length of time for these forces of soil formation to act on the soil material *(9)*.

Climate and plant and animal life, mainly plants, are active factors of soil formation. These factors act on the parent material through alluvial deposition and slowly change it to a natural body that has genetically related layers. The effects of climate and plant and animal life are conditioned by relief. The parent material also affects the kind of soil profile that is formed and, in some cases, determines it almost entirely. Time is needed to change the parent material into a soil profile. In most cases, a very long time is needed to develop distinct soil layers. If the climate is warm and moist, soil layers develop more rapidly than in a cooler, drier climate.

The factors of soil formation are so closely interrelated in their effects on the soil that few generalizations of any one factor can be made unless conditions are specified for the other four. In the following paragraphs the factors of soil formation are discussed as they relate to soils in the parish.

Climate

Caldwell Parish is in a region characterized by a humid, subtropical climate. Detailed information about climate is in the section "General Nature of the Parish."

A relatively uniform climate throughout the parish does not account for differences among the soils within the parish. The warm, moist climate promotes rapid soil formation. High precipitation rates promote rapid weathering of readily weatherable minerals and the movement of colloidal material downward in the soil. Plant remains decompose rapidly in the warm climate, preventing the formation of soils that have high organic matter content. The organic acids produced by decomposition hasten development of clay minerals and removal of carbonates. Soil development is increased because of the intensity of the soil forming processes in the warm, moist climate.

Living Organisms

Plants, animals, insects, bacteria, fungi, other micro-organisms, and man are important in the formation of the soils of Caldwell Parish. Plant growth and animal activity physically alter the soil. Land clearing and cultivation of crops also physically alter the surface layer of the soils.

The native vegetation on bottom lands and on low terraces of the parish was primarily hardwood forests. Native vegetation on the uplands was primarily mixed hardwood and pine forests. Soils developed under mixed hardwood and pine forests generally are lower in organic matter content and have a more distinct E horizon than soils developed under hardwood forests.

Bacteria, fungi, and other micro-organisms are primarily responsible for decomposition of organic matter and oxidation-reduction reactions that affect the physical and chemical properties of the soils. Aerobic bacteria are more abundant in well drained soils and decompose organic matter rapidly. Anaerobic bacteria are more abundant in poorly drained soils and decompose organic matter slowly. As a result, organic matter content is lower in well drained soils than in those that are poorly drained.

Parent Material

Parent material is the mass from which soil develops. It affects the color, texture, permeability, mineralogy, and the erosion potential of the soil.

The soils of Caldwell Parish formed in alluvium deposited by the Mississippi, Arkansas, and Ouachita Rivers and by local streams. They also formed in windblown material (loess) and Pleistocene and Tertiary sediment of the Citronelle, Cockfield, Deweyville, Prairie, and Jackson Formations *(8, 13)*.

The characteristics, distribution, and depositional pattern of the parent material in the parish are discussed in the section "Landforms and Surface Geology."

Relief

Relief influences soil formation by affecting soil drainage, runoff, erosion, deposition, and soil temperature. The influence of relief on soils in Caldwell Parish is especially evident in the runoff rate, internal soil drainage, and depth to a seasonal high water table. For example, relief on the Providence and Tippah soils that formed in loess is higher than that on the Falkner soils. The Tippah soils have gentle slopes and are moderately well drained. Runoff is medium, and the seasonal high water table is at a depth of more than 2 feet. The Falkner soils have nearly level slopes and are somewhat poorly drained. Runoff is slow, and a seasonal high water table fluctuates between a depth of about 1.5 to 2.5 feet.

In some areas of the uplands, the relief is great and slopes are steep. Runoff is rapid, and little water enters the soil. In these areas, erosion occurs on soils at rates nearly equal to soil formation. These factors account for the relatively thin solum of the Bayoudan, Cadeville, Olla, and Smithdale soils.

Time

The formation of soils requires many years for changes to take place in the parent material. A soil's age, however, is determined by the degree of development of the soil profile. Soils that have little profile development are immature, and those that have well expressed soil profiles are mature.

Generally, if the soil surface remains stable, the longer the parent material remains in place, the more fully developed the soil profile becomes. In Caldwell Parish, parent material ranges in age from a few hundred years to many millions of years.

The youngest soils, such as the Alligator, Perry, Portland, and Yorktown soils, formed in recent alluvium that was deposited by overflows from the Mississippi and Arkansas Rivers during the last 500 years. These soils have relatively weakly expressed soil horizons. Other soils, such as the Forestdale, Gallion, Hebert, and Rilla soils, are forming in alluvium that has been in place for as long as 7,000 years. These soils have developed horizons that express features and characteristics associated with processes acting over a longer period.

The soils on the uplands formed in the oldest parent material in the parish. This parent material was deposited by water 20,000 to perhaps 45 million years ago *(8, 13)*.

Landforms and Surface Geology

The soils of Caldwell Parish formed in several kinds of unconsolidated parent material. This parent material can be placed into general groups based on its source, age, and mode of deposition: recent alluvium, loess, late Pleistocene age sediment, early Pleistocene age sediment, and marine sediment of Tertiary age.

The major surface features, geology, and relative ages of the parent material are discussed in the following paragraphs.

Alluvial Plain

The alluvial plain of Caldwell Parish consists primarily of recent sediment from the Ouachita and Arkansas Rivers. In small areas, Pleistocene age terraces and loess are included on the alluvial plain.

Soils of the alluvial plain formed in recent alluvium and make up about 35 percent of the parish. Elevations on the alluvial plain range from about 39 feet above sea level in the backswamps near the Boeuf River in the southeastern part of the parish to about 70 feet above sea level on the natural levees of the Ouachita River in the northern part of the parish. Local relief generally is no more than 5 to 10 feet.

Differences in soils along the Ouachita/Arkansas River system resulted mainly from the partial sorting of the sediment during deposition. The sediment was partly sorted each time the waters overflowed the streambanks. As the water velocity slowed, sand, then silt, and finally clay particles were dropped. The alluvium on the natural levees near the streams has high content of sand. The most clayey alluvium is in the backswamps where sediment was deposited by still or slow moving water. Characteristically, this depositional pattern results in the formation of long, nearly level slopes that extend from the higher natural levees near the stream to the lower clayey backswamps. The gently undulating ridge and swale topography of the area was formed by the meandering of the streams. In places, the soils of this gently undulating topography have been completely covered with recently deposited clay. In some places, clay covered only the soils in the swales, and in other places, none of the soils were covered by clay.

In Caldwell Parish, the Gallion, Hebert, Rilla, and Sterlington soils formed in loamy alluvium on the natural levees of the Ouachita and Boeuf River system. The Alligator, Perry, Portland, and Yorktown soils formed in clayey alluvium in the backswamps.

In addition to the present Ouachita River channel, three relict channels of the Arkansas River have been recognized in Caldwell Parish *(15)*. The youngest relict channel of the Arkansas River is in about the same position as the present channel of the Ouachita River. It was in this channel about 3,100 to 800 years ago. The next youngest channel is that of the Boeuf River system. This channel was occupied about 5,100 to 3,000 years ago. The oldest channel of the Arkansas River, active about 8,500 to 7,800 years ago, is not very distinct in the parish and is expressed only as faint channel scars and possibly as oxbow swamps.

The present channel of the Ouachita River, along with the youngest relict channel, formed a natural levee system along the eastern flank of the uplands. The natural levee is 1 to 2 miles wide in the northern part of the parish, and gradually narrows to about 0.25 to 0.50 mile in the southern part. Landscape features characteristic of a mature alluvial plain, such as crevasses, point bars, and oxbow lakes, are common. Well expressed oxbow lakes, such as Davis Lake and Long Lake, can probably be attributed to the present channel system. More obscure and partly filled oxbow lakes and meander scars, such as Ferrand Lake, Horseshoe Lake, Brown Lake, and others, probably can be attributed to the youngest relict channel. In places, the Ouachita River is actively eroding the exposed Tertiary age sediment of the Cockfield Formation and the Jackson Group.

The flood plain of the Boeuf River system has many features that are similar to those of the present Ouachita River. Oxbow lakes, point bars, and crevasses are common. The natural levees of the Boeuf River system are not as wide and are at a slightly lower elevation than the levees along the present channel of the Ouachita River. The Boeuf River system enters the northeastern part of the parish and meanders southward. Bayou Lafourche, Crew Bayou, and Sandy Bayou are relict channels of this system. From the point where Sandy Bayou enters the Ouachita River, the Boeuf River system followed the same course as the present Ouachita River. Jones Brake, Morengo Lake, and the cypress and tupelo swamps in sec. 5 and 8, T. 13 N., R. 5 E. are oxbow channels formed by this system. An unusually large crevasse from this system begins in sec. 33, T. 13 N., R. 5 E. and extends northeastward for 6 or 7 miles.

Oxbow swamps of cypress and tupelo forests in sec. 13 and 24, T. 13 N., R. 4 E. and sec. 19 and 30, T. 13 N., R. 5 E. were recognized as abandoned channels of the oldest Arkansas River system *(15)*. These oxbow swamps are at a very low elevation and have very little soil material exposed surficially that could be identified as natural levee soil material. The lakes are almost completely surrounded by clayey alluvium (backswamp deposits), indicating that the natural levees of these abandoned channels have been buried by more recent clayey alluvium.

Another prominent stream on the alluvial plain is Bayou Lafourche, a backswamp drainage stream. This stream flowed southward from the Ouachita Parish line, through the Lafourche Basin (between the natural levees of the Boeuf River to the east and the Ouachita River to the west) into the Boeuf River system, then northward and into the Boeuf River. Since the bayou has been restructured and channeled by the U.S. Army Corps of Engineers, it drains into the Boeuf River through the Bayou Lafourche Cutoff.

The Boeuf River abandoned its channel in sec. 27, T. 14 N., R. 5 E. by cutting through its own natural levee. It took a course eastward, then southward, where it joined Big Creek. It continued southward until it emptied into the Ouachita River in Catahoula Parish. The abandonment resulted when the drainage waters from the Lafourche Basin sought a more efficient drainage outlet. The abandonment evidently occurred after the Arkansas River had abandoned this same channel because no loamy natural levees are along this stream in Caldwell or Catahoula Parishes *(24)*. The Boeuf River, from where it abandoned its original channel and southward, is on the lowest point on the alluvial plain. It functions as a backswamp stream in the Boeuf Basin (between the Macon Ridge to the east and the natural levees of the Boeuf River system and the present Ouachita River to the west).

Sediment now carried by the Ouachita River system is gray. Its source is primarily the Coastal Plain Uplands of Arkansas and Louisiana. The sediment is being deposited primarily in point bar positions along the Ouachita River.

Some pedologists believe that this gray sediment may be responsible for the gray horizons in the upper part of the Hebert and Perry soils, rather than from a gleying of the reddish sediment. Other pedologists hypothesize that alluvium from the Mississippi River may have come down the present Ouachita/Arkansas River Valley from a point north of the Macon Ridge where the Arkansas River converges with the Mississippi River.

Chemical and physical test data in tables 19 and 20 suggest that the Perry soils formed in parent material from more than one source. Particle-size analyses indicate that the ratio of fine clay to clay is 41 percent higher in the gray horizons than in the red horizons. The x-ray diffraction analyses indicate that the relative amounts of mica, montmorillonite, and kaolinite are also higher in the gray horizons than in the red horizons. Amounts of minor minerals in these horizons also differ. Differential thermal analyses indicate that one of the gray horizons has 22 percent kaolinite and one of the red horizons has only 14 percent kaolinite.

A geomorphic surface that is unusual for an alluvial plain is in an area of about 1,600 acres near Cane Hill in the north-central part of the parish. The landscape consists of a relatively level alluvial plain that has numerous circular depressions in an irregular pattern. The depressions are 2 to 6 feet deep and 1 to 15 acres in size. These depressions support wetland vegetation, mainly cypress, tupelo, willow, buttonbush, and other aquatic grasses and plants. The close proximity of this area to Cane Hill, a terrace remnant, suggests that this area possibly is a terrace that was buried by more recent alluvium. Similar topography exists nowhere else in Caldwell Parish.

Depressions similar to those in the area near Cane Hill, although not as large or deep, are on the Marksville Terrace in Avoyelles Parish *(8)*. These depressions are thought to be in the Prairie Terrace. They are still evident even though their surface has been covered by loess about 7 feet thick.

Cane Hill and Perrins Island are erosional remnants of a late Pleistocene age terrace of the Arkansas or Mississippi River system. These two small "islands" are surrounded by recent alluvium and have a total area of only about 200 acres. Cane Hill is about 15 acres, and Perrins Island is about 180 acres. The islands are about 20 to 30 feet higher than the surrounding alluvial plain. They are believed to represent an extension of the terraces recognized about 12 miles north in Ouachita Parish. The meandering of stream channels on the flood plain of the Ouachita/Arkansas or Mississippi River system eroded away most of this terrace.

The ridgetop of Perrins Island has been covered with a thin veneer of the same Peorian loess deposited throughout the region about 20,000 to 25,000 years ago *(8)*. The Falkner and Gore soils are on Cane Hill and Perrins Island.

Another terrace on the alluvial plain in Caldwell Parish has been identified as a late Pleistocene age Arkansas River braided stream terrace *(15)*. This terrace is evident along Louisiana Highway 4, about 0.5 mile west of the Boeuf River, and in the river bank below the bridge that crosses the Boeuf River. Most of the terrace is covered with more than 40 inches of clayey alluvium. In places, the clay is less than 40 inches thick over the original surface of the terrace. Forestdale soils formed in the thinner deposits of clay and the underlying Pleistocene age sediment.

Coastal Plain Uplands

The uplands of Caldwell Parish are composed of several geomorphic landscapes. Recent alluvium, Pleistocene age sediment, loess, and Tertiary age marine sediment are the geologic units from which these landscapes evolved.

The parish west of the Ouachita River Valley is underlain by Tertiary age sediment. Early Pleistocene age sediment, late Pleistocene age sediment, loess, and recent alluvium are underlain by much of the Tertiary age formations. Elevation ranges from about 80 feet above sea level at the base of the escarpment along the Ouachita River Valley to about 257 feet near LaSalle Parish at the tip of the Bayou Dan escarpment. In other parts of the parish, several ridgetops are at an elevation near 250 feet above sea level.

A steep escarpment parallels the Ouachita River Valley on its west side. The escarpment has steep slopes and is deeply dissected by many drainageways. The steep topography is a result of accelerated erosion caused by the steep hydraulic gradient of the streams that drain this area to the east. The hydraulic gradient is steep because the Ouachita River is so near.

All other drainage in the parish is to the west and south. Because the streams draining to the west have low hydraulic gradient, the landscape is more gentle and less dissected than that near the Ouachita River Valley.

The Cockfield Formation and the Jackson Group are two Tertiary age formations exposed on the uplands of Caldwell Parish. The Jackson group is underlain by the Cockfield Formation, and both dip southward to the Gulf of Mexico where they are covered with younger sediment. Exposures of the Cockfield Formation are in a larger area than those of the Jackson Group. The Jackson Group is exposed in a small area in the southeastern part of the uplands. Most of the Jackson Group is covered with a veneer of Peorian loess that is 2 to 3 feet thick.

The landscape of the Cockfield Formation differs significantly from that of the Jackson Group. It is deeply dissected by many streams and drainageways, and the ridgetops are relatively narrow and convex. Loess is not evident.

The landscape of the Jackson Group is less dissected than that of the Cockfield Formation and it has fewer streams and drainageways. The ridgetops are generally broad and show little or no erosion. The uniform thickness of the loess over the Jackson Group and the relatively uniform surface elevations indicate that the landscape has been relatively stable.

The Cockfield Formation can be easily seen in road exposures along many of the roads along the Ouachita River Valley escarpment. Two good exposures are along a gravel road in sec. 28, T. 13 N., R. 4 E. about 2 miles south of Columbia. The exposures consist of strata of grayish sand and clay in varying thicknesses.

Soils in Caldwell Parish that formed in parent material of the Cockfield Formation include the Cadeville, Olla, and Sacul soils. The Olla series was first recognized in Caldwell Parish and is mapped on the steep and eroding landscape adjacent to the flood plain of the Ouachita River.

Exposures of the Jackson Group can be seen in road cuts along the Ouachita River Valley escarpment in the Bayou Dan Hills. Several good exposures are along a road in sec. 36, T. 12 N., R. 4 E. about 5 miles east of Holum. Landslides are common in exposed areas of the Jackson Group because of the steep slopes and the nature of the soils. The Jackson Group consists of marine deposits of olive clay. In places, the clay has crystals of gypsum.

Small open areas, 1 to 5 acres in size, that are devoid of most vegetation also have been observed in areas of the Jackson Group. The soil material has large amounts of calcium carbonate concretions and shells of mollusks, coral, and other fossilized marine animals. These open areas are identified with a special symbol on the soil maps. They probably correlate with the Moody's Branch Marl described in some geology reports *(8)*. Several of these small areas are east of Copenhagen in sec. 13, T. 12 N., R. 4 E. The soils in most of these small, "Prairie-like" areas are calcareous; however, the soils are not calcareous in an area referred to as Copenhagen Prairie in at least one geology report *(8)*. In this particular area, a natural prairie, probably indicating the existence of a previous grassland, is evident.

The Bayoudan, Falkner, and Tippah soils in Caldwell Parish formed in parent material of the Jackson Group. The Falkner and Tippah soils formed in thin loess and the underlying sediment of the Jackson Group.

The alluvium deposited by the small streams that drain the uplands of Caldwell, Jackson, and Winn Parishes is mainly silty. This local stream alluvium is derived from material eroded from soils of the nearby uplands. Sandy alluvium is minor and is mainly in the narrow drain heads that are too small to map and along the channels of some of the small streams. No significant areas of clayey alluvium were observed except on the narrow flood plains of streams in the Ouachita River Valley escarpment that dissect materials of the Jackson Group. The clayey alluvium was evidently carried further downstream and deposited in and near Catahoula Lake.

Soils that formed in local stream alluvium include the Alligator, Guyton, Iuka, and Ouachita soils.

Elevation on the flood plains of local streams ranges from about 74 feet above sea level along Castor Creek at the LaSalle Parish line to about 180 feet above sea level near the upper limits of Bill Creek *(25)*.

Major streams that dissect the uplands of Caldwell Parish are Castor Creek, Flat Creek, Beaucoup Creek, Bill Creek, Black Creek, Boggy Branch, Hurricane Creek, Brushy Creek, Bayou de Chene, and Bayou Dan. Many other smaller creeks and drainageways contribute to the erosional and depositional processes in the parish.

Pleistocene age deposits recognized in Caldwell Parish include three waterborne deposits and one windblown deposit (loess). The waterborne deposits are on the terraces designated in the survey as T1, T2, and T3. Deposits of the T1 terrace are the youngest and lowest in elevation, and deposits of the T3 terrace are the oldest and highest in elevation.

The loess deposited in Caldwell Parish remains only on the stable landscape of the Jackson Group and on some of the gently sloping, nearby Pleistocene age terraces. It was deposited about 20,000 to 25,000 years ago *(15)*. Thickness of the loess does not appear to exceed 3 feet.

Soils in Caldwell Parish that formed in loess include the Falkner, Providence, and Tippah soils. The Falkner and Tippah soils formed in thin loess and the underlying sediment of the Jackson Group.

The T1 terrace in the parish is the first terrace above the alluvial plain. The difference in elevation between the T1 terrace and the alluvial plain decreases with distance upstream *(25)*. The alluvial plain is presumed to have a steeper gradient than the T1 terrace *(8)*. The T1 terrace closely parallels the major streams and decreases in width with distance upstream. The terrace eventually merges with the flood plain *(8)*. The point of convergence with the flood plain marks the upward limit of the braided stream conditions that existed during the period when the T1 terrace was forming.

The T1 sediment is characteristically low in clay, generally less than 18 percent, and is mostly very fine sand and silt. The landscape of the T1 terrace generally is nearly level; however, small mounds, referred to as pimple mounds, are in some areas. These mounds are neither large enough nor great enough in quantity to include on the soil maps.

In several places, relict stream channels are evident on the landscape of the T1 terrace. An example of a relict stream channel is in SW¼NE¼ sec. 10, T. 12 N., R. 2 E. These channels are larger than those on the present flood plain. The large size of the relict stream channels and the width of the T1 terrace suggest that an earlier stream larger than the present stream was in the valley.

The T1 terrace in Caldwell Parish seems to correlate well with the Deweyville Terraces described by some geomorphologists; however, Honer *(8)* designated it as Prairie Terraces.

Soils in Caldwell Parish that formed in sediment of the T1 terrace include the Brimstone, Frizzell, Guyton, Prentiss, and Providence soils.

Brimstone soils are an anomaly among the soils of the T1 terrace because they are alkaline, while the other soils are acid. The alkalinity of the Brimstone soils is thought to be caused by the concentration of salts in the soil as water evaporates from the soil surface. This occurs when hydrostatic pressure in the southward inclined aquifers of the Cockfield Formation forces water to the soil surface at a point where a stream has cut into the aquifer. Palmetto is a prominent indicator plant species of these alkaline soils.

The T2 terrace surface is locally higher than that of the T1 terrace *(25)*. In most places, the T2 terrace is immediately adjacent to the T1 terrace. In some places, Tertiary age outcrops are immediately adjacent to the T1 terrace, and in others, the T2 terrace is immediately adjacent to the T3 terrace. In a road cut in NW¼SW¼, sec. 8, T. 14 N., R. 3 E., the sediment of the T2 terrace was underlain by sediment of the T3 terrace.

The T2 terrace generally parallels the major streams. It has a gently rolling landscape. Slopes generally are less than 5 percent. The terrace commonly is dissected by small drainageways. In places, post-depositional erosion has entirely removed the T2 sediment from side slopes and exposed the underlying Tertiary age clays. On these eroded landscapes, the T2 sediment remains as thin caps 2 to 4 feet thick on ridgetops.

The surface elevation of the T2 terrace in Caldwell Parish is not so uniform as it commonly is for stream terraces *(25)*. Soils on some of the highest ridgetops in the parish (240 feet above sea level) are similar to soils at much lower elevations (140 feet above sea level). For example, the soils on a ridgetop in SE¼, sec. 21, T. 15 N., R. 2 E., have a profile that is very similar to that of soils in lower positions in SE¼, sec. 26, T. 13 N., R. 2 E. These soils have a similar degree of genetic development and are probably similar in their relative age.

Sediment of the T2 terrace is consistently yellowish brown and loamy wherever it occurs in the parish. The sediment is higher in content of clay, lower in content of silt, and has coarser sand than the sediment of the T1 terrace. Soils that formed in this sediment typically have a fragipan in the subsoil. The Savannah soils are on the T2 terrace in Caldwell Parish.

The content of plinthite and of small chert pebbles are the only soil features that did not appear to be uniform in the soils that formed in sediment of the T2 terrace.

The T3 terrace in Caldwell Parish has locally higher surface elevations than those of the T2 terrace. In places, the T3 terrace is adjacent to the lower-lying T2 terrace. In other places, the T3 terrace occurs as isolated erosional remnants on locally high and prominent Tertiary age landscapes; sediment of the associated T2 terrace is not present in these places. An example of this geomorphic relationship is evident in sec. 9, T. 13 N., R. 3 E. Unlike the T1 and T2 terraces, the T3 terrace exhibits no geomorphic relationship to the present alluvial plain.

The landscape of the T3 terrace consists of relatively small, convex ridgetops at locally high elevations. The ridgetops range from 5 to 40 acres. Slopes are generally less than 5 percent. The largest areas of the T3 terrace are about 100 acres. The areas generally are not dissected by drainageways; however, some of the larger areas are dissected by a few small drainageways. The surface elevation of the T3 terrace generally is not uniform throughout the parish. It ranges from about 145 feet above sea level to about 245 feet *(25)*.

Sediment of the T3 terrace was also recognized in the Cypress Creek drainage basin along the Ouachita

Parish line. This sediment is topographically lower in elevation than that of the more stable area outside of the drainage basin. It is believed to represent materials deposited in the pre-Pleistocene age valley of Cypress Creek. This sediment is underlain by the Tertiary age sediment of the Cockfield Formation. The landscape has narrow ridgetops and steep side slopes and it is dissected by numerous drainageways.

Sediment of the T3 terrace was consistently recognized throughout the uplands as red or yellowish red and loamy. It has sand that is somewhat coarser than that of the T2 terrace sediment. Small chert pebbles, generally less than 1 inch in diameter, were noted in some of the sediment but with no consistency or pattern. In places, a stone line was recognized at the contact with the underlying Tertiary age sediment. An example of this stone line can be seen in a road cut along Louisiana Highway 506 about 4.5 miles west of Kelley in NE¼SW¼, sec. 22, T. 12 N., R. 2 E.

An early geology map of Caldwell and Winn Parishes showed only two Pleistocene age terraces, the Montgomery and Prairie Terraces *(8)*. In Caldwell Parish, it is evident that the areas delineated as the Montgomery Terrace correlate very well with areas mapped as T3 terrace in Matson's geology report and on recent geology maps *(12, 13)*. Only in areas delineated in sec. 21, T. 14 N., R. 2 E. and sec. 29, T. 12 N., R. 4 E. were discrepancies shown. In addition, the soil survey indicated that areas of soils that formed in sediment of the T3 terrace generally were smaller than the corresponding areas of the Montgomery Terrace shown in the geology report by Honer *(8)*.

Soils in Caldwell Parish that formed in sediment of the T3 terrace include the Larue, Ruston, and Smithdale soils.

The sediment of the T3 terrace was considered to be early to mid-Pleistocene age by Fisk *(7)*. The terraces were formed during distinct periods of deposition that he correlated with the interglacial periods of the Pleistocene age.

Matson *(13)* considered the sediment of the T3 terrace to be Pliocene in age. He thought it was laid down on a very uneven and eroded Tertiary age surface. The different terrace levels were then formed by differential erosion of the landscape during the Pleistocene age. Based on observations made during the soil survey, the concepts of Matson seem to apply better to the landforms in Caldwell Parish than those of Fisk.

A reasonable concept of landscape evolution from the early Pleistocene age to the present begins with the T3 terrace sediment in place upon an uneven and eroded Tertiary surface, followed by the first of several periods of intense rainfall that correlate with the interglacial periods of the Pleistocene age.

During these periods of intense rainfall, the T3 terrace was severely eroded. Numerous rills, gullies, and small drainageways carried the eroded T3 sediment downslope where it was deposited as local colluvium on a toe slope. The sediment did not get carried into a stream. As erosion continued, additional increments of sediment accumulated and gradually increased the surface elevation of the toe slope colluvium. The rills, gullies, and small drainageways constantly changed course and migrated back and forth across the landscape, depositing the sediment eroded from the higher T3 terrace and the Tertiary age formations wherever they were exposed. These erosional/depositional processes acted as a sorting mechanism. The finer material from the T3 terrace was not deposited on the toe slope but was carried farther downslope. In fact, much of the finer material was carried away as alluvium by local streams. As these streams became clogged with the massive amounts of very fine sand and silt, a braided stream regime developed.

These erosional/depositional processes repeated themselves in response to each waning stage of glaciation. The area of the T3 landscape decreased as a result of the erosion, and the area of the T2 landscape increased as a result of the toe slope deposition. The area of exposed Tertiary age sediment also increased with each increment of erosion; however, some areas of Tertiary age formations were being covered by accumulating colluvium on toe slopes.

When the Pleistocene Epoch ended, the local streams again developed a single channel and formed their own flood plain in the braided stream sediment. A few erosional remnants of the T3 terrace were left on the higher parts of the landscape. The T2 terrace encompassed a large area. Sediment of the T1 terrace had filled the valleys during this process so much that the initial toe slope deposits that made up the T2 terrace were covered. The Tertiary age sediment, once completely covered with sediment of the T3 terrace, was again exposed over a large area by the erosional processes.

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Glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels, i.e., clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

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.

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.

Excess sodium (in tables). Excess exchangeable sodium is in the soil. The resulting poor physical properties restrict the growth of plants.

Fast intake (in tables). The movement of water into the soil is rapid.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

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.

Forb. Any herbaceous plant that is not a grass or a sedge.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai. Commonly a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of Vertisols—clayey soils having a high coefficient of expansion and contraction with changes in moisture content.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Green-manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual.* The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material.

Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material. This contrasts with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of the acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are—

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

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.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slippage (in tables). The soil mass is susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 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.

Stone line. A concentration of coarse fragments in a soil. Generally it is indicative of an old weathered surface. In a cross section, thickness of the line can be one fragment or more. It generally overlies material that weathered in place and it is overlain by recent sediment of variable thickness.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the 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.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

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 1951-75 at Chatham, Louisiana]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	57.0	32.8	44.9	80	11	59	4.67	2.26	6.74	7	0.4
February---	61.2	34.9	48.1	82	15	86	4.61	2.60	6.39	6	.6
March------	68.7	41.9	55.3	87	23	227	4.96	2.73	6.91	7	.2
April------	77.7	51.6	64.7	91	31	441	4.81	2.35	6.93	7	.0
May--------	84.8	59.2	72.0	95	41	682	5.78	2.78	8.36	6	.0
June-------	91.1	66.1	78.6	99	51	858	4.05	1.05	6.44	5	.0
July-------	94.0	69.3	81.7	101	58	983	4.60	1.94	6.84	7	.0
August-----	94.2	67.8	81.0	103	54	961	2.84	1.26	4.18	4	.0
September--	88.5	61.5	75.0	99	41	750	3.98	1.29	6.18	5	.0
October----	79.8	49.3	64.6	94	30	453	2.50	.53	4.04	3	.0
November---	67.6	39.9	53.8	86	20	167	4.35	2.44	6.04	6	.0
December---	59.2	34.0	46.6	80	14	59	5.22	2.58	7.51	7	.1
Yearly:											
Average--	77.0	50.7	63.9	---	---	---	---	---	---	---	---
Extreme--	---	---	---	104	8	---	---	---	---	---	---
Total----	---	---	---	---	---	5,726	52.37	40.56	61.69	70	1.3

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Data recorded in the period 1951-75 at Chatham, 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. 15	Mar. 31	Apr. 10
2 years in 10 later than--	Mar. 8	Mar. 25	Apr. 5
5 years in 10 later than--	Feb. 22	Mar. 14	Mar. 27
First freezing temperature in fall:			
1 year in 10 earlier than--	Nov. 2	Oct. 26	Oct. 16
2 years in 10 earlier than--	Nov. 10	Oct. 31	Oct. 21
5 years in 10 earlier than--	Nov. 24	Nov. 9	Oct. 31

TABLE 3.--GROWING SEASON

[Data recorded in the period 1951-75 at Chatham, 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	213	196
8 years in 10	258	222	203
5 years in 10	274	240	217
2 years in 10	291	257	232
1 year in 10	299	266	239

TABLE 4.--SUITABILITY AND LIMITATIONS OF MAP UNITS ON THE GENERAL SOIL MAP FOR MAJOR LAND USES

Map unit	Percent of area	Cultivated crops	Pastureland	Woodland	Urban uses
Perry-Alligator	16	Poorly suited: flooding, wetness, poor tilth.	Somewhat poorly suited: flooding, wetness.	Moderately well suited: flooding, wetness.	Poorly suited: flooding, wetness, shrink-swell, very slow permeability, low strength for roads.
Perry-Hebert	11	Moderately well suited: wetness, poor tilth, flooding.	Moderately well suited: wetness, flooding.	Well suited	Poorly suited: flooding, wetness, shrink-swell, moderately slow and very slow permeability, low strength for roads.
Hebert-Rilla	7	Well suited	Well suited	Well suited	Moderately well suited: flooding, wetness, moderately slow permeability.
Guyton-Ouachita	8	Not suited: flooding, wetness.	Poorly suited: flooding, wetness.	Somewhat poorly suited: flooding, wetness.	Not suited: flooding, wetness.
Olla-Cadeville	5	Not suited: slope.	Poorly suited: slope.	Moderately well suited: slope.	Poorly suited: slope, moderate and very slow permeability, shrink-swell, low strength for roads.
Sacul-Savannah	34				
Sacul:		Not suited: slope.	Somewhat poorly suited: slope, low fertility.	Well suited	Poorly suited: slope, wetness, shrink-swell, slow permeability, low strength for roads.
Savannah:		Moderately well suited: slope, low fertility, potential aluminum toxicity in root zone.	Well suited	Well suited	Poorly suited: slope, wetness, shrink-swell, moderately slow permeability, low strength for roads.
Falkner-Guyton	7	Moderately well suited: wetness, low fertility, potential aluminum toxicity in root zone, flooding in some areas.	Moderately well suited: low fertility, wetness, flooding in some areas.	Well suited	Poorly suited: wetness, flooding, shrink-swell, moderately slow and 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 crops	Pastureland	Woodland	Urban uses
Frizzell-Providence	8	Moderately well suited: low fertility, potential aluminum toxicity in root zone, wetness, slope.	Moderately well suited: low fertility, slope.	Well suited	Somewhat poorly suited: wetness, shrink-swell, moderately slow and slow permeability.
Bayoudan	4	Not suited: slope.	Poorly suited: slope, potential landslides.	Moderately well suited: slope, potential landslides.	Poorly suited: slope, shrink-swell, very slow permeability, potential landslides, low strength for roads.

TABLE 5.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
Ar	Alligator clay, frequently flooded	10,706	3.1
At	Arents, loamy and clayey	1,311	0.4
Bb	Bayoudan clay, 3 to 8 percent slopes	2,414	0.7
Bc	Bayoudan clay, 8 to 40 percent slopes	10,155	2.9
BR	Brimstone-Prentiss association, 0 to 3 percent slopes	2,499	0.7
Ch	Cahaba fine sandy loam, 1 to 3 percent slopes	583	0.2
Fa	Falkner silt loam	15,966	4.6
Fe	Forestdale silty clay loam, occasionally flooded	555	0.2
FZ	Frizzell-Guyton-Providence association, 0 to 2 percent slopes	29,403	8.4
Go	Gallion silt loam	1,789	0.5
Gr	Gore silt loam, 2 to 5 percent slopes	85	*
GY	Guyton and Ouachita silt loams, frequently flooded	36,756	10.5
He	Hebert silt loam	14,533	4.1
Hh	Hebert silt loam, gently undulating, occasionally flooded	5,272	1.5
Hn	Hebert silty clay loam	2,417	0.7
Hs	Hebert-Sterlington silt loams, 0 to 2 percent slopes	1,565	0.4
IB	Iuka fine sandy loam, frequently flooded	1,339	0.4
LA	Larue-Smithdale association, moderately steep	1,593	0.5
OC	Olla-Cadeville association, steep	18,382	5.2
Pe	Perry silty clay loam	8,030	2.3
Pf	Perry clay	2,078	0.6
Pg	Perry clay, occasionally flooded	44,106	12.4
Pk	Perry-Hebert complex, gently undulating	7,505	2.1
Pm	Portland silty clay loam	2,037	0.6
Pn	Portland clay	1,217	0.3
Po	Providence silt loam, 1 to 5 percent slopes	3,355	1.0
Rg	Rilla silt loam	6,838	2.0
Rk	Rilla-Hebert silt loams, gently undulating	2,137	0.6
Ru	Ruston fine sandy loam, 3 to 8 percent slopes	2,502	0.7
SC	Sacul fine sandy loam, moderately sloping	51,626	14.7
SH	Savannah-Sacul association, gently sloping	49,171	14.0
St	Sterlington silt loam	3,005	0.9
Tp	Tippah silt loam, 1 to 5 percent slopes	580	0.2
YO	Yorktown clay, frequently flooded	1,765	0.5
	Water areas less than 40 acres in size	741	0.2
	Water areas more than 40 acres in size	6,574	1.9
	Total	350,590	100.0

* Less than 0.1 percent.

TABLE 6.--PRIME FARMLAND

[Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name]

Map symbol	Soil name
Ch	Cahaba fine sandy loam, 1 to 3 percent slopes
Fa	Falkner silt loam
FZ	Frizzell-Guyton-Providence association, 0 to 2 percent slopes
Go	Gallion silt loam
He	Hebert silt loam (where drained)
Hn	Hebert silty clay loam (where drained)
Hs	Hebert-Sterlington silt loams, 0 to 2 percent slopes
Pe	Perry silty clay loam (where drained)
Pf	Perry clay (where drained)
Pk	Perry-Hebert complex, gently undulating (where drained)
Pm	Portland silty clay loam (where drained)
Pn	Portland clay (where drained)
Po	Providence silt loam, 1 to 5 percent slopes
Rg	Rilla silt loam
Rk	Rilla-Hebert silt loams, gently undulating
Ru	Ruston fine sandy loam, 3 to 8 percent slopes
SH	Savannah-Sacul association, gently sloping
St	Sterlington silt loam
Tp	Tippah silt loam, 1 to 5 percent slopes

TABLE 7.--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	Rice	Soybeans	Grain sorghum	Corn	Bahiagrass	Improved bermudagrass
		Lbs	Bu	Bu	Bu	Bu	AUM*	AUM*
Ar--------------- Alligator	Vw	---	---	15	35	---	---	---
At. Arents								
Bb--------------- Bayoudan	IVe	---	---	---	---	---	6.0	12.0
Bc--------------- Bayoudan	VIIe	---	---	---	---	---	5.0	---
BR:								
Brimstone-------	IIIs	---	---	24	40	45	6.5	---
Prentiss--------	IIe	750	---	30	50	80	8.0	14.5
Ch--------------- Cahaba	IIe	800	---	35	80	100	8.5	15.0
Fa--------------- Falkner	IIw	625	---	35	70	75	8.0	13.5
Fe--------------- Forestdale	IVw	---	---	30	55	---	---	---
FZ:								
Frizzell--------	IIw	425	---	28	50	50	7.0	13.0
Guyton----------	IIIw	---	---	23	50	40	6.0	10.0
Providence------	IIw	800	---	40	90	90	9.0	14.0
Go--------------- Gallion	I	975	---	40	90	90	9.5	15.0
Gr--------------- Gore	IVe	---	---	23	45	---	7.0	12.0
Gy--------------- Guyton and Ouachita	Vw	---	---	---	---	---	7.0	---
He--------------- Hebert	IIw	750	---	30	90	80	10.0	13.5
Hh--------------- Hebert	IIIw	---	---	25	40	70	9.0	10.0
Hn--------------- Hebert	IIw	700	---	32	80	80	10.0	13.5
Hs--------------- Hebert and Sterlington	IIw	751	---	33	80	80	10.5	14.5

See footnote at end of table.

TABLE 7.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Cotton	Rice	Soybeans	Grain sorghum	Corn	Bahiagrass	Improved bermudagrass
		Lbs	Bu	Bu	Bu	Bu	AUM*	AUM*
IB-------------- Iuka	Vw	---	---	---	---	---	7.5	---
LA:								
Larue----------	VIe	---	---	---	---	---	5.0	11.0
Smithdale------	VIe	---	---	---	---	---	6.0	9.0
OC-------------- Olla-Cadeville	VIIe	---	---	---	---	---	---	---
Pe, Pf---------- Perry	IIIw	---	110	30	75	50	---	13.0
Pg-------------- Perry	IVw	---	110	25	55	---	---	---
Pk-------------- Perry-Hebert	IIIw	534	---	25	50	60	---	14.0
Pm-------------- Portland	IIIw	---	110	30	75	55	---	14.0
Pn-------------- Portland	IIIw	---	110	30	70	50	---	13.5
Po-------------- Providence	IIe	750	---	40	90	90	8.0	14.0
Rg-------------- Rilla	I	925	---	40	90	85	9.5	13.5
Rk:								
Rilla----------	IIe	775	---	35	90	85	9.5	13.0
Hebert---------	IIw	750	---	30	85	80	10.0	13.5
Ru-------------- Ruston	IIIe	600	---	25	60	65	7.5	---
SC-------------- Sacul	VIe	---	---	---	---	---	7.0	12.0
SH-------------- Savannah and Sacul	IIe	---	---	25	65	70	7.5	14.0
St-------------- Sterlington	I	900	---	30	90	85	9.5	15.5
Tp-------------- Tippah	IIe	650	---	35	80	80	9.0	16.0
YO-------------- Yorktown	VIIw	---	---	---	---	---	---	---

* 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 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: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
Ar: Alligator	7W	Slight	Severe	Severe	Moderate	Eastern cottonwood	90	7	Eastern cottonwood, green ash, American sycamore.
						Green ash	70	3	
						Nuttall oak	---	---	
						Overcup oak	---	---	
						Water locust	---	---	
						Water hickory	---	---	
Bb, Bc: Bayoudan	8C	Moderate	Moderate	Slight	Moderate	Shortleaf pine	70	8	Loblolly pine.
						Loblolly pine	80	8	
						Southern red oak	---	---	
						Sweetgum	---	---	
BR:									
Brimstone	11T	Slight	Severe	Moderate	Moderate	Slash pine	85	11	Loblolly pine.
						Loblolly pine	80	8	
Prentiss	9W	Slight	Slight	Slight	Moderate	Loblolly pine	88	9	Loblolly pine.
						Shortleaf pine	79	9	
						Sweetgum	90	7	
						Cherrybark oak	90	8	
						White oak	80	4	
Ch: Cahaba	9A	Slight	Slight	Slight	Slight	Loblolly pine	87	9	Loblolly pine, sweetgum, water oak.
						Slash pine	91	12	
						Shortleaf pine	70	8	
						Yellow poplar	---	---	
						Sweetgum	90	7	
						Southern red oak	---	---	
						Water oak	---	---	
Fa: Falkner	8W	Slight	Moderate	Slight	Slight	Loblolly pine	85	8	Loblolly pine, shortleaf pine.
						Shortleaf pine	75	8	
						Sweetgum	90	7	
Fe: Forestdale	9W	Slight	Moderate	Moderate	Moderate	Eastern cottonwood	100	9	Eastern cottonwood, green ash, sweetgum, American sycamore.
						Green ash	78	3	
						Cherrybark oak	94	9	
						Nuttall oak	99	---	
						Water oak	90	6	
						Willow oak	94	6	
						Sweetgum	100	10	
FZ:									
Frizzell	9W	Slight	Moderate	Slight	Slight	Loblolly pine	90	9	Loblolly pine.
						Sweetgum	90	7	
						Water oak	---	---	
Guyton	9W	Slight	Severe	Moderate	Moderate	Loblolly pine	90	9	Loblolly pine, sweetgum.
						Slash pine	90	11	
						Sweetgum	---	---	
						Green ash	---	---	
						Southern red oak	---	---	
						Water oak	---	---	
Providence	9W	Slight	Slight	Slight	Moderate	Loblolly pine	87	9	Loblolly pine, sweetgum, yellow poplar.
						Longleaf pine	73	6	
						Sweetgum	90	7	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
Go-------------- Gallion	9A	Slight	Slight	Slight	Slight	Cherrybark oak------	95	9	Eastern cottonwood, American sycamore.
						Green ash-----------	80	3	
						Sweetgum------------	83	6	
						Water oak-----------	---	---	
						Pecan---------------	---	---	
						American sycamore---	---	---	
						Eastern cottonwood--	100	9	
Gr-------------- Gore	7C	Slight	Moderate	Moderate	Slight	Loblolly pine-------	76	7	Loblolly pine.
						Shortleaf pine------	---	---	
GY: Guyton---------	9W	Slight	Severe	Severe	Moderate	Loblolly pine-------	90	9	Loblolly pine, sweetgum.
						Slash pine----------	90	11	
						Sweetgum------------	---	---	
						Green ash-----------	---	---	
						Southern red oak----	---	---	
						Water oak-----------	---	---	
Ouachita--------	11W	Slight	Moderate	Slight	Slight	Loblolly pine-------	100	9	Loblolly pine, sweetgum, yellow poplar, American sycamore, eastern cottonwood.
						Sweetgum------------	100	10	
						Eastern cottonwood--	100	9	
He-------------- Hebert	8A	Slight	Slight	Slight	Slight	Eastern cottonwood--	95	8	Eastern cottonwood, American sycamore.
						Cherrybark oak------	95	9	
						Nuttall oak---------	90	---	
						Sweetgum------------	90	7	
						Pecan---------------	---	---	
						Water oak-----------	90	6	
						American sycamore---	---	---	
						Green ash-----------	---	---	
Hh-------------- Hebert	8W	Slight	Moderate	Slight	Slight	Eastern cottonwood--	95	8	Eastern cottonwood, American sycamore.
						Cherrybark oak------	95	9	
						Nuttall oak---------	90	---	
						Sweetgum------------	90	7	
						Pecan---------------	---	---	
						Water oak-----------	90	6	
						American sycamore---	---	---	
						Green ash-----------	---	---	
Hn-------------- Hebert	8A	Slight	Slight	Slight	Slight	Eastern cottonwood--	95	8	Eastern cottonwood, American sycamore.
						Cherrybark oak------	95	9	
						Nuttall oak---------	90	---	
						Sweetgum------------	90	7	
						Pecan---------------	---	---	
						Water oak-----------	90	6	
						American sycamore---	---	---	
						Green ash-----------	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
Hs:									
Hebert	8A	Slight	Slight	Slight	Slight	Eastern cottonwood	95	8	Eastern cottonwood, American sycamore.
						Cherrybark oak	95	9	
						Nuttall oak	90	---	
						Sweetgum	90	7	
						Pecan	---	---	
						Water oak	90	6	
						American sycamore	---	---	
						Green ash	---	---	
Sterlington	3A	Slight	Slight	Slight	Slight	Green ash	75	3	Eastern cottonwood, sweetgum.
						Eastern cottonwood	---	---	
						Cherrybark oak	95	4	
						Water oak	90	---	
						Pecan	---	---	
						Sweetgum	90	7	
						Swamp chestnut	---	---	
IB: Iuka	11W	Slight	Moderate	Moderate	Slight	Loblolly pine	100	9	Loblolly pine, eastern cottonwood, yellow poplar.
						Sweetgum	100	10	
						Eastern cottonwood	105	9	
						Water oak	100	7	
						Swamp chestnut	---	---	
LA:									
Larue	8S	Slight	Moderate	Moderate	Slight	Loblolly pine	80	8	Loblolly pine, shortleaf pine.
						Shortleaf pine	70	8	
						Longleaf pine	70	6	
						Southern red oak	---	---	
						Sweetgum	---	---	
Smithdale	9R	Moderate	Moderate	Slight	Slight	Loblolly pine	86	9	Loblolly pine, longleaf pine.
						Longleaf pine	69	5	
OC:									
Olla	8R	Severe	Severe	Moderate	---------	Loblolly pine	80	8	Loblolly pine.
						Southern red oak	---	---	
						White oak	---	---	
						American elm	---	---	
						Post oak	---	---	
						Shortleaf pine	---	---	
						Sweetgum	---	---	
						Hickory	---	---	
						Beech	---	---	
Cadeville	8C	Severe	Moderate	Moderate	Slight	Loblolly pine	80	8	Loblolly pine.
						Shortleaf pine	70	8	
Pe, Pf, Pg: Perry	3W	Slight	Severe	Moderate	Moderate	Green ash	72	3	Green ash, sweetgum, water oak.
						Sweetgum	92	8	
						Water oak	---	---	
						Pecan	---	---	
						Water hickory	---	---	
						American sycamore	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
Pk:									
Perry	3W	Slight	Severe	Moderate	Moderate	Green ash	72	3	Green ash,
						Sweetgum	92	8	sweetgum,
						Water oak	---	---	water oak.
						Pecan	---	---	
						Water hickory	---	---	
Hebert	8A	Slight	Slight	Slight	Slight	Eastern cottonwood	95	8	Eastern
						Cherrybark oak	95	9	cottonwood,
						Nuttall oak	90	---	American
						Sweetgum	90	7	sycamore.
						Pecan	---	---	
						Water oak	90	6	
						American sycamore	---	---	
						Green ash	---	---	
Pm, Pn	3W	Slight	Severe	Moderate	Moderate	Green ash	80	3	Green ash,
Portland						Sweetgum	90	7	sweetgum,
						Water oak	---	---	water oak.
						American sycamore	---	---	
Po	8W	Slight	Slight	Slight	Moderate	Loblolly pine	84	8	Loblolly pine,
Providence						Shortleaf pine	64	7	sweetgum,
						Sweetgum	90	7	yellow poplar.
Rg	9A	Slight	Slight	Slight	Slight	Eastern cottonwood	100	9	Eastern
Rilla						Cherrybark oak	100	10	cottonwood,
						Nuttall oak	85	---	American
						Sweetgum	100	10	sycamore.
						Pecan	---	---	
						American sycamore	---	---	
Rk:									
Rilla	9A	Slight	Slight	Slight	Slight	Eastern cottonwood	100	9	Eastern
						Cherrybark oak	100	10	cottonwood,
						Nuttall oak	85	---	American
						Sweetgum	100	10	sycamore.
						Pecan	---	---	
						American sycamore	---	---	
Hebert	8A	Slight	Slight	Slight	Slight	Eastern cottonwood	95	8	Eastern
						Cherrybark oak	95	9	cottonwood,
						Nuttall oak	90	---	American
						Sweetgum	90	7	sycamore.
						Pecan	---	---	
						Water oak	90	6	
						American sycamore	---	---	
						Green ash	---	---	
Ru	9A	Slight	Slight	Slight	Slight	Loblolly pine	91	9	Loblolly pine,
Ruston						Slash pine	91	12	longleaf pine.
						Longleaf pine	76	6	
						Southern red oak	---	---	
						Sweetgum	---	---	

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	Windthrow hazard	Common trees	Site index	Productivity class*	
SC: Sacul	8C	Slight	Slight	Slight	Slight	Loblolly pine	80	8	Loblolly pine, shortleaf pine.
						Shortleaf pine	70	8	
SH: Savannah	9W	Slight	Moderate	Slight	Moderate	Loblolly pine	88	9	Loblolly pine, sweetgum, American sycamore, yellow poplar.
						Longleaf pine	78	7	
						Slash pine	88	11	
						Sweetgum	85	6	
Sacul	8C	Slight	Slight	Slight	Slight	Loblolly pine	80	8	Loblolly pine, shortleaf pine.
						Shortleaf pine	70	8	
						Southern red oak	---	---	
						Sweetgum	---	---	
St: Sterlington	3A	Slight	Slight	Slight	Slight	Green ash	75	3	Eastern cottonwood.
						Eastern cottonwood	---	---	
						Cherrybark oak	95	9	
						Water oak	90	6	
						Pecan	---	---	
						Sweetgum	90	7	
Tp: Tippah	8A	Slight	Slight	Slight	Slight	Loblolly pine	78	8	Loblolly pine, sweetgum, yellow poplar.
						Cherrybark oak	95	9	
						Shumard oak	95	5	
						White oak	80	4	
						Sweetgum	90	7	
						Yellow poplar	90	6	
						Southern red oak	---	---	
YO: Yorktown	3W	Slight	Severe	Severe	Severe	Baldcypress	70	3	Baldcypress, green ash, water tupelo.
						Water tupelo	---	---	
						Water hickory	---	---	
						Green ash	---	---	

* 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
Ar: Alligator	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness, flooding.	Severe: wetness, too clayey.	Severe: wetness, flooding, too clayey.
At. Arents					
Bb: Bayoudan	Severe: percs slowly, too clayey.	Severe: too clayey, percs slowly.	Severe: too clayey, percs slowly.	Severe: too clayey.	Severe: too clayey.
Bc: Bayoudan	Severe: slope, percs slowly, too clayey.	Severe: slope, too clayey, percs slowly.	Severe: slope, too clayey, percs slowly.	Severe: too clayey.	Severe: slope, too clayey.
BR:					
Brimstone	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Prentiss	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight	Moderate: droughty.
Ch: Cahaba	Slight	Slight	Slight	Slight	Slight.
Fa: Falkner	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
Fe: Forestdale	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
FZ:					
Frizzell	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Slight	Moderate: wetness.
Guyton	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Providence	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
Go: Gallion	Slight	Slight	Slight	Slight	Slight.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Gr------------------- Gore	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight----------	Slight.
GY:					
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.
He------------------- Hebert	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
Hh------------------- Hebert	Severe: flooding.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
Hn------------------- Hebert	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
Hs:					
Hebert---------------	Severe: flooding.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
Sterlington----------	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
IB------------------- Iuka	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
LA:					
Larue----------------	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: droughty, slope.
Smithdale------------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
OC:					
Olla-----------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Cadeville------------	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Moderate: slope.	Severe: slope.
Pe------------------- Perry	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Pf------------------- Perry	Severe: wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.	Severe: wetness, too clayey.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Pg: Perry	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
Pk:					
Perry	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
Hebert	Severe: flooding.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
Pm: Portland	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Pn: Portland	Severe: wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
Po: Providence	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight	Moderate: wetness.
Rg: Rilla	Slight	Slight	Slight	Slight	Slight.
Rk:					
Rilla	Slight	Slight	Slight	Slight	Slight.
Hebert	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
Ru: Ruston	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
SC: Sacul	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
SH:					
Savannah	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, droughty.
Sacul	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
St: Sterlington	Slight	Slight	Slight	Slight	Slight.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Tp: Tippah	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight	Slight.
YO: Yorktown	Severe: flooding, ponding, percs slowly.	Severe: ponding, too clayey, excess humus.	Severe: too clayey, excess humus, ponding.	Severe: ponding, too clayey, excess humus.	Severe: ponding, flooding, too clayey.

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: 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
Ar----------------- Alligator	Poor	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
At. Arents											
Bb, Bc------------- Bayoudan	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
BR:											
Brimstone---------	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Prentiss----------	Fair	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Ch----------------- Cahaba	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Fa----------------- Falkner	Good	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Fe----------------- Forestdale	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
FZ:											
Frizzell----------	Fair	Good	Good	Fair	Good	Good	Fair	Fair	Good	Good	Fair.
Guyton------------	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Providence--------	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Go----------------- Gallion	Good	Good	Good	Good	Fair	Good	Poor	Very poor.	Good	Good	Very poor.
Gr----------------- Gore	Poor	Good	Good	Fair	Fair	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
GY:											
Guyton------------	Poor	Fair	Fair	Fair	Fair	Fair	Good	Good	Poor	Fair	Good.
Ouachita----------	Poor	Fair	Fair	Good	Poor	Good	Good	Fair	Fair	Good	Fair.
He----------------- Hebert	Good	Good	Good	Good	Fair	Good	Fair	Fair	Good	Good	Fair.
Hh----------------- Hebert	Fair	Fair	Good	Good	Fair	Good	Fair	Fair	Fair	Good	Fair.
Hn----------------- Hebert	Good	Good	Good	Good	Fair	Good	Fair	Fair	Good	Good	Fair.
Hs:											
Hebert------------	Good	Good	Good	Good	Fair	Good	Fair	Fair	Good	Good	Fair.
Sterlington-------	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
IB------------------ Iuka	Poor	Fair	Fair	Good	Good	Fair	Poor	Poor	Fair	Good	Poor.
LA:											
Larue---------------	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Smithdale-----------	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
OC:											
Olla----------------	Poor	Poor	Good	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Cadeville-----------	Poor	Poor	Good	Fair	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Pe, Pf-------------- Perry	Fair	Fair	Fair	Good	Poor	Good	Good	Good	Fair	Good	Good.
Pg------------------ Perry	Poor	Fair	Fair	Fair	Poor	Good	Fair	Fair	Fair	Fair	Fair.
Pk:											
Perry---------------	Fair	Fair	Fair	Good	Poor	Good	Good	Good	Fair	Good	Good.
Hebert--------------	Good	Good	Good	Good	Fair	Good	Fair	Fair	Good	Good	Fair.
Pm, Pn-------------- Portland	Good	Good	Good	Good	Fair	Good	Good	Good	Good	Good	Good.
Po------------------ Providence	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Rg------------------ Rilla	Good	Good	Good	Good	Fair	Good	Poor	Very poor.	Good	Good	Very poor.
Rk:											
Rilla---------------	Good	Good	Good	Good	Fair	Good	Poor	Very poor.	Good	Good	Very poor.
Hebert--------------	Good	Good	Good	Good	Fair	Good	Fair	Fair	Good	Good	Fair.
Ru------------------ Ruston	Fair	Good	Good	Fair	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
SC------------------ Sacul	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
SH:											
Savannah------------	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Sacul---------------	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
St------------------ Sterlington	Good	Good	Good	Good	Fair	Good	Poor	Very poor.	Good	Good	Very poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Tp: Tippah	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
YO: Yorktown	Very poor.	Very poor.	Very poor.	Poor	Poor	Poor	Poor	Good	Very poor.	Very poor.	Fair.

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
Ar: Alligator	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness, flooding, too clayey.
At. Arents					
Bb: Bayoudan	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: slippage, low strength, shrink-swell.	Severe: too clayey.
Bc: Bayoudan	Severe: slope, cutbanks cave.	Severe: shrink-swell, slope, slippage.	Severe: shrink-swell, slope, slippage.	Severe: low strength, slope, slippage.	Severe: slope, too clayey.
BR:					
Brimstone	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, low strength.	Severe: wetness.
Prentiss	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: droughty.
Ch: Cahaba	Severe: cutbanks cave.	Slight	Slight	Slight	Slight.
Fa: Falkner	Severe: wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness.
Fe: Forestdale	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, flooding, shrink-swell.	Severe: wetness.
FZ:					
Frizzell	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Guyton	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: wetness.
Providence	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: low strength.	Moderate: wetness.
Go: Gallion	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
Gr: Gore	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.

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
GY:					
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.
He Hebert	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
Hh Hebert	Severe: wetness.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: wetness, flooding.
Hn Hebert	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
Hs:					
Hebert	Severe: wetness.	Severe: flooding.	Severe: flooding.	Severe: low strength.	Moderate: wetness.
Sterlington	Slight	Slight	Slight	Slight	Slight.
IB Iuka	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.
LA:					
Larue	Severe: cutbanks cave.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
Smithdale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
OC:					
Olla	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Cadeville	Severe: slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.	Severe: slope.
Pe Perry	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, wetness.	Severe: wetness.
Pf Perry	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, wetness.	Severe: wetness, too clayey.

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
Pg----------------- Perry	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, flooding.	Severe: wetness, too clayey.
Pk:					
Perry--------------	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness.	Severe: wetness, too clayey.
Hebert-------------	Severe: wetness.	Severe: flooding.	Severe: flooding.	Severe: low strength.	Moderate: wetness.
Pm----------------- Portland	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, wetness.	Severe: wetness.
Pn----------------- Portland	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, wetness.	Severe: wetness, too clayey.
Po----------------- Providence	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: low strength.	Moderate: wetness.
Rg----------------- Rilla	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
Rk:					
Rilla--------------	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
Hebert-------------	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
Ru----------------- Ruston	Slight------------	Slight------------	Moderate: slope.	Moderate: low strength.	Slight.
SC----------------- Sacul	Moderate: too clayey, wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
SH:					
Savannah-----------	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: low strength, wetness.	Moderate: wetness, droughty.
Sacul--------------	Moderate: too clayey, wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
St----------------- Sterlington	Slight------------	Slight------------	Slight------------	Slight------------	Slight.
Tp----------------- Tippah	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Severe: low strength.	Slight.

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
YO----------------- Yorktown	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding, too clayey.

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
Ar: Alligator	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
At. Arents					
Bb: Bayoudan	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
Bc: Bayoudan	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey, slippage.	Severe: slope.	Poor: too clayey, hard to pack, slope.
BR:					
Brimstone	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Prentiss	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Fair: wetness.
Ch: Cahaba	Slight	Severe: seepage.	Severe: seepage.	Slight	Fair: thin layer.
Fa: Falkner	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
Fe: Forestdale	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
FZ:					
Frizzell	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
Guyton	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Providence	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
Go: Gallion	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
Gr: Gore	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.

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
GY:					
Guyton	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Ouachita	Severe: flooding, percs slowly.	Severe: flooding.	Severe: flooding, seepage.	Severe: flooding.	Fair: too clayey.
He: Hebert	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
Hh: Hebert	Severe: wetness, percs slowly, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Fair: too clayey, wetness.
Hn: Hebert	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
Hs:					
Hebert	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
Sterlington	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Good.
IB: Iuka	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
LA:					
Larue	Severe: poor filter.	Severe: seepage, slope.	Moderate: slope.	Severe: seepage.	Fair: slope.
Smithdale	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
OC:					
Olla	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: hard to pack, slope.
Cadeville	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Pe, Pf: Perry	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Pg: Perry	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, 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
Pk:					
Perry	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Hebert	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
Pm, Pn Portland	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Po Providence	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
Rg Rilla	Moderate: wetness, percs slowly.	Moderate: seepage.	Severe: wetness.	Moderate: wetness.	Poor: thin layer.
Rk:					
Rilla	Moderate: wetness, percs slowly.	Moderate: seepage.	Severe: wetness.	Moderate: wetness.	Poor: thin layer.
Hebert	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
Ru Ruston	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
SC Sacul	Severe: percs slowly, wetness.	Severe: wetness.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
SH:					
Savannah	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
Sacul	Severe: percs slowly, wetness.	Severe: wetness.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
St Sterlington	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Good.
Tp Tippah	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
YO Yorktown	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.

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
Ar: Alligator	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
At. Arents				
Bb: Bayoudan	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Bc: Bayoudan	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
BR:				
Brimstone	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Prentiss	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Ch: Cahaba	Good	Probable	Improbable: too sandy.	Fair: too clayey.
Fa: Falkner	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Fe: Forestdale	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
FZ:				
Frizzell	Fair: thin layer, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Guyton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Providence	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Go: Gallion	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Gr: Gore	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
GY:				
Guyton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Ouachita	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
He, Hh: Hebert	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Hn: Hebert	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Hs:				
Hebert	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Sterlington	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
IB: Iuka	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
LA:				
Larue	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, slope.
Smithdale	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
OC:				
Olla	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Cadeville	Poor: low strength, shrink-swell, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
Pe: Perry	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Pf, Pg: Perry	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
Pk:				
Perry	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
Hebert	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Pm, Pn: Portland	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
Po: Providence	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
Rg: Rilla	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
Rk:				
Rilla	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
Hebert	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Ru: Ruston	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
SC: Sacul	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
SH:				
Savannah	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
Sacul	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
St: Sterlington	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
Tp: Tippah	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.
YO: Yorktown	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.

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	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions
Ar----------------- Alligator	Slight----------	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly, flooding.	Wetness, slow intake.	Wetness, percs slowly.
At. Arents						
Bb----------------- Bayoudan	Moderate: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slow intake, percs slowly, slope.	Percs slowly.
Bc----------------- Bayoudan	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slow intake, percs slowly, slope.	Slope, percs slowly.
BR: Brimstone---------	Slight----------	Severe: wetness.	Severe: no water.	Percs slowly---	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.
Prentiss----------	Moderate: seepage.	Severe: piping.	Severe: no water.	Favorable------	Wetness, droughty, rooting depth.	Wetness, rooting depth.
Ch----------------- Cahaba	Severe: seepage.	Moderate: thin layer, piping.	Severe: no water.	Deep to water	Favorable------	Favorable.
Fa----------------- Falkner	Slight----------	Severe: hard to pack.	Severe: no water.	Percs slowly---	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.
Fe----------------- Forestdale	Slight----------	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, flooding.	Wetness, percs slowly.	Erodes easily, wetness.
FZ: Frizzell----------	Moderate: seepage.	Severe: piping, wetness.	Severe: slow refill.	Percs slowly---	Wetness, percs slowly, erodes easily.	Erodes easily, wetness.
Guyton------------	Moderate: seepage.	Severe: piping, wetness.	Severe: no water.	Percs slowly---	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.
Providence--------	Moderate: seepage.	Moderate: thin layer, piping, wetness.	Severe: no water.	Favorable------	Wetness, rooting depth.	Erodes easily, wetness, rooting depth.
Go----------------- Gallion	Moderate: seepage.	Moderate: thin layer, piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
Gr----------------- Gore	Moderate: slope.	Moderate: thin layer, hard to pack.	Severe: no water.	Deep to water	Percs slowly, slope.	Erodes easily, percs slowly.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions
GY:						
Guyton	Moderate: seepage.	Severe: piping, wetness.	Severe: no water.	Percs slowly, flooding.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.
Ouachita	Slight	Severe: piping.	Severe: no water.	Deep to water	Erodes easily, flooding.	Erodes easily.
He Hebert	Moderate: seepage.	Severe: thin layer, wetness.	Severe: slow refill.	Favorable	Wetness, erodes easily.	Erodes easily, wetness.
Hh Hebert	Moderate: seepage.	Severe: thin layer, wetness.	Severe: slow refill.	Flooding	Wetness, flooding, erodes easily.	Erodes easily, wetness.
Hn Hebert	Moderate: seepage.	Severe: thin layer, wetness.	Severe: slow refill.	Favorable	Wetness, erodes easily.	Erodes easily, wetness.
Hs:						
Hebert	Moderate: seepage.	Severe: thin layer, wetness.	Severe: slow refill.	Favorable	Wetness, erodes easily.	Erodes easily, wetness.
Sterlington	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
IB Iuka	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding	Wetness, flooding.	Wetness.
LA:						
Larue	Severe: seepage, slope.	Severe: thin layer.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Slope, soil blowing.
Smithdale	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope.
OC:						
Olla	Severe: slope.	Severe: piping, hard to pack.	Severe: no water.	Deep to water	Slope, droughty, rooting depth.	Slope, erodes easily.
Cadeville	Severe: slope.	Moderate: piping, hard to pack.	Severe: no water.	Deep to water	Percs slowly, slope.	Slope, percs slowly.
Pe Perry	Slight	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly	Wetness, percs slowly.	Wetness, percs slowly.
Pf Perry	Slight	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly	Wetness, slow intake, percs slowly.	Wetness, percs slowly.
Pg Perry	Slight	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly, flooding.	Wetness, slow intake, percs slowly.	Wetness, percs slowly.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions
Pk:						
Perry	Slight	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly	Wetness, slow intake, percs slowly.	Wetness, percs slowly.
Hebert	Moderate: seepage.	Severe: thin layer, wetness.	Severe: slow refill.	Favorable	Wetness, erodes easily.	Erodes easily, wetness.
Pm Portland	Slight	Severe: hard to pack, wetness.	Severe: no water.	Percs slowly	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.
Pn Portland	Slight	Severe: hard to pack, wetness.	Severe: no water.	Percs slowly	Wetness, slow intake, percs slowly.	Wetness, percs slowly.
Po Providence	Moderate: seepage, slope.	Moderate: thin layer, piping, wetness.	Severe: no water.	Slope	Slope, wetness, rooting depth.	Erodes easily, wetness, rooting depth.
Rg Rilla	Moderate: seepage.	Severe: thin layer.	Moderate: deep to water, slow refill.	Deep to water	Erodes easily	Erodes easily.
Rk:						
Rilla	Moderate: seepage.	Severe: thin layer.	Moderate: deep to water, slow refill.	Deep to water	Erodes easily	Erodes easily.
Hebert	Moderate: seepage.	Severe: thin layer, wetness.	Severe: slow refill.	Favorable	Wetness, erodes easily.	Erodes easily, wetness.
Ru Ruston	Moderate: seepage, slope.	Severe: thin layer.	Severe: no water.	Deep to water	Slope	Favorable.
SC Sacul	Slight	Severe: hard to pack.	Moderate: deep to water.	Deep to water	Slope, percs slowly, wetness.	Percs slowly, wetness.
SH:						
Savannah	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Slope	Slope, wetness, droughty, rooting depth.	Wetness, rooting depth.
Sacul	Slight	Severe: hard to pack.	Moderate: deep to water.	Deep to water	Slope, percs slowly, wetness.	Percs slowly, wetness.
St Sterlington	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
Tp Tippah	Moderate: seepage, slope.	Moderate: hard to pack, wetness.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, slope.	Erodes easily, wetness.
YO Yorktown	Slight	Severe: hard to pack, ponding.	Severe: slow refill.	Ponding, percs slowly, flooding.	Ponding, slow intake, percs slowly.	Ponding, percs slowly.

TABLE 15.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated. Some soils may have Unified classifications and USDA textures in addition to those shown. In general, the dominant classifications and textures are shown]

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
Ar---------------- Alligator	0-4	Clay-------------	CH	A-7	0	100	100	95-100	95-100	52-75	30-50
	4-40	Silty clay, clay	CH	A-7	0	100	100	100	95-100	62-94	33-64
	40-60	Silty clay loam, silty clay, clay.	CH	A-7	0	100	100	100	95-100	62-94	33-64
At. Arents											
Bb---------------- Bayoudan	0-2	Clay-------------	CL, CH	A-7	0	100	100	95-100	85-100	40-90	25-55
	2-48	Clay-------------	CH	A-7-6	0	100	100	95-100	90-100	75-90	48-60
	48-72	Clay-------------	CH	A-7-6	0	100	100	95-100	90-100	75-90	48-60
Bc---------------- Bayoudan	0-5	Clay-------------	CL, CH	A-7	0	100	100	95-100	85-100	40-90	25-55
	5-25	Clay-------------	CH	A-7-6	0	100	100	95-100	90-100	75-90	48-60
	25-72	Clay-------------	CH	A-7-6	0	100	100	95-100	90-100	75-90	48-60
BR: Brimstone-------	0-21	Very fine sandy loam.	CL-ML, CL	A-4, A-6	0	100	100	90-100	70-90	15-38	6-17
	21-45	Silt loam, silty clay loam.	CL	A-6, A-7-6	0	100	100	95-100	80-95	26-48	11-33
	45-85	Silty clay loam, silt loam, fine sandy loam.	CL	A-6, A-7-6	0	100	100	95-100	80-95	26-48	11-33
Prentiss--------	0-5	Fine sandy loam.	SC, SM-SC, SM	A-4	0	100	100	65-85	36-50	<30	NP-10
	5-84	Loam, fine sandy loam, very fine sandy loam.	CL-ML, CL, SC, SM-SC	A-6, A-4	0	100	100	70-100	40-75	20-35	4-12
Ch---------------- Cahaba	0-6	Fine sandy loam.	SM	A-4, A-2-4	0	95-100	95-100	65-90	30-45	---	NP
	6-44	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
	44-62	Sand, loamy sand, fine sandy loam.	SM, SP-SM	A-2-4	0	95-100	90-100	60-85	10-35	---	NP
Fa---------------- Falkner	0-5	Silt loam--------	CL-ML, CL	A-4	0	100	100	95-100	90-100	20-30	5-10
	5-22	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	95-100	85-95	30-45	15-30
	22-63	Silty clay, clay.	CH	A-7	0	100	100	90-100	85-95	51-75	30-50
Fe---------------- Forestdale	0-4	Silty clay loam.	CL, CH	A-6, A-7	0	100	100	95-100	90-100	30-58	12-30
	4-22	Silty clay, clay, silty clay loam.	CH, CL	A-7	0	100	100	95-100	90-100	40-65	20-40
	22-87	Silty clay loam, clay loam, sandy clay loam.	CL, CL-ML	A-6, A-7, A-4	0	100	100	95-100	75-100	20-50	5-30

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

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	
FZ:											
Frizzell	0-4	Silt loam	CL-ML, ML, CL	A-4	0	100	100	90-100	65-90	<30	NP-10
	4-35	Silt loam, loam.	CL	A-6	0	100	100	90-100	70-95	31-40	11-19
	35-72	Silt loam, silty clay loam, clay loam, loam.	CL	A-6, A-4	0	100	100	90-100	65-95	28-40	8-19
Guyton	0-4	Silt loam	ML, CL-ML	A-4	0	100	100	95-100	65-90	<27	NP-7
	4-28	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
	28-60	Silt loam, silty clay loam.	CL, CL-ML, ML	A-6, A-4	0	100	100	95-100	50-95	<40	NP-18
Providence	0-5	Silt loam	ML, CL, CL-ML	A-4	0	100	100	100	85-100	<30	NP-10
	5-34	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	85-100	30-45	11-20
	34-54	Silt loam, silty clay loam.	CL	A-6	0	100	100	90-100	70-90	25-40	11-20
	54-60	Loam, clay loam, sandy clay loam, silt loam.	CL, SC	A-6, A-4	0	100	95-100	70-95	40-80	20-35	8-18
Go: Gallion	0-9	Silt loam	ML, CL-ML, CL	A-4, A-6	0	100	100	100	90-100	<28	NP-11
	9-46	Silt loam, silty clay loam, very fine sandy loam.	CL	A-6	0	100	100	100	90-100	28-40	11-17
	46-64	Stratified silty clay loam to very fine sandy loam.	CL, CL-ML	A-6, A-4	0	100	100	100	90-100	23-34	4-12
Gr: Gore	0-6	Silt loam	ML, CL-ML	A-4	0	100	100	95-100	60-90	<27	NP-7
	6-71	Clay, silty clay	CH	A-7-6	0	100	100	95-100	85-100	53-65	28-40
GY:											
Guyton	0-24	Silt loam	ML, CL-ML	A-4	0	100	100	95-100	65-90	<27	NP-7
	24-46	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
	46-62	Silt loam, silty clay loam.	CL, CL-ML,	A-6, A-4	0	100	100	95-100	50-95	<40	NP-18
Ouachita	0-7	Silt loam	ML, CL-ML, CL	A-4, A-6	0	100	100	85-100	75-95	<30	NP-12
	7-65	Silt loam, loam, silty clay loam.	ML, CL-ML, CL	A-4, A-6	0	100	100	85-100	80-100	25-40	5-20
	65-72	Fine sandy loam, loamy fine sand, silty clay loam.	SM, ML, CL-ML, SM-SC	A-4, A-2	0	100	100	50-95	20-75	<30	NP-5
He: Hebert	0-13	Silt loam	ML, CL-ML	A-4	0	100	100	100	75-100	<27	NP-7
	13-54	Clay loam, silt loam, silty clay loam.	CL	A-6, A-7-6	0	100	100	100	85-100	31-45	11-22
	54-72	Stratified very fine sandy loam to silty clay loam.	ML, CL-ML, CL	A-4, A-6	0	100	100	90-100	60-100	22-40	3-18

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	
Hh------------- Hebert	0-5	Silt loam--------	ML, CL-ML	A-4	0	100	100	100	65-100	<27	NP-7
	5-38	Loam, silt loam, silty clay loam.	CL	A-6, A-7-6	0	100	100	100	85-100	31-45	11-22
	38-60	Stratified very fine sandy loam to silty clay loam.	ML, CL-ML, CL	A-4, A-6	0	100	100	90-100	60-100	22-40	3-18
Hn------------- Hebert	0-5	Silty clay loam.	CL	A-6	0	100	100	100	80-100	31-40	11-18
	5-47	Loam, silt loam, silty clay loam.	CL	A-6, A-7-6	0	100	100	100	85-100	31-45	11-22
	47-71	Stratified very fine sandy loam to silty clay loam.	ML, CL-ML, CL	A-4, A-6	0	100	100	90-100	60-100	22-40	3-18
Hs:											
Hebert----------	0-8	Silt loam--------	ML, CL-ML	A-4	0	100	100	100	75-100	<27	NP-7
	8-42	Loam, silt loam, silty clay loam.	CL	A-6, A-7-6	0	100	100	100	85-100	31-45	11-22
	42-60	Stratified very fine sandy loam to silty clay loam.	ML, CL-ML, CL	A-4, A-6	0	100	100	90-100	60-100	22-40	3-18
Sterlington-----	0-15	Silt loam--------	ML	A-4	0	100	100	90-100	60-95	<23	NP-3
	15-54	Silt loam, very fine sandy loam, loam.	CL-ML, ML	A-4	0	100	100	90-100	80-95	<28	NP-7
	54-60	Very fine sandy loam, silt loam, loam.	ML, CL-ML	A-4	0	100	100	90-100	80-95	<28	NP-7
IB------------- Iuka	0-10	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
	10-29	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
	29-60	Sandy loam, fine sandy loam, loam.	SM, ML	A-2, A-4	0	95-100	90-100	70-100	25-60	<30	NP-7
LA:											
Larue-----------	0-29	Loamy fine sand.	SM	A-2-4	0	100	98-100	50-75	15-30	---	NP
	29-40	Sandy clay loam, clay loam, 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
	40-72	Sandy clay loam, loam, clay loam.	SM, SM-SC, SC	A-2-4, A-4	0	100	95-100	60-70	30-40	20-30	3-10
Smithdale-------	0-14	Fine sandy loam.	SM, SM-SC	A-4, A-2	0	100	85-100	60-95	28-49	<20	NP-5
	14-59	Clay loam, sandy clay loam, loam.	SM-SC, SC, CL, CL-ML	A-6, A-4	0	100	85-100	80-96	45-75	23-38	7-16
	59-95	Loam, sandy loam.	SM, ML, CL, SC	A-4	0	100	85-100	65-95	36-70	<30	NP-10

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	
OC:											
Olla------------	0-6	Fine sandy loam.	SM, ML, SM-SC	A-4, A-2	0	95-100	85-100	60-85	40-60	<20	NP-5
	6-24	Sandy clay loam, clay loam, loam.	SC, CL, CH	A-6, A-7, A-2	0	95-100	85-100	75-90	45-75	22-53	7-35
	24-64	Fine sandy loam, sandy loam, loam.	SM, ML, CL, SC	A-4, A-7, A-6	0	95-100	85-100	60-90	36-70	<30	NP-10
	64-72	Variable---------	---	---	---	---	---	---	---	---	---
Cadeville-------	0-3	Very fine sandy loam.	SM, CL-ML, ML, SM-SC	A-4	0	100	100	70-85	40-55	<28	NP-7
	3-18	Silty clay, clay.	CH, CL	A-7-6	0	100	100	95-100	80-95	41-60	22-35
	18-60	Clay, silty clay, silty clay loam.	CH, CL	A-7-6, A-6	0	100	100	95-100	75-95	30-55	12-30
Pe--------------- Perry	0-6	Silty clay loam.	CL, CH	A-7-6	0	100	100	100	95-100	42-65	22-40
	6-28	Clay-------------	CH	A-7-6	0	100	100	100	95-100	60-80	33-50
	28-60	Clay-------------	CH, CL	A-7-6	0	90-100	85-100	75-100	70-100	45-80	22-50
Pf--------------- Perry	0-4	Clay-------------	CH, CL	A-7-6	0	100	100	100	95-100	45-75	22-45
	4-25	Clay-------------	CH	A-7-6	0	100	100	100	95-100	60-80	33-50
	25-64	Clay-------------	CH, CL	A-7-6	0	90-100	85-100	75-100	70-100	45-80	22-50
Pg--------------- Perry	0-5	Clay-------------	CH, CL	A-7-6	0	100	100	100	95-100	45-75	22-45
	5-19	Clay-------------	CH	A-7-6	0	100	100	100	95-100	60-80	33-50
	19-60	Clay-------------	CH, CL	A-7-6	0	90-100	85-100	75-100	70-100	45-80	22-50
Pk:											
Perry-----------	0-5	Clay-------------	CH, CL	A-7-6	0	100	100	100	95-100	45-75	22-45
	5-31	Clay-------------	CH	A-7-6	0	100	100	100	95-100	60-80	33-50
	31-60	Clay-------------	CH, CL	A-7-6	0	90-100	85-100	75-100	70-100	45-80	22-50
Hebert----------	0-6	Silt loam--------	ML, CL-ML	A-4	0	100	100	100	75-100	<27	NP-7
	6-42	Loam, silt loam, silty clay loam.	CL	A-6, A-7-6	0	100	100	100	85-100	31-45	11-22
	42-64	Stratified very fine sandy loam to silty clay loam.	ML, CL-ML, CL	A-4, A-6	0	100	100	90-100	60-100	22-40	3-18
Pm--------------- Portland	0-8	Silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	100	100	95-100	95-100	20-35	2-15
	8-20	Clay, silty clay.	CH	A-7	0	100	100	95-100	95-100	60-90	40-60
	20-35	Clay, silty clay.	CH	A-7	0	100	98-100	95-100	95-100	60-90	40-60
	35-60	Stratified very fine sandy loam to clay.	CH, CL	A-7, A-6	0	100	98-100	95-100	85-100	35-90	20-55
Pn--------------- Portland	0-5	Clay-------------	CH	A-7	0	100	100	95-100	95-100	55-80	35-55
	5-14	Clay, silty clay.	CH	A-7	0	100	100	95-100	95-100	60-90	40-60
	14-52	Clay, silty clay.	CH	A-7	0	100	98-100	95-100	95-100	60-90	40-60
	52-72	Stratified very fine sandy loam to clay.	CH, CL	A-7, A-6	0	100	98-100	95-100	85-100	35-90	20-55

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

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	
Po------------- Providence	0-6	Silt loam--------	ML, CL, CL-ML	A-4	0	100	100	100	85-100	<30	NP-10
	6-24	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	85-100	30-45	11-20
	24-54	Silt loam, silty clay loam, clay loam.	CL	A-6	0	100	100	90-100	70-90	25-40	11-20
	54-72	Loam, clay loam, sandy clay loam.	CL, SC	A-6, A-4	0	100	95-100	70-95	40-80	20-35	8-18
Rg------------- Rilla	0-10	Silt loam--------	ML, CL-ML, CL	A-4	0	100	100	100	90-100	<31	NP-10
	10-29	Silty clay loam, clay loam, silt loam.	CL	A-6, A-4	0	100	100	100	90-100	28-40	8-17
	29-68	Loam, silty clay loam, silt loam.	CL-ML, CL	A-4, A-6, A-7-6	0	100	100	100	75-100	23-45	4-21
Rk:											
Rilla-----------	0-12	Silt loam--------	ML, CL-ML, CL	A-4	0	100	100	100	90-100	<31	NP-10
	12-45	Silty clay loam, clay loam, silt loam.	CL	A-6, A-4	0	100	100	100	90-100	28-40	8-17
	45-60	Loam, silty clay loam, clay loam.	CL-ML, CL	A-4, A-6, A-7-6	0	100	100	100	75-100	23-45	4-21
Hebert----------	0-14	Silt loam--------	ML, CL-ML	A-4	0	100	100	100	75-100	<27	NP-7
	14-45	Loam, silt loam, silty clay loam.	CL	A-6, A-7-6	0	100	100	100	85-100	31-45	11-22
	45-72	Stratified very fine sandy loam to silty clay loam.	ML, CL-ML, CL	A-4, A-6	0	100	100	90-100	60-100	22-40	3-18
Ru------------- Ruston	0-8	Fine sandy loam.	SM, ML	A-4, A-2-4	0	85-100	78-100	65-100	30-75	<20	NP-3
	8-49	Sandy clay loam, loam, clay loam.	SC, CL	A-6	0	85-100	78-100	70-100	36-75	30-40	11-20
	49-68	Fine sandy loam, sandy loam, loamy sand.	SM, ML, CL-ML, SM-SC	A-4, A-2-4	0	85-100	78-100	65-100	30-75	<27	NP-7
	68-84	Sandy clay loam, loam, clay loam.	SC, CL	A-6	0	85-100	78-100	70-100	36-75	30-42	11-20
SC------------- Sacul	0-6	Fine sandy loam.	SM, ML	A-4	0	95-100	90-100	80-100	40-65	<20	NP-3
	6-25	Clay, silty clay.	CH, CL	A-7	0	95-100	90-100	85-95	80-90	45-70	20-40
	25-60	Silt loam, clay loam, sandy clay loam.	CL, CH, SC	A-6, A-7, A-4	0	95-100	90-100	85-100	40-90	25-55	8-32
SH:											
Savannah--------	0-9	Fine sandy loam.	SM, ML	A-2-4, A-4	0	98-100	90-100	60-100	30-65	<25	NP-4
	9-29	Sandy clay loam, clay loam, loam.	CL, SC, CL-ML	A-4, A-6	0	98-100	90-100	80-100	40-80	23-40	7-19
	29-72	Loam, clay loam, sandy clay loam.	CL, SC, CL-ML	A-4, A-6, A-7	0	94-100	90-100	60-100	30-80	23-43	7-19
Sacul-----------	0-9	Fine sandy loam.	SM, ML	A-4	0	95-100	90-100	80-100	40-65	<20	NP-3
	9-26	Clay, silty clay.	CH, CL	A-7	0	95-100	90-100	85-95	80-90	45-70	20-40
	26-64	Silt loam, clay loam, sandy clay loam.	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	
St---------------- Sterlington	0-10	Silt loam--------	ML	A-4	0	100	100	90-100	60-95	<23	NP-3
	10-53	Silt loam, very fine sandy loam, loam.	CL-ML, ML	A-4	0	100	100	90-100	80-95	<28	NP-7
	53-80	Very fine sandy loam, silt loam, loam.	ML, CL-ML	A-4	0	100	100	90-100	80-95	<28	NP-7
Tp---------------- Tippah	0-5	Silt loam--------	CL, CL-ML	A-4	0	100	100	90-100	70-90	20-30	4-10
	5-34	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	98-100	90-100	85-95	30-45	11-22
	34-60	Silty clay, clay.	CH	A-7	0	100	99-100	80-100	60-95	50-65	25-40
YO---------------- Yorktown	0-10	Clay-------------	MH, CH, OH	A-7	0	100	100	100	95-100	55-75	24-45
	10-59	Clay-------------	CH	A-7	0	100	100	100	95-100	60-80	32-50
	59-72	Clay-------------	CH	A-7	0	100	100	95-100	90-100	60-80	32-50

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
Ar: Alligator	0-4	40-60	1.20-1.50	<0.06	0.18-0.20	4.5-5.5	High	0.32	5	1-4
	4-40	60-85	1.20-1.55	<0.06	0.14-0.18	4.5-5.5	Very high	0.24		
	40-60	35-85	1.20-1.55	<0.06	0.14-0.18	4.5-7.3	Very high	0.24		
At. Arents										
Bb: Bayoudan	0-2	40-80	1.20-1.40	<0.06	0.12-0.18	4.5-6.5	High	0.32	5	.5-8
	2-48	60-90	1.15-1.35	<0.06	0.12-0.18	3.6-5.5	Very high	0.32		
	48-72	60-90	1.15-1.35	<0.06	0.12-0.18	3.6-8.4	Very high	0.32		
Bc: Bayoudan	0-5	40-80	1.20-1.40	<0.06	0.12-0.18	4.5-6.5	High	0.32	5	.5-8
	5-25	60-90	1.15-1.35	<0.06	0.12-0.18	3.6-5.5	Very high	0.32		
	25-72	60-90	1.15-1.35	<0.06	0.12-0.18	3.6-8.4	Very high	0.32		
BR:										
Brimstone	0-21	5-14	1.35-1.65	0.6-2.0	0.13-0.20	4.5-9.0	Low	0.49	3	.5-2
	21-45	17-32	1.35-1.70	0.06-0.2	0.10-0.16	6.6-9.0	Moderate	0.43		
	45-85	20-35	1.35-1.70	0.06-0.2	0.10-0.16	6.6-9.0	Moderate	0.43		
Prentiss	0-5	5-18	1.50-1.60	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.28	3	1-3
	5-84	10-20	1.65-1.75	0.2-0.6	0.06-0.09	4.5-5.5	Low	0.24		
Ch: Cahaba	0-6	7-17	1.35-1.60	2.0-6.0	0.10-0.14	4.5-6.0	Low	0.24	5	.5-2
	6-44	18-35	1.35-1.60	0.6-2.0	0.12-0.20	4.5-6.0	Low	0.28		
	44-62	4-20	1.40-1.70	2.0-20	0.05-0.10	4.5-6.0	Low	0.24		
Fa: Falkner	0-5	5-18	1.40-1.55	0.2-0.6	0.20-0.22	3.6-6.0	Low	0.49	4	.5-4
	5-22	20-35	1.35-1.55	0.2-0.6	0.19-0.22	3.6-6.0	Moderate	0.43		
	22-63	38-60	1.40-1.50	0.06-0.2	0.16-0.18	3.6-6.0	High	0.24		
Fe: Forestdale	0-4	27-38	1.35-1.60	0.2-0.6	0.20-0.22	4.5-6.0	Moderate	0.37	5	.5-6
	4-22	35-60	1.20-1.60	<0.06	0.14-0.18	4.5-6.0	High	0.28		
	22-87	10-35	1.35-1.65	0.2-0.6	0.17-0.22	4.5-7.8	Moderate	0.37		
FZ:										
Frizzell	0-4	8-18	1.35-1.65	0.6-2.0	0.15-0.22	4.5-5.5	Low	0.49	5	.5-2
	4-35	14-27	1.35-1.65	0.06-0.2	0.15-0.20	4.5-5.5	Low	0.43		
	35-72	14-30	1.35-1.65	0.06-0.6	0.15-0.20	4.5-5.5	Low	0.43		
Guyton	0-4	7-25	1.35-1.65	0.6-2.0	0.20-0.23	3.6-6.0	Low	0.43	5	.5-5
	4-28	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-6.5	Low	0.37		
	28-60	20-35	1.35-1.70	0.06-2.0	0.15-0.22	3.6-6.0	Low	0.37		
Providence	0-5	5-12	1.30-1.40	0.6-2.0	0.20-0.22	4.5-6.0	Low	0.49	3	.5-5
	5-34	18-30	1.40-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low	0.43		
	34-54	20-30	1.40-1.75	0.2-0.6	0.08-0.10	4.5-6.0	Low	0.32		
	54-60	12-30	1.40-1.75	0.2-0.6	0.08-0.10	4.5-6.0	Low	0.32		
Go: Gallion	0-9	14-27	1.35-1.65	0.6-2.0	0.21-0.23	5.6-7.3	Low	0.43	5	.5-4
	9-46	14-35	1.35-1.70	0.6-2.0	0.20-0.22	5.6-8.4	Moderate	0.32		
	46-64	14-35	1.35-1.70	0.6-2.0	0.20-0.23	5.6-8.4	Low	0.37		
Gr: Gore	0-6	5-15	1.30-1.50	0.6-2.0	0.20-0.22	3.6-6.0	Low	0.49	5	.5-4
	6-71	40-60	1.20-1.65	<0.06	0.14-0.18	3.6-7.3	High	0.32		

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
GY:										
Guyton----------	0-24	7-25	1.35-1.65	0.6-2.0	0.20-0.23	3.6-6.0	Low----------	0.43	5	.5-5
	24-46	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-6.0	Low----------	0.37		
	46-62	20-35	1.35-1.70	0.06-2.0	0.15-0.22	3.6-6.0	Low----------	0.37		
Ouachita--------	0-7	8-25	1.25-1.60	0.6-2.0	0.15-0.24	4.5-5.5	Low----------	0.43	5	.5-2
	7-65	8-25	1.25-1.60	0.2-0.6	0.15-0.24	4.5-5.5	Low----------	0.32		
	65-72	18-35	1.25-1.65	0.6-6.0	0.07-0.24	4.5-5.5	Low----------	0.24		
He--------------- Hebert	0-13	10-27	1.30-1.65	0.6-2.0	0.21-0.23	3.6-7.3	Low----------	0.43	5	.5-4
	13-54	14-35	1.30-1.70	0.2-0.6	0.18-0.22	4.5-6.5	Moderate-----	0.32		
	54-72	10-35	1.30-1.70	0.6-2.0	0.18-0.22	5.1-7.8	Low----------	0.37		
Hh--------------- Hebert	0-5	10-27	1.30-1.65	0.6-2.0	0.21-0.23	3.6-7.3	Low----------	0.43	5	.5-4
	5-38	14-35	1.30-1.65	0.2-0.6	0.18-0.22	4.5-6.5	Moderate-----	0.32		
	38-60	10-35	1.30-1.65	0.6-2.0	0.18-0.22	5.1-7.8	Low----------	0.37		
Hn--------------- Hebert	0-5	27-35	1.40-1.70	0.2-0.6	0.20-0.22	3.6-7.3	Moderate-----	0.37	5	.5-4
	5-47	14-35	1.30-1.70	0.2-0.6	0.18-0.22	4.5-6.5	Moderate-----	0.32		
	47-71	10-35	1.30-1.70	0.6-2.0	0.18-0.22	5.1-7.8	Low----------	0.37		
Hs:										
Hebert----------	0-8	10-27	1.30-1.65	0.6-2.0	0.21-0.23	3.6-7.3	Low----------	0.43	5	.5-4
	8-42	14-35	1.30-1.70	0.2-0.6	0.18-0.22	4.5-6.5	Moderate-----	0.32		
	42-60	10-35	1.30-1.70	0.6-2.0	0.18-0.22	5.1-7.8	Low----------	0.37		
Sterlington-----	0-15	10-18	1.30-1.65	0.6-2.0	0.18-0.22	4.5-6.0	Low----------	0.43	5	.5-4
	15-54	10-18	1.30-1.70	0.6-2.0	0.18-0.22	4.5-6.5	Low----------	0.37		
	54-60	10-22	1.30-1.70	0.6-2.0	0.18-0.22	5.1-8.4	Low----------	0.37		
IB--------------- Iuka	0-10	6-15	1.35-1.65	2.0-6.0	0.10-0.15	4.5-6.0	Low----------	0.24	5	.5-2
	10-29	8-18	1.35-1.65	0.6-2.0	0.10-0.20	4.5-6.0	Low----------	0.28		
	29-60	5-15	1.35-1.65	0.6-2.0	0.10-0.20	4.5-6.0	Low----------	0.20		
LA:										
Larue-----------	0-29	3-15	1.30-1.50	6.0-20	0.05-0.10	5.1-6.5	Low----------	0.17	5	.5-2
	29-40	20-30	1.40-1.60	0.6-2.0	0.10-0.15	5.1-6.5	Low----------	0.24		
	40-72	15-30	1.40-1.60	0.6-2.0	0.10-0.15	5.1-6.5	Low----------	0.24		
Smithdale-------	0-14	2-15	1.40-1.50	2.0-6.0	0.14-0.16	4.5-5.5	Low----------	0.28	5	.5-2
	14-59	18-33	1.40-1.55	0.6-2.0	0.15-0.17	4.5-5.5	Low----------	0.24		
	59-95	12-27	1.40-1.55	2.0-6.0	0.14-0.16	4.5-5.5	Low----------	0.28		
OC:										
Olla------------	0-6	10-20	1.30-1.65	0.6-2.0	0.08-0.13	3.6-6.0	Low----------	0.37	5	.5-2
	6-24	18-35	1.35-1.75	0.6-2.0	0.10-0.16	3.6-5.5	Moderate-----	0.32		
	24-64	10-27	1.30-1.70	0.6-2.0	0.06-0.16	3.6-5.5	Low----------	0.37		
	64-72	8-60	1.30-1.70	0.6-2.0	0.06-0.16	3.6-5.5	Low----------	0.37		
Cadeville-------	0-3	5-20	1.35-1.70	2.0-6.0	0.11-0.15	3.6-6.0	Low----------	0.43	5	.5-5
	3-18	39-60	1.20-1.45	<0.06	0.18-0.20	3.6-5.5	High---------	0.32		
	18-60	30-60	1.20-1.65	0.06-0.2	0.18-0.20	3.6-5.5	High---------	0.32		
Pe--------------- Perry	0-6	27-40	1.35-1.70	0.06-0.2	0.18-0.22	4.5-6.0	High---------	0.37	5	.5-4
	6-28	55-85	1.17-1.50	<0.06	0.17-0.20	5.1-7.3	Very high----	0.28		
	28-60	55-85	1.17-1.50	<0.06	0.17-0.20	6.1-8.4	Very high----	0.28		
Pf--------------- Perry	0-4	40-80	1.20-1.60	<0.06	0.17-0.20	4.5-6.0	High---------	0.32	5	.5-4
	4-25	55-85	1.17-1.50	<0.06	0.17-0.20	5.1-7.3	Very high----	0.28		
	25-64	55-85	1.17-1.50	<0.06	0.17-0.20	6.1-8.4	Very high----	0.28		

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
Pg---------------- Perry	0-5	40-80	1.20-1.60	<0.06	0.17-0.20	4.5-6.0	High---------	0.32	5	.5-4
	5-19	55-85	1.17-1.50	<0.06	0.17-0.20	5.1-7.3	Very high----	0.28		
	19-60	55-85	1.17-1.50	<0.06	0.17-0.20	6.1-8.4	Very high----	0.28		
Pk:										
Perry-----------	0-5	40-80	1.20-1.60	<0.06	0.17-0.20	4.5-6.0	High---------	0.32	5	.5-4
	5-31	55-85	1.17-1.50	<0.06	0.17-0.20	5.1-7.3	Very high----	0.28		
	31-60	55-85	1.17-1.50	<0.06	0.17-0.20	6.1-8.4	Very high----	0.28		
Hebert----------	0-6	10-27	1.30-1.65	0.6-2.0	0.21-0.23	3.6-7.3	Low----------	0.43	5	.5-4
	6-42	14-35	1.30-1.70	0.2-0.6	0.18-0.22	4.5-6.5	Moderate-----	0.32		
	42-64	10-35	1.30-1.70	0.6-2.0	0.18-0.22	5.1-7.8	Low----------	0.37		
Pm---------------- Portland	0-8	27-35	1.25-1.55	0.2-2.0	0.16-0.24	4.5-7.3	Low----------	0.43	5	1-4
	8-20	60-85	1.15-1.45	<0.06	0.12-0.18	4.5-7.3	High---------	0.32		
	20-35	60-85	1.15-1.45	<0.06	0.12-0.18	6.1-8.4	High---------	0.32		
	35-60	15-60	1.15-1.55	<0.06	0.12-0.22	6.1-8.4	High---------	0.32		
Pn---------------- Portland	0-5	40-60	1.15-1.50	<0.06	0.12-0.18	4.5-7.3	High---------	0.32	5	.5-4
	5-14	60-85	1.15-1.45	<0.06	0.12-0.18	4.5-7.3	High---------	0.32		
	14-52	60-85	1.15-1.45	<0.06	0.12-0.18	6.1-8.4	High---------	0.32		
	52-72	15-60	1.15-1.55	<0.06	0.12-0.22	6.1-8.4	High---------	0.32		
Po---------------- Providence	0-6	5-12	1.30-1.40	0.6-2.0	0.20-0.22	4.5-6.0	Low----------	0.49	3	.5-5
	6-24	18-30	1.40-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low----------	0.43		
	24-54	20-30	1.40-1.75	0.2-0.6	0.08-0.10	4.5-6.0	Low----------	0.32		
	54-72	12-30	1.40-1.60	0.2-0.6	0.08-0.10	4.5-6.0	Low----------	0.32		
Rg---------------- Rilla	0-10	14-27	1.30-1.65	0.6-2.0	0.21-0.23	4.5-7.3	Low----------	0.43	5	.5-4
	10-29	18-35	1.30-1.65	0.6-2.0	0.20-0.22	3.6-5.5	Moderate-----	0.32		
	29-68	20-35	1.30-1.65	0.6-2.0	0.18-0.22	3.6-8.4	Low----------	0.32		
Rk:										
Rilla-----------	0-12	14-27	1.30-1.65	0.6-2.0	0.21-0.23	4.5-7.3	Low----------	0.43	5	.5-4
	12-45	18-35	1.30-1.65	0.6-2.0	0.20-0.22	3.6-5.5	Moderate-----	0.32		
	45-60	20-35	1.30-1.65	0.6-2.0	0.18-0.22	3.6-8.4	Low----------	0.32		
Hebert----------	0-14	10-27	1.30-1.65	0.6-2.0	0.21-0.23	3.6-7.3	Low----------	0.43	5	.5-4
	14-45	14-35	1.30-1.70	0.2-0.6	0.18-0.22	4.5-6.5	Moderate-----	0.32		
	45-72	10-35	1.30-1.70	0.6-2.0	0.18-0.22	5.1-7.8	Low----------	0.37		
Ru---------------- Ruston	0-8	5-20	1.30-1.70	0.6-2.0	0.09-0.16	4.5-6.5	Low----------	0.28	5	.5-2
	8-49	18-35	1.30-1.70	0.6-2.0	0.12-0.17	4.5-6.0	Low----------	0.28		
	49-68	10-20	1.30-1.70	0.6-2.0	0.12-0.15	4.5-6.0	Low----------	0.32		
	68-84	15-38	1.40-1.70	0.6-2.0	0.12-0.17	4.5-6.0	Low----------	0.28		
SC---------------- Sacul	0-6	5-25	1.30-1.50	0.6-2.0	0.10-0.20	3.6-5.5	Low----------	0.32	5	.5-5
	6-25	35-60	1.20-1.35	0.06-0.2	0.12-0.18	3.6-5.5	High---------	0.32		
	25-60	20-40	1.25-1.45	0.2-0.6	0.16-0.24	3.6-5.5	Moderate-----	0.37		
SH:										
Savannah--------	0-9	3-16	1.45-1.65	0.6-2.0	0.10-0.15	4.5-5.5	Low----------	0.24	3	.5-3
	9-29	18-32	1.55-1.75	0.6-2.0	0.13-0.20	4.5-5.5	Low----------	0.28		
	29-72	18-32	1.60-1.80	0.2-0.6	0.05-0.10	4.5-5.5	Low----------	0.24		
Sacul-----------	0-9	5-25	1.30-1.50	0.6-2.0	0.10-0.20	3.6-5.5	Low----------	0.32	5	.5-3
	9-26	35-60	1.20-1.35	0.06-0.2	0.12-0.18	3.6-5.5	High---------	0.32		
	26-64	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 K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
St----------------	0-10	10-18	1.30-1.65	0.6-2.0	0.18-0.22	4.5-6.0	Low-----------	0.43	5	.5-4
Sterlington	10-53	10-18	1.30-1.70	0.6-2.0	0.18-0.22	4.5-6.5	Low-----------	0.37		
	53-80	10-30	1.30-1.70	0.6-2.0	0.18-0.22	5.1-8.4	Low-----------	0.37		
Tp----------------	0-5	5-20	1.35-1.45	0.6-2.0	0.20-0.22	4.5-6.0	Low-----------	0.49	5	.5-3
Tippah	5-34	20-35	1.40-1.50	0.6-2.0	0.19-0.21	4.5-6.0	Moderate------	0.43		
	34-60	40-55	1.20-1.55	0.06-0.2	0.16-0.18	4.5-6.0	High----------	0.24		
YO----------------	0-10	40-65	1.15-1.45	<0.06	0.12-0.18	4.5-7.3	High----------	0.32	5	---
Yorktown	10-59	60-80	1.15-1.45	<0.06	0.12-0.18	4.5-7.3	Very high----	0.32		
	59-72	60-80	1.15-1.45	<0.06	0.12-0.18	7.4-8.4	Very high----	0.32		

TABLE 17.--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		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
Ar: Alligator	D	Frequent	Brief to very long.	Jan-Apr	0.5-2.0	Apparent	Jan-Apr
At. Arents							
Bb, Bc: Bayoudan	D	None	---	---	>6.0	---	---
BR:							
Brimstone	D	Rare	---	---	0-1.5	Perched	Dec-Apr
Prentiss	C	None	---	---	2.0-2.5	Perched	Jan-Mar
Ch: Cahaba	B	None	---	---	>6.0	---	---
Fa: Falkner	C	None	---	---	1.5-2.5	Perched	Jan-Mar
Fe: Forestdale	D	Occasional	Brief to very long.	Jan-Apr	0.5-2.0	Apparent	Jan-Apr
FZ:							
Frizzell	C	None	---	---	1.5-4.0	Apparent	Dec-Apr
Guyton	D	Rare	---	---	0-1.5	Perched	Dec-May
Providence	C	None	---	---	1.5-3.0	Perched	Jan-Mar
Go: Gallion	B	None	---	---	>6.0	---	---
Gr: Gore	D	None	---	---	>6.0	---	---
GY:							
Guyton	D	Frequent	Very brief to long.	Jan-Dec	0-1.5	Perched	Dec-May
Ouachita	C	Frequent	Very brief to long.	Jan-Dec	>6.0	---	---
He: Hebert	C	None	---	---	1.5-3.0	Apparent	Dec-Apr
Hh: Hebert	C	Occasional	Brief to very long.	Dec-Apr	1.5-3.0	Apparent	Dec-Apr
Hn: Hebert	C	None	---	---	1.5-3.0	Apparent	Dec-Apr
Hs:							
Hebert	C	Rare	---	---	1.5-3.0	Apparent	Dec-Apr
Sterlington	B	None	---	---	>6.0	---	---

TABLE 17.--WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
IE------------------------ Iuka	C	Frequent--------	Very brief to long.	Dec-Apr	1.0-3.0	Apparent	Dec-Apr
LA:							
Larue-------------------	A	None------------	---	---	>6.0	---	---
Smithdale---------------	B	None------------	---	---	>6.0	---	---
OC:							
Olla--------------------	B	None------------	---	---	>6.0	---	---
Cadeville---------------	D	None------------	---	---	>6.0	---	---
Pe, Pf------------------ Perry	D	None------------	---	---	0-2.0	Apparent	Dec-Jun
Pg---------------------- Perry	D	Occasional------	Brief to very long.	Dec-Jun	0-2.0	Apparent	Dec-Jun
Pk:							
Perry-------------------	D	Rare------------	---	---	0-2.0	Apparent	Dec-Jun
Hebert------------------	C	Rare------------	---	---	1.5-3.0	Apparent	Dec-Apr
Pm, Pn------------------ Portland	D	None------------	---	---	0-2.0	Perched	Dec-May
Po---------------------- Providence	C	None------------	---	---	1.5-3.0	Perched	Jan-Mar
Rg---------------------- Rilla	B	None------------	---	---	4.0-6.0	Apparent	Dec-Apr
Rk:							
Rilla-------------------	B	None------------	---	---	4.0-6.0	Apparent	Dec-Apr
Hebert------------------	C	None------------	---	---	1.5-3.0	Apparent	Dec-Apr
Ru---------------------- Ruston	B	None------------	---	---	>6.0	---	---
SC---------------------- Sacul	C	None------------	---	---	2.0-4.0	Apparent	Dec-Apr
SH:							
Savannah----------------	C	None------------	---	---	1.5-3.0	Perched	Jan-Mar
Sacul-------------------	C	None------------	---	---	2.0-4.0	Apparent	Dec-Apr
St---------------------- Sterlington	B	None------------	---	---	>6.0	---	---
Tp---------------------- Tippah	C	None------------	---	---	2.0-2.5	Perched	Dec-Apr
YO---------------------- Yorktown	D	Frequent--------	Very long-----	Jan-Dec	+5-0.5	Apparent	Jan-Dec

TABLE 18.--FERTILITY TEST DATA OF SELECTED SOILS

[Analyses by the Soil Fertility Laboratory, Louisiana Agricultural Experiment Station. The symbol < means less than. Dashes indicate data not available]

Soil name and sample number	Depth	Horizon	pH 1:1	Organic carbon	Extractable phosphorus	Exchangeable cations: Ca	Mg	K	Na	Al	H	Total acidity	Cation exchange capacity (sum)	Base saturation (sum)	Saturation: Aluminum: Effective cation exchange capacity	Saturation: Sodium: Sum of cation exchange capacity
	In			Pct	Ppm	Meq/100g								Pct	Pct	Pct
Alligator clay: (S84LA-21-07)	0-4	Ap	4.6	1.96	42	20.9	9.6	0.8	0.4	1.3	0.5	16.2	47.8	66.1	3.9	0.8
	4-23	Bg1	4.5	0.63	9	18.9	11.5	0.5	1.2	4.2	0.4	16.6	48.7	65.9	11.4	2.4
	23-40	Bg2	4.5	0.37	16	23.0	16.5	0.5	3.4	1.3	0.6	7.6	51.1	85.1	2.9	6.7
	40-60	Cg	6.3	0.19	41	27.7	21.4	0.7	5.6	0.0	0.0	10.1	65.4	84.6	0.0	8.6
Bayoudan clay: (S84LA-21-16)	0-2	A1	4.8	4.65	5	36.4	4.0	0.8	0.1	0.4	0.3	21.8	63.1	65.5	1.0	0.2
	2-5	A2	4.6	3.15	6	31.4	3.8	0.8	0.1	3.1	0.8	19.1	55.2	65.4	7.8	0.2
	5-10	Bw1	4.4	1.61	5	31.4	3.5	0.9	0.1	9.2	0.5	23.6	59.5	60.3	20.2	0.2
	10-16	Bw2	3.9	0.90	5	18.1	2.1	0.8	0.2	14.4	0.6	24.1	45.3	46.8	39.8	0.4
	16-25	Bw3	3.7	0.24	5	31.1	1.6	0.7	0.4	8.0	0.2	19.6	53.4	63.3	19.0	0.7
	25-36	By1	3.6	0.37	5	18.2	1.9	0.8	0.3	12.5	0.3	24.5	45.7	46.4	36.8	0.7
	36-72	By2	6.1	0.01	6	20.1	11.3	0.6	2.6	0.0	0.0	8.6	43.2	80.1	0.0	6.0
Bayoudan clay: 1/ (S84LA-21-12)	0-2	A	5.7	3.77	5	11.3	2.2	0.6	0.0	0.0	0.0	9.5	23.6	59.7	0.0	0.0
	2-13	Bw1	4.5	0.59	5	12.6	5.6	0.4	0.1	13.0	0.8	23.8	42.5	44.0	40.0	0.2
	13-24	Bw2	4.6	0.19	5	11.0	6.3	0.4	0.4	13.5	1.5	24.7	42.8	42.3	40.8	0.9
	24-34	Bw3	4.5	0.15	5	13.7	7.2	0.3	0.7	11.1	0.2	20.7	42.6	51.4	33.4	1.6
	34-48	Bw4	4.5	0.10	5	14.4	7.7	0.3	0.9	5.8	0.3	14.8	38.1	61.2	19.7	2.4
	48-59	By1	4.3	0.10	6	19.5	10.8	0.5	2.2	1.4	1.0	12.2	45.2	73.0	4.0	4.9
	59-72	By2	3.6	0.10	14	57.2	9.8	0.9	2.1	7.6	0.6	20.0	90.0	77.8	9.7	2.3
Brimstone very fine sandy loam: (S85LA-21-05)	0-7	An	8.7	1.16	<5	2.9	1.1	0.1	2.8	0.0	0.0	0.3	7.2	95.8	0.0	38.9
	7-21	Eng	9.0	0.06	<5	4.1	2.0	0.1	4.8	0.0	0.0	0.0	11.0	100.0	0.0	43.6
	21-35	Btng/E	8.7	0.00	<5	6.4	3.7	0.2	5.2	0.0	0.0	0.0	15.5	100.0	0.0	33.5
	35-45	Btng1	8.4	0.00	<5	7.5	3.7	0.1	3.9	0.0	0.0	0.7	15.9	95.6	0.0	24.5
	45-62	Btng2	7.7	0.00	<5	6.8	3.7	0.1	3.4	0.0	0.0	3.0	17.0	82.4	0.0	20.0
	62-85	2C	8.1	0.00	<5	4.2	2.1	0.1	1.6	0.0	0.0	1.9	9.9	80.8	0.0	16.2
Cahaba fine sandy loam: (S85LA-21-08)	0-6	Ap	5.2	0.85	38	1.2	0.5	0.1	0.0	0.3	0.2	4.7	6.5	27.7	13.0	0.0
	6-26	Bt1	5.5	0.24	<5	3.8	1.1	0.2	0.2	0.2	0.2	4.8	10.1	52.5	3.5	2.0
	26-44	Bt2	5.4	0.06	<5	1.9	1.2	0.1	0.2	0.8	0.2	4.8	8.2	41.5	18.2	2.4
	44-53	BC	5.3	0.00	<5	1.0	1.0	0.1	0.1	2.1	0.2	5.0	7.2	30.6	46.7	1.4
	53-62	C	4.9	0.00	<5	0.4	0.8	0.0	0.1	1.7	0.1	3.6	4.8	25.0	56.7	0.0
Falkner silt loam: (S84LA-21-11)	0-5	A	4.8	2.31	7	6.2	1.7	0.1	0.0	0.6	0.4	8.3	16.3	49.1	6.7	0.0
	5-12	Bt1	4.4	0.54	5	4.5	2.2	0.2	0.1	7.4	0.1	11.7	18.7	37.4	51.0	0.5
	12-22	Bt1	4.5	0.32	5	5.1	2.5	0.2	0.3	7.1	0.2	13.3	21.4	37.9	46.1	1.4
	22-29	2Btg1	4.4	0.15	5	9.8	6.0	0.3	1.1	7.1	0.7	16.2	33.4	51.5	28.4	3.3
	29-43	2Btg2	4.8	0.15	5	10.8	7.4	0.3	1.6	3.6	0.3	12.6	32.7	61.5	15.0	4.9
	43-63	2Bt	5.7	0.06	5	15.0	9.8	0.2	3.0	0.0	0.0	7.7	35.7	78.4	0.0	8.4
Forestdale silty clay loam: (S86LA-21-05)	0-4	A	5.0	3.20	18	14.2	7.5	0.9	0.4	1.7	1.0	22.8	45.8	50.2	6.6	0.9
	4-12	Btg1	4.7	0.90	8	13.3	9.9	0.8	0.7	10.4	0.9	21.9	46.6	53.0	28.9	1.5
	12-22	Btg2	4.7	0.46	6	11.8	10.6	0.7	1.2	8.6	0.4	18.3	42.6	57.0	25.8	2.8
	22-28	2Btg3	4.7	0.28	5	7.1	8.0	0.4	1.8	1.4	0.4	6.6	23.9	72.4	7.3	7.5
	28-61	2Bt1	6.4	0.10	10	10.8	8.1	0.3	3.1	---	---	2.4	24.7	90.3	---	12.6
	61-87	2Bt2	7.2	0.10	34	10.9	7.5	0.3	2.3	---	---	1.2	22.2	94.6	---	10.4

See footnotes at end of table.

TABLE 18.--FERTILITY TEST DATA OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	pH 1:1	Organic carbon	Extractable phosphorus	Exchangeable cations: Ca	Mg	K	Na	Al	H	Total acidity	Cation exchange capacity (sum)	Base saturation (sum)	Saturation: Aluminum, Effective cation exchange capacity	Saturation: Sodium, Sum of cation exchange capacity
	In			Pct	Ppm	Meq/100g								Pct	Pct	Pct
Frizzell silt loam: (S85LA-21-09)	0-4	A	4.9	0.99	<5	1.3	0.7	0.0	0.0	1.2	0.4	5.8	7.8	25.6	33.3	0.0
	4-18	B/E1	4.9	0.15	<5	0.8	0.5	0.0	0.1	2.3	0.3	4.7	6.1	23.0	57.5	1.6
	18-35	B/E2	5.3	0.06	<5	1.6	1.1	0.0	0.6	3.8	0.0	7.2	10.5	31.4	53.5	5.7
	35-51	Bt1	5.0	0.06	<5	2.2	2.2	0.1	1.6	4.4	0.2	8.6	14.7	41.5	41.1	10.9
	51-72	Bt2	4.8	0.00	<5	3.0	2.8	0.1	2.3	1.2	0.5	4.3	12.5	65.6	12.1	18.4
Gallion silt loam: (S84LA-21-08)	0-5	Ap	6.8	2.00	800	13.1	1.0	0.6	0.1	0.0	0.0	2.9	17.8	83.7	0.0	0.6
	5-9	A	7.1	0.46	500	9.6	0.7	0.3	0.1	0.0	0.0	2.5	13.8	81.1	0.0	0.7
	9-23	Bt1	6.7	0.10	500	12.6	2.4	0.6	0.1	0.0	0.0	4.0	19.8	79.8	0.0	0.8
	23-31	Bt2	6.5	0.01	580	10.0	2.1	0.7	0.1	0.0	0.0	4.0	17.0	76.5	0.0	0.6
	31-46	BC	6.7	0.01	360	8.3	1.2	0.6	0.1	0.0	0.0	2.5	12.7	80.4	0.0	1.0
	46-64	C	6.7	0.01	360	7.7	1.0	0.5	0.1	0.0	0.0	2.5	11.9	78.9	0.0	0.8
Gore silt loam: (S84LA-21-10)	0-6	Ap	4.1	0.50	10	6.2	3.5	0.4	0.2	3.9	0.0	10.1	20.4	50.5	27.5	7.0
	6-14	Bt1	4.4	0.32	5	11.0	10.1	0.6	1.0	15.6	0.2	19.4	42.1	53.9	40.5	2.4
	14-28	Bt2	4.3	0.15	5	12.7	13.0	0.6	1.6	13.9	0.4	18.4	46.3	60.3	32.9	3.5
	28-40	Bt3	4.6	0.10	5	16.3	17.1	0.5	3.6	4.9	0.2	11.0	48.5	77.3	11.5	7.4
	40-71	BC	6.9	0.10	14	14.8	17.4	0.4	5.9	0.0	0.0	4.0	42.5	90.6	0.0	13.9
Guyton silt loam: (S84LA-21-13)	0-4	A	4.4	2.89	5	3.8	0.9	0.2	0.3	1.2	0.2	11.9	17.1	30.4	18.2	1.8
	4-16	Eg1	4.3	0.72	5	1.7	0.7	0.1	0.1	3.8	0.3	9.7	12.3	21.1	56.7	0.8
	16-24	Eg2	4.2	0.24	5	1.2	0.9	0.1	0.1	5.7	0.5	10.8	13.1	17.6	67.1	0.8
	24-46	B/E	4.7	0.19	5	2.7	2.2	0.1	1.3	7.5	0.2	11.4	17.7	35.6	53.6	7.3
	46-62	Btg1	4.5	0.15	5	3.7	2.3	0.1	1.6	3.1	0.1	8.6	16.3	47.2	28.4	9.8
Hebert silt loam: 2/ (S84LA-21-01)	0-6	Ap	4.5	1.87	37	5.7	2.0	0.2	0.2	0.7	0.3	6.8	14.9	54.3	7.7	1.3
	6-14	E	4.6	0.41	6	4.7	1.6	0.1	0.2	0.9	0.3	4.3	10.9	60.7	11.5	2.0
	14-27	Bt1	4.5	0.28	5	7.8	5.1	0.2	0.9	4.9	0.3	6.2	20.1	69.1	25.7	4.3
	27-38	Bt2	4.7	0.02	5	9.5	7.0	0.2	1.4	1.4	0.5	6.7	24.9	73.1	7.0	5.6
	38-56	Bt3	6.4	0.10	38	15.5	12.3	0.3	2.3	0.0	0.0	4.7	35.1	86.6	0.0	6.5
	56-62	BC1	6.7	0.19	109	15.3	12.0	0.3	2.4	0.0	0.0	3.6	33.6	89.3	0.0	7.2
	62-72	BC2	6.9	0.10	155	14.6	10.3	0.3	1.9	0.0	0.0	3.1	30.2	89.7	0.0	6.4
Iuka fine sandy loam: (S86LA-21-02)	0-4	Ap	5.2	0.94	13	3.5	1.0	0.1	0.0	0.0	0.2	4.2	8.8	52.3	0.0	0.0
	4-10	A	5.5	0.24	7	2.4	0.9	0.1	0.0	0.2	0.0	2.4	5.8	58.6	5.6	0.0
	10-29	C1	5.7	0.10	8	2.2	0.7	0.0	0.0	0.2	0.1	2.0	4.9	59.2	6.3	0.0
	29-60	C2	5.7	0.10	8	2.0	0.8	0.0	0.0	0.0	0.2	2.0	4.8	58.3	0.0	0.0
Larue loamy fine sand: (S85LA-21-03)	0-10	A	5.1	0.68	<5	1.0	0.2	0.0	0.0	0.4	0.0	3.1	4.3	27.9	25.0	0.0
	10-29	E	5.8	0.06	<5	0.9	0.2	0.0	0.0	0.0	0.2	1.7	2.8	39.3	0.0	0.0
	29-40	Bt1	5.1	0.10	<5	4.0	2.0	0.2	0.0	0.4	0.3	6.1	12.3	50.4	5.8	0.0
	40-72	Bt2	5.1	0.00	<5	2.1	1.1	0.1	0.0	0.4	0.2	3.4	6.7	49.3	10.3	0.0
Portland clay: 3/ (S84LA-21-04)	0-5	Ap	5.4	1.43	50	35.2	16.2	0.8	0.4	0.0	0.0	13.0	65.7	80.2	0.0	0.6
	5-20	Bw1	7.3	0.32	145	43.7	18.7	0.7	1.0	0.0	0.0	5.5	69.8	92.0	0.0	1.5
	20-39	Bw2	7.8	0.41	151	46.4	20.5	0.7	2.2	0.0	0.0	2.9	72.6	96.0	0.0	3.0
	39-52	Bw3	7.9	0.32	195	42.3	22.8	0.7	3.9	0.0	0.0	2.9	72.7	96.0	0.0	5.4
	52-60	C	7.7	0.32	209	42.0	24.2	0.8	4.9	0.0	0.0	3.6	75.5	95.2	0.0	6.5

See footnotes at end of table.

TABLE 18.--FERTILITY TEST DATA OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	pH 1:1	Organic carbon	Extractable phosphorus	Exchangeable cations: Ca	Mg	K	Na	Al	H	Total acidity	Cation exchange capacity (sum)	Base saturation (sum)	Saturation: Aluminum: Effective cation exchange capacity	Saturation: Sodium: Sum of cation exchange capacity
	In			Pct	Ppm	Meq/100g								Pct	Pct	Pct
Portland clay: (S84LA-21-17)	0-5	Ap	7.2	2.05	53	38.6	17.8	0.8	2.6	0.0	0.0	9.4	69.2	86.4	0.0	3.8
	5-14	Bw1	7.3	0.90	13	34.1	24.1	0.7	6.5	0.0	0.0	9.0	74.4	87.9	0.0	8.7
	14-28	Bw2	7.9	0.59	141	46.3	25.9	0.8	7.0	0.0	0.0	7.6	87.6	91.3	0.0	8.0
	28-52	Bw3	8.2	0.41	137	42.9	26.4	0.9	8.8	0.0	0.0	6.8	85.8	92.1	0.0	10.3
	52-72	C	8.1	0.37	144	19.0	26.6	0.8	11.7	0.0	0.0	6.8	64.9	89.5	0.0	18.0
Prentiss fine sandy loam: (S84LA-21-07)	0-5	Ap	5.1	1.07	<5	1.9	0.6	0.1	0.0	0.4	0.2	5.8	8.4	31.0	12.5	0.0
	5-16	Bw1	5.0	0.10	<5	1.7	1.0	0.1	0.1	2.4	0.3	6.5	9.4	30.9	42.9	1.1
	16-24	Bw2	5.1	0.01	<5	1.1	0.8	0.1	0.1	2.1	0.1	4.7	6.8	30.9	48.8	1.5
	24-37	Btx1	5.1	0.00	<5	0.9	0.8	0.1	0.1	2.2	0.3	4.8	6.7	28.4	50.0	1.5
	37-51	Btx2	5.2	0.01	<5	0.7	0.6	0.1	0.1	2.3	0.1	4.3	5.8	25.9	59.0	1.7
	51-64	Btx3	5.2	0.00	<5	0.9	1.0	0.1	0.3	2.4	0.0	4.5	6.8	33.8	51.1	4.4
Providence silt loam: (S84LA-21-15)	0-2	A	5.2	2.84	5	3.8	1.6	0.3	0.1	0.6	0.3	6.5	12.3	47.2	9.0	0.8
	2-6	E	4.9	1.07	5	2.7	1.3	0.1	0.1	0.7	0.3	6.8	11.0	38.2	13.5	0.9
	6-16	Bt1	4.8	0.41	5	4.0	2.9	0.2	0.2	2.4	0.2	7.7	15.0	48.7	24.2	1.3
	16-24	Bt2	4.9	0.19	5	2.6	2.6	0.1	0.1	3.1	0.3	8.6	14.0	38.6	35.2	0.7
	24-30	Btx1	4.9	0.10	5	1.7	2.0	0.1	0.1	3.1	0.3	8.1	12.0	32.5	42.5	0.8
	30-37	Btx2	4.8	0.10	5	1.6	1.9	0.1	0.1	3.4	0.1	7.9	11.6	31.9	47.2	0.9
	37-49	Btx2	4.7	0.10	5	1.5	2.1	0.1	0.1	4.5	0.1	8.8	12.6	30.2	53.6	0.8
	49-54	Btx3	4.8	0.10	5	1.7	2.4	0.1	0.2	4.2	0.2	8.3	12.7	34.6	47.7	1.6
	54-72	2Bt3	4.8	0.06	5	3.1	3.6	0.1	0.2	3.6	0.8	8.5	15.5	45.2	31.6	1.3
Rilla silt loam: (S84LA-21-06)	0-6	Ap	5.3	0.54	96	3.6	1.3	0.3	0.1	0.0	0.0	3.1	8.4	63.1	0.0	1.2
	6-10	E	5.2	0.37	58	3.8	1.1	0.3	0.1	0.0	0.0	3.2	8.5	62.6	0.0	1.3
	10-18	Bt1	4.5	0.10	23	7.0	2.3	0.2	0.2	3.6	0.2	9.7	19.3	49.7	26.9	0.8
	18-29	Bt2	4.6	0.02	41	6.7	3.0	0.2	0.2	2.1	0.4	7.0	17.1	59.0	16.7	1.0
	29-48	Bt3	4.8	0.01	61	3.6	1.5	0.1	0.1	0.6	0.4	3.8	9.0	57.8	9.7	1.3
	48-56	Bt4	4.7	0.01	96	5.7	2.6	0.1	0.2	0.6	0.3	4.5	13.1	65.5	6.3	1.4
	56-68	C	5.0	0.01	93	6.3	3.2	0.2	0.2	0.3	0.3	2.9	12.8	77.3	2.9	1.8
Ruston fine sandy loam: (S86LA-21-01)	0-3	A	5.6	0.50	10	1.0	0.3	0.0	0.0	0.2	0.2	2.4	3.7	35.1	11.8	0.0
	3-8	E	5.7	0.24	5	0.9	0.3	0.0	0.0	0.2	0.2	1.5	2.7	44.4	12.5	0.0
	8-25	Bt1	4.8	0.15	5	0.8	1.4	0.2	0.0	3.2	0.1	8.1	10.5	22.9	56.1	0.0
	25-49	Bt2	4.8	0.01	5	0.6	0.9	0.1	0.0	2.2	0.1	6.0	7.6	21.1	56.4	0.0
	49-68	B/E	5.1	0.01	11	0.5	0.3	0.0	0.0	0.5	0.2	2.0	2.8	28.6	33.3	0.0
	68-84	B't1	4.8	0.01	5	0.6	2.7	0.2	0.1	3.2	0.3	7.8	11.4	31.6	45.1	0.9
Savannah fine sandy loam: (S84LA-21-14)	0-9	A	5.0	0.72	<5	1.4	0.4	0.0	0.0	1.3	0.1	5.8	7.6	23.7	40.6	3.5
	9-20	Bt1	5.2	0.06	<5	0.9	0.8	0.1	0.1	3.3	0.2	8.4	10.3	18.4	61.1	1.1
	20-29	Bt2	5.3	0.00	<5	0.3	0.5	0.1	0.1	2.9	0.3	6.6	7.6	13.2	69.0	0.6
	29-44	Btx1	5.4	0.00	<5	0.4	0.5	0.0	0.2	3.3	0.2	6.3	7.4	14.9	71.7	0.8
	44-55	Btx2	5.4	0.00	<5	1.0	1.0	0.1	0.5	4.3	0.3	8.1	10.7	24.3	59.7	1.0
	55-72	Btx3	5.3	0.00	<5	1.7	1.5	0.1	0.6	3.6	0.4	7.4	11.3	34.5	45.6	1.1
Smithdale fine sandy loam: (S85LA-21-04)	0-7	A	5.3	0.72	<5	0.8	0.3	0.1	0.0	0.7	0.1	3.4	4.6	26.1	35.0	0.0
	7-14	E	5.5	0.15	<5	0.6	0.3	0.0	0.0	0.6	0.0	1.8	2.7	33.3	40.0	0.0
	14-38	Bt1	4.9	0.06	<5	0.4	1.8	0.2	0.0	6.3	0.3	10.8	13.2	18.2	70.0	0.0
	38-59	Bt2	4.9	0.00	<5	0.2	1.5	0.1	0.0	5.6	0.3	10.1	11.9	15.1	72.7	0.0
	59-83	Bt3	4.8	0.00	<5	0.3	1.4	0.1	0.0	4.8	0.5	8.8	10.6	17.0	67.6	0.0
	83-95	Bt4	4.8	0.00	<5	0.3	1.6	0.1	0.0	4.4	0.2	7.6	9.6	20.8	66.7	0.0

See footnotes at end of table.

TABLE 18.--FERTILITY TEST DATA OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	pH 1:1	Organic carbon	Extractable phosphorus	Exchangeable cations: Ca	Mg	K	Na	Al	H	Total acidity	Cation exchange capacity (sum)	Base saturation (sum)	Saturation: Aluminum: Effective cation exchange capacity	Saturation: Sodium: Sum of cation exchange capacity
	In			Pct	Ppm	-----	-----	-----	Meq/100g	-----	-----	-----	-----	Pct	Pct	Pct
Sterlington silt loam:																
(S84LA-21-05)	0-7	Ap	5.6	0.72	119	4.2	0.6	0.4	0.1	0.0	0.0	3.2	8.6	62.6	0.0	1.2
	7-10	A	5.4	0.46	96	4.9	0.8	0.4	0.1	0.0	0.2	4.1	10.3	60.1	0.0	1.3
	10-23	Bt	4.6	0.19	19	4.1	1.1	0.1	0.1	3.2	0.0	7.4	12.9	42.5	36.9	0.9
	23-30	B/E	4.7	0.06	36	3.0	1.0	0.1	0.1	1.5	0.3	4.3	8.5	49.6	24.9	1.4
	30-53	B't	4.9	0.01	50	6.6	3.7	0.2	0.3	0.5	0.5	4.9	15.7	68.9	4.2	1.9
	53-80	C	5.5	0.01	86	6.7	3.7	0.1	0.3	0.0	0.3	2.9	13.7	78.9	0.0	2.2
Ouachita silt loam:																
(S86LA-21-09)	0-7	Ap	5.0	0.81	7	1.6	0.4	0.1	0.0	3.4	0.2	11.1	13.2	15.9	59.6	0.0
	7-21	Bw1	4.8	0.10	11	0.8	0.4	0.0	0.0	3.6	1.0	9.3	10.5	11.4	62.1	0.0
	21-41	Bw2	4.8	0.10	10	0.6	0.4	0.1	0.0	4.1	0.5	9.6	10.7	10.3	71.9	0.0
	41-65	Bw3	5.3	0.01	40	0.4	0.3	0.1	0.2	5.2	0.4	8.1	9.1	11.0	78.8	2.2
	65-72	C	5.3	0.01	167	0.5	0.9	0.1	0.7	4.5	0.7	12.0	14.2	15.5	60.8	4.9
Sacul fine sandy loam:																
(S86LA-21-07)	0-1	A	5.0	4.12	5	10.9	1.1	0.2	0.0	0.0	0.2	11.4	23.6	51.7	0.0	0.0
	1-6	E	5.1	0.54	5	0.7	0.3	0.0	0.0	0.9	0.5	3.0	4.0	25.0	37.5	0.0
	6-18	Bt1	4.6	0.19	5	1.2	2.3	0.1	0.0	8.3	0.3	13.5	17.1	21.1	68.0	0.0
	18-25	Bt2	4.7	0.01	5	0.5	1.9	0.1	0.0	8.1	0.3	12.3	14.8	16.9	74.3	0.0
	25-36	Btg1	5.0	0.01	5	0.4	1.7	0.1	0.1	8.3	0.1	12.0	14.3	16.1	77.6	0.7
	36-52	Btg2	5.0	0.00	5	0.4	2.5	0.1	0.7	6.5	0.5	11.1	14.8	25.0	60.7	4.7
Tippah silt loam:	0-5	A	5.3	1.34	5	1.6	0.4	0.0	0.0	0.9	0.5	4.8	6.8	29.4	26.5	0.0
(S86LA-21-08)	5-15	Bt1	4.9	0.10	5	1.1	1.3	0.1	0.1	8.6	0.2	14.7	17.3	15.0	75.4	0.6
	15-26	Bt2	5.1	0.10	5	0.8	1.4	0.1	0.2	6.5	0.7	13.8	16.3	15.3	67.0	1.2
	26-34	Bt3	5.2	0.06	5	0.8	1.5	0.1	0.2	6.5	0.7	11.7	14.3	18.2	66.3	1.4
	34-45	2Bt4	5.1	0.01	5	3.3	5.0	0.2	1.0	6.5	0.5	12.0	21.5	44.2	39.4	4.7
	45-60	2Bt5	5.0	0.01	5	4.5	7.2	0.2	1.4	5.2	0.8	10.5	23.8	55.9	26.9	5.9
Yorktown clay:	0-3	Oa	5.0	53.65	73	34.1	6.6	1.2	0.2	0.0	0.0	12.1	54.2	77.7	0.0	0.4
(S84LA-21-09)	3-10	A	4.5	4.12	77	28.2	8.5	0.8	0.1	0.5	0.7	13.5	51.1	73.7	1.3	0.2
	10-23	Bg1	4.9	1.52	49	29.1	8.4	0.3	0.2	0.0	0.0	9.9	47.9	79.3	0.0	0.4
	23-38	Bg2	7.1	0.99	32	31.1	11.3	0.4	0.2	0.0	0.0	4.1	47.1	91.3	0.0	0.4
	38-59	Bg3	7.0	0.40	35	37.3	15.1	0.5	0.5	0.0	0.0	4.7	58.1	91.9	0.0	0.9
	59-72	BC	7.5	0.14	251	50.9	15.4	0.8	1.2	0.0	0.0	5.2	73.5	92.9	0.0	1.6

1/ Sample pedon is in an area of Bayoudan clay, 3 to 8 percent slopes, about 180 feet down a logging road and 27 feet east of logging road; SW1/4SW1/4 sec. 35, T. 11 N., R. 4 E.

2/ Sample pedon is in an area of Hebert silt loam about 60 feet southwest of the center of the road; NW1/4NE1/4 sec. 20, T. 13 N., R. 5 E.

3/ Sample pedon is in an area of Portland clay about 12 feet south of the east-west field road and 240 feet east of field road; NW1/4SE1/4 sec. 33, T. 15 N., R. 4 E. The pedon differs from the Portland series because it has a Bw1 horizon that is less acid than is typical for the series.

TABLE 19.--PHYSICAL TEST DATA OF SELECTED SOILS

[Dashes indicate analyses were not made]

Soil name and sample number	Depth	Horizon	Particle-size distribution: Sand: Very coarse (2-1 mm)	Coarse (1.0-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.10 mm)	Very fine (0.1-0.05 mm)	Total (2.0-0.5 mm)	Silt (0.25-0.002 mm)	Clay (0.002 mm)	Fine clay (0.0002 mm)	Water content at tension: 1/3 bar	15 bar	WRD	Bulk density: 1/3 bar	Oven-dry	Field moist	COLE 1/
	In		Pct									Pct (wt)			G/cm³			
Hebert silt loam: 2/ (S84LA-21-20)	0-6	Ap	0.0	0.0	0.0	1.4	11.3	12.7	67.7	19.6	11.9	19.5	9.9	0.15	1.51	1.60	---	0.019
	6-13	Bt1	0.0	0.0	0.0	3.4	21.8	25.2	45.3	29.5	19.6	19.4	12.7	0.11	1.57	1.75	---	0.037
	13-21	Bt2	0.0	0.0	0.1	2.0	20.4	22.5	50.8	26.7	20.0	22.4	12.5	0.15	1.55	1.75	---	0.041
	21-35	Bt3	0.0	0.2	0.3	1.5	12.4	14.4	61.1	24.5	17.1	22.3	11.8	0.16	1.54	1.71	---	0.036
	35-44	Bt4	0.0	0.2	0.3	0.4	4.0	4.9	74.5	20.6	13.7	18.6	10.1	0.13	1.51	1.64	---	0.028
	44-54	Bt5	0.0	0.1	0.2	0.4	2.1	2.8	76.9	20.3	12.3	23.0	9.8	0.20	1.52	1.67	---	0.032
	54-72	BC	0.0	0.0	0.1	0.2	0.5	0.8	68.9	30.3	16.9	25.0	14.4	0.16	1.50	1.70	---	0.043
Olla fine sandy loam: 3/ (S86LA-21-04)	0-6	A	0.2	0.2	7.9	29.4	17.8	55.5	41.4	3.1	---	17.6	2.8	14.8	---	1.52	1.51	---
	6-16	Bt1	0.0	0.1	8.2	26.5	13.5	48.3	25.6	25.8	---	27.6	12.8	14.8	---	1.73	1.70	---
	16-24	Bt2	0.0	0.1	16.2	37.4	8.8	62.5	17.4	20.1	---	19.8	10.4	9.4	---	1.68	1.63	---
	24-38	Bt3	0.0	0.0	26.2	45.9	3.9	76.0	6.0	18.0	---	12.0	5.9	6.1	---	1.62	1.60	---
	38-64	BC	0.0	0.1	5.9	45.4	22.2	73.6	9.0	17.4	---	18.6	8.9	9.7	---	1.61	1.57	---
	64-72	C	0.0	0.0	0.2	6.2	48.2	54.6	26.1	19.3	---	22.8	9.6	13.2	---	1.58	1.54	---
Perry clay: 2/ 4/ (S85LA-21-03)	0-5	Ap	0.0	0.0	0.2	0.1	0.2	0.5	18.4	81.1	48.6	---	29.2	---	---	---	---	---
	5-11	Bg1	---	---	---	---	---	---	16.1	83.9	53.2	---	32.2	---	---	---	---	---
	11-19	Bg2	---	---	---	---	---	---	16.2	83.8	54.9	---	32.8	---	---	---	---	---
	19-46	2BC	1.0	0.9	0.7	0.7	0.4	3.7	20.4	75.9	25.1	---	29.6	---	---	---	---	---
	46-60	2C	0.4	0.6	0.5	0.5	0.3	2.3	22.2	75.5	27.9	---	29.7	---	---	---	---	---
Providence silt loam: 2/ (S84LA-21-18)	6-24	Bt1, Bt2	0.4	0.7	1.2	5.1	8.1	15.5	59.8	24.7	---	---	11.1	---	---	---	---	---
	54-72	2Bt3	0.0	0.2	1.4	9.4	17.5	28.5	49.6	21.9	---	---	10.3	---	---	---	---	---

See footnotes at end of table.

TABLE 19.--PHYSICAL TEST DATA OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution: Sand: Very coarse (2-1 mm)	Sand: Coarse (1.0-0.5 mm)	Sand: Medium (0.5-0.25 mm)	Sand: Fine (0.25-0.10 mm)	Sand: Very fine (0.1-0.05 mm)	Sand: Total (2.0-0.5 mm)	Silt (0.25-0.002 mm)	Clay (0.002 mm)	Fine clay (0.0002 mm)	Water content at tension: 1/3 bar	Water content at tension: 15 bar	Water content at tension: WRD	Bulk density: 1/3 bar	Bulk density: Oven-dry	Bulk density: Field moist	COLE 1/
	In		Pct									Pct (wt)			G/cm^3			
SND: (series not	0-8	Ap	0.0	0.0	0.0	0.6	18.3	18.9	73.1	8.0	2.9	20.8	4.2	0.26	1.54	1.57	---	0.006
designated; Rg,	8-16	E	0.2	0.4	0.4	1.1	26.3	28.4	63.2	8.4	3.0	19.7	4.0	0.25	1.60	1.61	---	0.002
Rilla silt loam)	16-22	Bt1	0.0	0.0	0.0	0.8	19.0	19.8	59.3	20.9	13.6	23.4	9.2	0.22	1.53	1.66	---	0.028
2/ 5/	22-29	Bt2	0.0	0.0	0.0	0.7	17.2	17.9	58.9	23.2	17.5	23.4	10.5	0.20	1.53	1.65	---	0.025
(S84LA-21-21)	29-41	Bt3	0.0	0.0	0.1	1.5	27.5	29.1	54.4	16.5	11.1	19.9	7.9	0.19	1.55	1.62	---	0.015
	41-65	BC	0.0	0.1	0.1	1.2	43.0	44.3	45.6	10.1	5.8	18.1	5.8	0.19	1.52	1.56	---	0.009
	65-78	C1	0.0	0.0	0.1	0.2	1.1	1.5	75.8	22.7	13.3	24.5	11.6	0.19	1.49	1.59	---	0.022
	78-86	C2	0.0	0.0	0.1	0.3	3.6	4.0	77.3	18.7	11.3	24.8	9.3	0.23	1.48	1.57	---	0.020

1/ COLE (Coefficient of Linear Extensibility): A quantitative method of determining shrink-swell behavior of soil. It is an estimate of the vertical component of swelling of a natural soil clod. COLE is expressed as: low (0.03), moderate (0.03-0.06), and high (0.06).

2/ Analyses by the National Soil Survey Laboratory, Soil Conservation Service, Lincoln, Nebraska.

3/ Analyses by the Soil Characterization Laboratory, Louisiana Agricultural Experiment Station, Louisiana State University, Baton Rouge, Louisiana.

4/ The Ap horizon has 1.1 percent more clay than is typical for the Perry series, and the reaction of the Bg1 horizon is 0.1 unit lower than is typical for the series. These differences are within the normal errors of observation.

5/ This pedon was sampled as Rilla silt loam. It is closely similar to the Rilla series, but the clay content of the Ap, E, BC, and C2 horizons is less than is allowed in the series range. The pedon classifies as fine-silty, mixed, thermic Typic Hapludalfs. The pedon is about 3 miles southeast of Hebert; NW1/4SE1/4 sec. 34, T. 14 N., R. 5 E.

TABLE 20.--CHEMICAL ANALYSES OF SELECTED SOILS

[TR means trace. The symbol < means less than. Dashes indicate analyses were not made]

Soil name and sample number	Depth	Horizon	Extractable bases: Ca	Extractable bases: Mg	Extractable bases: K	Extractable bases: Na	Extractable acidity	Cation exchange capacity (NH_4OAc)	Base saturation (NH_4OAc)	Organic carbon	pH H_2O 1:1	pH KCl 1:1	pH $CaCl_2$ 1:2[2]	Extractable iron	Extractable aluminum	Extractable hydrogen	Extractable phosphorus
	In		Meq/100g						Pct	Pct				Pct	Meq/100g		Ppm
Hebert silt loam: 1/ (S84LA-21-20)	0-6	Ap	12.1	2.6	0.1	0.1	4.2	14.4	100	1.63	6.2	5.4	6.1	0.7	0.1	---	---
	6-13	Bt1	11.9	5.7	0.2	0.2	4.1	17.6	100	0.44	6.4	4.9	5.9	0.9	0.1	---	---
	13-21	Bt2	9.6	7.0	0.3	0.5	5.2	17.5	99	0.21	5.8	4.1	5.2	0.8	0.1	---	---
	21-35	Bt3	8.1	6.7	0.3	0.6	4.9	16.4	96	0.15	5.5	4.0	5.0	0.8	0.1	---	---
	35-44	Bt4	7.1	6.3	0.2	0.6	4.0	14.6	97	0.14	5.6	4.1	5.2	0.8	0.1	---	---
	44-54	Bt5	7.3	6.7	0.2	0.7	5.0	16.0	93	0.13	5.9	4.4	5.4	0.7	0.1	---	---
	54-72	BC	11.2	9.7	0.4	1.1	5.5	21.4	100	0.18	5.9	4.5	5.6	1.2	0.1	---	---
Olla fine sandy loam: 2/ (S86LA-21-04)	0-6	A	0.1	0.1	0.1	0.4	2.7	3.0	23.3	0.34	4.4	3.8	4.2	0.2	1.3	0.2	<5
	6-16	Bt1	2.4	1.9	0.1	0.2	9.5	12.8	35.9	0.28	4.6	3.6	4.0	0.8	4.9	0.6	<5
	16-24	Bt2	1.6	1.5	0.1	0.4	8.9	10.6	34.0	0.16	4.9	3.6	4.0	0.6	4.7	0.4	<5
	24-38	Bt3	0.9	1.3	0.1	0.2	4.6	6.6	37.9	0.09	4.8	3.8	4.0	0.3	2.8	0.4	<5
	38-64	BC	0.1	1.9	0.1	0.2	8.0	10.2	22.5	0.06	4.7	3.6	3.9	0.3	5.5	0.2	<5
	64-72	C	0.0	2.8	0.1	0.3	9.5	12.0	26.7	0.06	4.6	3.5	3.8	0.2	6.8	0.2	<5
Perry clay: 1/ 3/ (S85LA-21-03)	0-5	Ap	30.4	15.3	1.7	0.6	12.2	51.0	---	1.64	6.0	4.5	5.6	1.4	0.2	---	---
	5-11	Bg1	27.2	16.6	1.5	0.8	15.5	51.7	47.0	1.51	5.0	3.9	4.7	1.2	0.2	---	---
	11-19	Bg2	30.6	18.7	1.5	1.4	13.0	52.7	52.5	1.29	5.1	4.1	5.1	1.5	0.2	---	---
	19-46	2BC	---	23.6	1.2	3.0	---	46.4	---	0.47	7.9	6.9	7.9	1.1	0.1	---	---
	46-60	2C	---	22.1	1.3	4.2	---	43.9	---	0.44	7.9	7.0	7.9	1.3	0.1	---	---
Providence silt loam: 1/ (S84LA-21-18)	6-24	Bt1, Bt2	2.8	2.8	---	0.2	7.3	9.7	60	0.18	5.2	---	4.7	---	---	---	---
	54-72	2Bt3	1.5	3.5	---	0.2	6.8	10.2	51	0.05	4.9	---	4.2	---	---	---	---

See footnotes at end of table.

TABLE 20.--CHEMICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Extractable bases				Extractable acidity	Cation exchange capacity	Base saturation	Organic carbon	pH			Extractable iron	Extractable aluminum	Extractable hydrogen	Extractable phosphorus
			Ca	Mg	K	Na		(NH_4OAc)			H_2O 1:1	KCl 1:1	$CaCl_2$ 1:2				
	In		Meq/100g						Pct	Pct				Pct	Meq/100g		Ppm
SND: (series not designated; Rg, Rilla silt loam) 1/ 4/ (S84LA-21-21)	0-8	Ap	3.1	0.8	0.3	TR	3.3	5.1	82	0.66	5.7	4.9	5.2	TR	TR	---	---
	8-16	E	3.2	0.7	TR	0.1	3.5	4.5	89	0.19	5.1	4.2	4.8	0.5	0.1	---	---
	16-22	Bt1	7.8	2.2	0.2	0.1	4.9	11.0	94	0.20	5.2	4.0	5.0	0.7	0.1	---	---
	22-29	Bt2	8.8	3.2	0.2	0.1	6.5	13.1	94	0.19	5.1	3.9	4.9	0.7	0.1	---	---
	29-41	Bt3	6.1	2.5	0.1	0.1	4.8	9.9	89	0.15	5.0	3.9	4.7	0.6	0.1	---	---
	41-65	BC	4.2	1.9	0.1	0.1	3.6	7.2	87	0.09	4.9	3.8	4.7	0.6	0.1	---	---
	65-78	C1	10.3	5.6	0.3	0.2	6.0	16.7	98	0.10	5.3	3.7	4.6	0.9	0.1	---	---
	78-86	C2	8.1	4.8	0.3	0.2	4.5	14.1	95	0.11	5.3	3.8	4.7	0.8	0.1	---	---

1/ Analyses by the National Soil Survey Laboratory, Soil Conservation Service, Lincoln, Nebraska.

2/ Analyses by the Soil Characterization Laboratory, Louisiana Agricultural Experiment Station, Louisiana State University, Baton Rouge, Louisiana.

3/ The Ap horizon has 1.1 percent more clay than is typical for the Perry series, and the reaction of the Bg1 horizon is 0.1 unit lower than is typical for the series. These differences are within the normal errors of observation.

4/ This pedon was sampled as Rilla silt loam. It is closely similar to the Rilla series, but the clay content of the Ap, E, BC, and C2 horizons is less than is allowed in the series range. The pedon classifies as fine-silty, mixed, thermic Typic Hapludalfs. The pedon is about 3 miles southeast of Hebert; NW1/4SE1/4 sec. 34, T. 14 N., R. 5 E.

TABLE 21.--MINERALOGY DATA OF SILT AND CLAY FRACTIONS OF SELECTED SOILS

Soil name and sample number	Depth	Horizon	Resistant	Silt fraction 1/	Clay fraction 1/
				2-50 micron	0.2-2.0 micron
	In			Percent	Relative amounts
Hebert silt loam: 2/ (S84LA-21-20)	13-21	Bt2	80	QZ75, FK18, OP2, RA1, OR1, BA1, TM1, MS1, HN1	MT3, MI3, KK3, VR2, LE1
	54-72	BC	76	QZ72, FK16, MS6, OP2, RA1, OR1, BA1, ZR1, TM1	MT3, MI3, KK3, VR3
Olla fine sandy loam: 3/ (S86LA-21-04)	6-16	Bt1	95	QZ95, IO4, PK4, MI2	
	16-24	Bt2	95	QZ95, IO4, PK4, MI2	
Perry clay: 2/ (S85LA-21-03)	11-19	Bg2			MI4, MT4, KK3, LE1
	46-60	2C			MI3, MT3, KK2, QZ1
Providence silt loam: 2/ (S84LA-21-18)	6-24	Bt1, Bt2	78	QZ77, FK16, AR2, MS2, BT1, ZR1, TM1, PO1, HN1	KK3, VM2, MI2, VR2, GE2
	54-72	2Bt3	88	QZ85, FK9, HN2, OP2, AR2, MS1, ZR1, TM1	KK4, VM3, GE2, MI1
SND: 2/ 4/ (series not designated; Rg, Rilla silt loam) (S84LA-21-21)	22-29	Bt2	79	QZ77, FK15, MS5, OP1, RA1, SP1, OR1, AM1, TM1	KK3, MT2, VR2
	65-78	C1	73	QZ67, FK19, MS7, RA3, OP1, ZR1, AM1, TM1	MT3, MI3, VR3, KK3, QZ1

1/ Code for mineralogical data in Silt fraction and Clay fraction columns: The letter represents the kind of mineral (A), and the number represents the quantity (percent or relative amount) of mineral (B). Minerals are listed in the table in order of abundance, decreasing from left to right.

A. Kind of mineral:
AR--weathered aggregates
LE--lepidocrocite
OP--opaques
QZ--quartz
RA--resistant aggregates
TM--tourmaline
BT--biotite
PK--potassium feldspars
HN--hornblende
MI--mica
MS--muscovite
MT--montmorillonite
VR--vermiculite
KK--kaolinite
OR--other resistant minerals
ZR--zircon
IO--iron oxides
PO--plant opal
GE--goethite
VM--vermiculite-mica
SP--sphene
AM--amphibole

B. Relative amounts:
6--indeterminate
5--dominant
4--abundant
3--moderate
2--small
1--trace

2/ Analyses by the National Soil Survey Laboratory, Soil Conservation Service, Lincoln, Nebraska.
3/ Analyses by the Soil Characterization Laboratory, Louisiana Agricultural Experiment Station, Louisiana State University, Baton Rouge, Louisiana.
4/ This pedon was sampled as Rilla silt loam. It is closely similar to the Rilla series, but the clay content of the Ap, E, BC, and C2 horizons is less than is allowed in the series range. The pedon is about 3 miles southeast of Hebert; NW1/4SE1/4 sec. 34, T. 14 N., R. 5 E.

TABLE 22.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Alligator	Very fine, montmorillonitic, acid, thermic Vertic Haplaquepts
Arents	Arents
Bayoudan	Very fine, montmorillonitic, thermic Aquentic Chromuderts
*Brimstone	Fine-silty, siliceous, thermic Glossic Natraqualfs
Cadeville	Fine, mixed, thermic Albaquic Hapludalfs
Cahaba	Fine-loamy, siliceous, thermic Typic Hapludults
Falkner	Fine-silty, siliceous, thermic Aquic Paleudalfs
*Forestdale	Fine, montmorillonitic, thermic Typic Ochraqualfs
Frizzell	Coarse-silty, siliceous, thermic Glossaquic Hapludalfs
Gallion	Fine-silty, mixed, thermic Typic Hapludalfs
*Gore	Fine, mixed, thermic Vertic Paleudalfs
Guyton	Fine-silty, siliceous, thermic Typic Glossaqualfs
*Hebert	Fine-silty, mixed, thermic Aeric Ochraqualfs
Iuka	Coarse-loamy, siliceous, acid, thermic Aquic Udifluvents
Larue	Loamy, siliceous, thermic Arenic Paleudalfs
Olla	Fine-loamy, siliceous, thermic Typic Hapludults
Ouachita	Fine-silty, siliceous, thermic Fluventic Dystrochrepts
Perry	Very fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts
*Portland	Very fine, mixed, nonacid, thermic Vertic Haplaquepts
*Prentiss	Coarse-loamy, siliceous, thermic Glossic Fragiudults
Providence	Fine-silty, mixed, thermic Typic Fragiudalfs
Rilla	Fine-silty, mixed, thermic Typic Hapludalfs
Ruston	Fine-loamy, siliceous, thermic Typic Paleudults
Sacul	Clayey, mixed, thermic Aquic Hapludults
Savannah	Fine-loamy, siliceous, thermic Typic Fragiudults
Smithdale	Fine-loamy, siliceous, thermic Typic Hapludults
*Sterlington	Coarse-silty, mixed, thermic Typic Hapludalfs
Tippah	Fine-silty, mixed, thermic Aquic Paleudalfs
*Yorktown	Very fine, montmorillonitic, nonacid, thermic Typic Fluvaquents

* 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.--FORMATIVE ELEMENTS AND ADJECTIVES OF THE HIGHER TAXONOMIC CLASSES

[The symbol < means less than]

Formative element or adjective	Connotation (simplified explanation) or meaning
Aeric	Browner or better aerated than typic.
Alb	A surface or a lower horizon in which clay and free iron oxides have been removed or in which the oxides have been segregated to the extent that the color of the horizon is determined by the color of the primary sand and silt colors rather than by coatings on these particles.
Alf	Mineral soils; an illuvial horizon of silicate clays; high base saturation.
Aqu	A soil that is wet or that has been artificially drained.
Dystr	Have base saturation <60 percent in all subhorizons between depths of 25 centimeters and 75 centimeters below the soil surface.
Ent	Mineral soils; weak or no pedogenic horizons; no deep, wide cracks in most years.
Ept	Mineral soils; some pedogenic horizons and some weatherable minerals.
Fluv	Composed of recent alluvium.
Frag	Presence of a fragipan.
Glossic	The presence of albic material that tongues or interfingers.
Hapl	The simplest set of horizons.
Hydr	The presence of water.
Ist	Organic in more than half of upper 80 centimeters.
Med	A soil of mid altitudes.
Natr	Presence of natric horizon.
Ochr	A surface horizon that is either light in color, low in organic matter, or both.
Pale	A soil having horizons that have more than normal development.
Sapr	Composed mostly of highly decomposed plant material.
Ud	Moist but not wet, and dry for short periods or not at all.

* U.S. GOVERNMENT PRINTING OFFICE: 1990-262-945/20023