USDA United States Department of Agriculture

Natural Resources Conservation Service

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

Soil Survey of Webster Parish, Louisiana

How To Use This Soil Survey

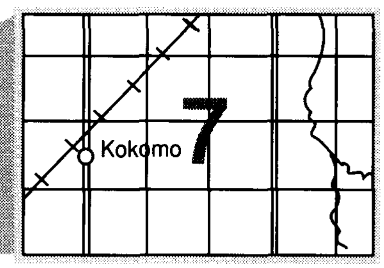
General Soil Map

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

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

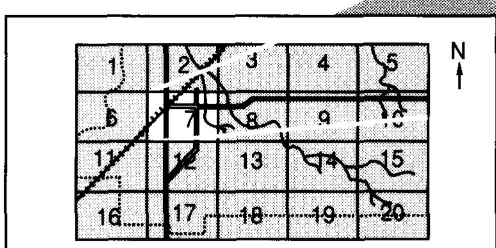
Detailed Soil Maps

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



MAP SHEET

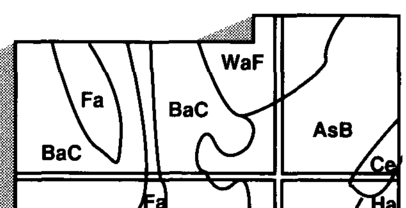
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

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

MAP SHEET



AREA OF INTEREST

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

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

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

Major fieldwork for this soil survey was completed in 1988. Soil names and descriptions were approved in 1989. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1988. This soil survey was made cooperatively by the Natural Resources Conservation Service, the Louisiana Agricultural Experiment Station, the Louisiana Soil and Water Conservation Committee, the U.S. Forest Service, and the Webster Parish Police Jury. It is part of the technical assistance furnished to the Dorcheat Soil and Water Conservation District.

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

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

Cover: Cotton and loblolly pine in an area of Malbis fine sandy loam, 1 to 3 percent slopes. Cotton is a major crop and pine woodland is a major land use in the survey area.

Issued 1998

Contents

Summary of Tables

Foreword

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

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

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

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

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Soil Survey of
Webster Parish, Louisiana

By W. Wayne Kilpatrick, Curtis Godfrey, and Charles Henry, Jr.,
Natural Resources Conservation Service

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

WEBSTER PARISH is in northwest Louisiana, about 30 miles east of Shreveport (fig. 1). The total area is 393,555 acres, of which 385,491 acres is land and 8,064 acres is water in the form of lakes, reservoirs, and streams. Webster Parish is bordered on the north by Arkansas. It is bordered on the east by Claiborne and Bienville Parishes, on the south by Bienville and Bossier Parishes, and on the west by Bossier Parish. The population of Webster Parish is about equally rural and urban. About 50.5 percent of the population resides in rural areas and 49.5 percent is in urban communities. In 1980, Webster Parish had a population of 43,631. By 1985, the estimated figure had increased by 4.6 percent to 45,754, according to the Bureau of the Census, continuing the growth trend of increasing population evident since 1960. Minden, with a population of 15,800, is the largest city and the parish seat. Other cities and communities are Springhill, Shongaloo, Sarepta, Cotton Valley, Dixie Inn, Doyline, Sibley, Dubberly, Heflin, and Cullen.

The parish consists of two major physiographic areas: the level to steep uplands and terraces and the level and nearly level flood plains. Elevations range from about 140 to 460 feet above mean sea level. The uplands and terraces make up 85 percent of the land area of the parish. The soils on uplands are gravelly, loamy, or sandy and range from poorly drained to somewhat excessively drained. Most of the acreage is in woodland. Smaller acreages are used as pastureland, hayland, urban areas, or cropland. Most of the soils are low in natural fertility. The hazard of erosion is generally the main concern in soil management. Slope, wetness, and low fertility are additional soil limitations for crops and pasture.

The flood plains of streams drain the uplands and make up about 15 percent of the land area. The soils on flood plains are loamy and range from poorly drained to well drained. Most of the acreage is woodland. Smaller acreages are pastureland or cropland. The poorly drained soils are limited by wetness and flooding. The well drained soils are limited mainly by flooding during winter and spring.

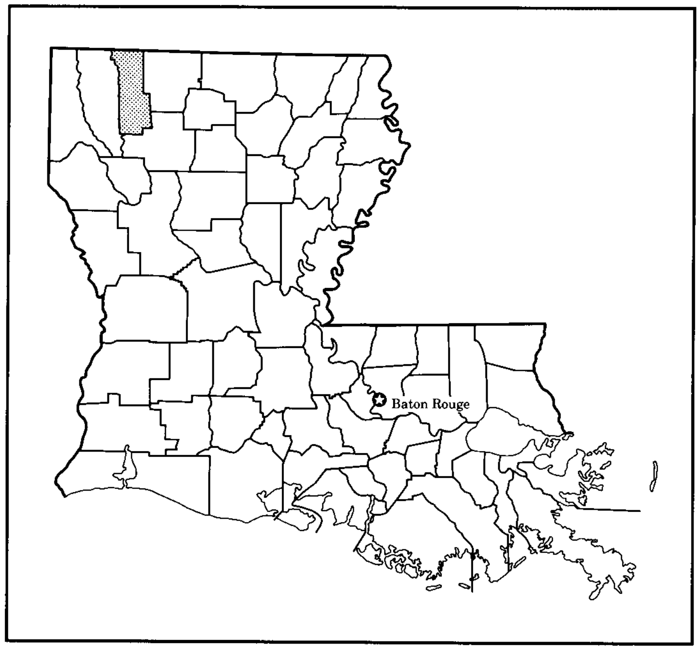

Figure 1.—Location of Webster Parish in Louisiana.

General Nature of the Parish

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

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 Homer Experiment Station in the period 1951 to 1979. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

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

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

The total annual precipitation is 52 inches. Of this, 26 inches, or 50 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 20 inches. The heaviest 1-day rainfall during the period of record was 5.77 inches at Homer Experiment Station on April 29, 1953. Thunderstorms occur on about 55 days each year, and most occur in summer.

The average seasonal snowfall is 1 inch. The greatest snow depth at any one time during the period of record was 5 inches. On an average, there is seldom a day with at least 1 inch of snow on the ground.

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

History and Development

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

In 1871, Webster Parish was created from an area that was part of Claiborne Parish. Minden was named the parish seat. In 1811, the first white man to settle in Webster Parish settled in an area about 8 miles east of the present site of Minden. Other early pioneers settled near Germantown and Sykes Ferry along Bayou Dorcheat. Early immigrants settled near streams. Flooding forced them to move to higher ground. Bayou Dorcheat was navigable for six months of each year to a point near Minden. This was the area's main artery of commerce until 1885, when the railroad was completed.

The parish was self-sustaining from the earliest days. Agriculture became the major enterprise, and cotton was the main cash crop. Timber production replaced cotton as the main source of income in the mid-1900's. Extensive oil and gas production, sand and gravel deposits, woodland products industry, ammunitions, and other light industries have created a healthy economic climate in Webster Parish. The location of Webster Parish to nearby Shreveport has also influenced the economic conditions of the area.

Agriculture

Agriculture is an important industry in Webster Parish. Cotton was the main cash crop before 1950. Thousands of acres of cropland have been converted to pine tree plantations and pastures in the last 40 years.

According to the 1982 Census of Agriculture, 510 farms are in the parish, which is a slight increase since 1978. The average farm is 153 acres with an average value of 916 dollars per acre. Total cropland in Webster Parish was 30,163 acres in 1982, a decrease from the 40,371 reported in 1978. Total pastureland reported in 1982 was 15,776 acres, up slightly from 15,049 acres reported in 1978. The remaining acres in the parish are mainly woodland. A small acreage is used for homesites, urban areas, or industrial sites.

According to the 1987 Louisiana Summary of Agriculture and Natural Resources by the Louisiana Cooperative Extension Service, the main cultivated crops in the parish were cotton, grain sorghum, corn, wheat, hay, and sweet potatoes (17). A small acreage is in home vegetable gardens and commercial vegetable farms.

Webster Parish has 250 producers of horses. A thoroughbred track near Webster Parish created an increase in the number of farms and acres dedicated to the equine industry.

The present land use trend in Webster Parish appears to be stable. Agricultural officials do not foresee any major land use changes.

Transportation

Webster Parish is served by two railroads that connect to major railroad systems. A major bus line and major motor carriers also serve the parish. There are two U.S.

highways (Highway 79 and 80), one Interstate highway (I-20), and numerous other paved state highways and parish roads.

Two airports that have lighted main runways serve the north and central parts of the parish. Commercial air service is available in Shreveport, which is less than 30 miles from Minden.

Industry

The "Sun Belt" quality of life has helped to bring major economic development to Webster Parish. Webster Parish is blessed with a mild climate and natural resources.

In 1984, the average civilian labor force in Webster Parish was 15,400. According to the Louisiana Department of Labor, the 1984 average unemployment rate for Webster Parish was 12.3 percent as compared to 10 percent for the state and 7.5 percent for the United States. The following table shows the number of employees by industry for Webster Parish during 1984:

Industry	*Employment*
Mining	*681*
Construction	*868*
Transportation	*556*
Wholesale Trade	*309*
Retail Trade	*1,966*
Finance	*404*
Services	*3,210*
Public Administration	*387*
Manufacturing	*3,901*

The following table indicates the acreage in urban and built-up land:

Urban Use	*Acres*
Residential	*7,475*
Commercial and Services	*2,502*
Industrial	*1,900*
Transportation	*1,544*

Soils and timber are still among Webster Parish's most valuable resources. Webster Parish is one of Louisiana's leading producers of sand and gravel. Oil and gas are also important resources in the parish.

How This Survey Was Made

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

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

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

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

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

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

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

Map Unit Composition

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

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

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

General Soil Map Units

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

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

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

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

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

The boundaries of the general soil map units in Webster Parish were matched, where possible, with those of previously published surveys of Columbia and Lafayette Counties in Arkansas and Bossier and Claiborne Parishes in Louisiana. In a few places, however, the lines do not join and the names of the map units differ. These differences resulted mainly because of changes in soil series concepts, differences in map unit design, and changes in soil patterns near the survey area boundaries.

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

SOILS ON FLOOD PLAINS

This map unit consists of level and nearly level, poorly drained, well drained, and moderately well drained loamy soils on narrow flood plains. The soils are subject to frequent flooding. This map unit makes up about 15 percent of Webster Parish. Most of the acreage is woodland. Flooding and seasonal wetness are the main limitations for most uses.

1. Guyton-Ouachita-Iuka

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

This map unit consists of soils on flood plains of streams. These soils are subject to frequent flooding. Slopes range from 0 to 2 percent.

This map unit makes up about 15 percent of the parish. It is about 55 percent Guyton soils, 25 percent Ouachita soils, 8 percent Iuka soils, and 12 percent soils of minor extent.

The Guyton soils are level and poorly drained. They are in level areas and in swales. These soils have a dark grayish brown or dark brown silt loam or silty clay loam surface layer. The subsurface layer is light brownish gray and grayish brown, mottled silt loam. The next layer is grayish brown, mottled silty clay loam and light brownish gray, mottled silt loam. The subsoil is grayish brown, mottled silt loam.

The Ouachita soils are nearly level and well drained. They are on low ridges or natural levees on the flood plains. These soils have a brown silt loam surface layer. The next layer is dark yellowish brown silt loam. The subsoil is dark yellowish brown, mottled silty clay loam in the upper part; yellowish brown, mottled silty clay loam in the middle part; and yellowish brown, mottled loam in the lower part. The substratum is yellowish brown, mottled fine sandy loam.

The Iuka soils are nearly level and moderately well drained. They are in swales and low positions on natural levees on the flood plains. These soils have a dark yellowish brown fine sandy loam surface layer. The next layer is dark brown, mottled silt loam. The underlying material is yellowish brown, mottled sandy loam in the upper part; gray, mottled silt loam in the middle part; and grayish brown, mottled silt loam in the lower part.

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

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

The soils in this map unit are moderately well suited to use as woodland. The use of equipment is restricted and seedling mortality is moderate or severe because of flooding and seasonal wetness. Competition from understory plants is severe. Also, the surface layer of these soils compacts when it is moist and heavy equipment is used.

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

These soils are poorly suited to urban and intensive recreational uses because of frequent flooding and seasonal wetness. These soils are not suited to dwellings because of the hazard of flooding.

SOILS ON TERRACES AND UPLANDS

The map units in this group consist of somewhat excessively drained to poorly drained, level to strongly sloping, loamy and sandy soils on high stream terraces and on uplands. These map units make up about 85 percent of Webster Parish. Most of the acreage is woodland or pastureland. Areas used as cropland commonly are small and scattered. Seasonal wetness, steepness of slope, low or medium fertility, poor tilth, soil droughtiness, and potential aluminum toxicity are the main limitations to agricultural uses. Wetness, steepness of slope, moderate to very slow permeability, and moderate to very high shrink-swell potential are limitations for most urban uses.

2. Gurdon-Malbis

Very gently sloping to moderately sloping, somewhat poorly drained and moderately well drained soils that are loamy throughout

This map unit consists of soils on high stream terraces and on ridgetops and side slopes on uplands. Slopes range from 1 to 3 percent on terraces and from 1 to 8 percent on uplands.

This map unit makes up about 2 percent of the parish. It is about 75 percent Gurdon soils, 20 percent Malbis soils, and 5 percent soils of minor extent.

The Gurdon soils are very gently sloping and moderately well drained. They are on high stream terraces. These soils have a dark brown silt loam surface layer. The subsoil is yellowish brown, mottled silt loam in the upper part; light brownish gray, mottled silt loam in the middle part; and grayish brown, mottled silt loam in the lower part.

The Malbis soils are very gently sloping to moderately sloping and moderately well drained. They are on ridgetops and side slopes on uplands. These soils have a brown fine sandy loam surface layer. The next layer is yellowish brown and light yellowish brown loam. The subsoil is strong brown clay loam in the upper part; yellowish brown, mottled clay loam in the middle part; and mottled yellowish brown, light yellowish brown, light brownish gray, and red clay loam in the lower part.

The minor soils in this map unit are the somewhat excessively drained Bienville soils, the well drained Cahaba soils, and the poorly drained Guyton soils. Bienville and Cahaba soils are on low stream terraces, and Guyton soils are on broad flats and in depressional areas.

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

These soils are well suited to woodland. Wetness restricts the use of equipment during winter and spring. These soils are subject to rutting and compaction when they are moist and heavy equipment is used. Competition from understory plants is moderate or severe.

The soils in this map unit are moderately well suited to crops. Low fertility, steepness of slope, wetness, and potentially toxic levels of exchangeable aluminum in the rooting zone are the main limitations.

These soils are well suited to use as pastureland. Low fertility, steepness of slope, and wetness are the main limitations.

The Malbis soils are moderately well suited to urban and intensive recreational uses, and the Gurdon soils are poorly suited to urban and intensive recreational uses. The main limitations are wetness, moderate or moderately slow permeability, and steepness of slope.

3. Kolin-Gore-Wrightsville

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

This map unit consists of soils on ridgetops, side slopes, broad flats, and in slightly depressional areas on uplands. Slopes range from less than 1 percent to 12 percent.

This map unit makes up about 34 percent of the parish. It is about 38 percent Kolin soils, 31 percent Gore soils, 12 percent Wrightsville soils, and 19 percent soils of minor extent.

The Kolin soils are very gently sloping and moderately well drained. They are on broad ridgetops on uplands. These soils have a dark brown silt loam surface layer. The subsurface layer is light yellowish brown, mottled silt loam. The subsoil is yellowish brown, mottled silty clay loam in the upper part. The subsoil is yellowish brown, mottled silty clay loam; yellowish brown silty clay loam with light gray silt coatings; yellowish brown, mottled clay; and yellowish brown, mottled silty clay in the middle part. The subsoil is red clay in the lower part.

The Gore soils are gently sloping to strongly sloping and moderately well drained. They are on ridgetops and side slopes on uplands. These soils have a brown silt loam surface layer. The next layer is yellowish red and light yellowish brown silt loam. The subsoil is red, mottled silty clay loam in the upper part; red, mottled silty clay and red, mottled clay in the middle part; and red clay in the lower part. The substratum is dark red clay.

The Wrightsville soils are level and poorly drained. They are on broad flats and in slightly depressional areas on uplands. These soils have a dark grayish brown silt loam surface layer. The subsurface layer is light brownish gray, mottled silt loam. The next layer is light brownish gray, mottled silty clay loam and light gray, mottled silt loam. The subsoil is light brownish gray, mottled silty clay. The substratum is dark red, mottled clay.

The minor soils in this map unit are the moderately well drained Forbing soils on some of the ridgetops and side slopes.

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

The soils in this map unit are moderately well suited to use as woodland. Wetness and the clayey subsoil restrict the use of equipment and cause moderate or severe seedling mortality. Plant competition is slight to severe, and the surface layer of these soils is subject to compaction when moist and heavy equipment is used.

The soils in this map unit dominantly are moderately well suited to crops. However, the strongly sloping Gore soils are not suited to crops because of slope. Low fertility, potentially toxic levels of exchangeable aluminum in the rooting zone, and wetness are additional limitations.

The Kolin soils are well suited to use as pastureland. The Gore and Wrightsville soils are moderately well suited to use as pastureland. Slope, low fertility, and wetness are the main limitations.

The soils in this map unit are poorly suited to most urban and intensive recreational uses. Wetness, very slow permeability, high shrink-swell potential, and low strength for roads and streets are the main limitations. In addition, flooding is a hazard to dwellings in areas of the Wrightsville soil.

4. Malbis-Ruston-Smithdale

Very gently sloping to strongly sloping, moderately well drained and well drained soils that are loamy throughout

This map unit consists of soils on ridgetops and side slopes on uplands. Slopes range from 1 to 3 percent on the ridgetops and from 3 to 12 percent on the side slopes.

This map unit makes up about 20 percent of the parish. It is about 54 percent Malbis soils, 17 percent Ruston soils, 15 percent Smithdale soils, and 14 percent soils of minor extent.

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

The Ruston soils are very gently sloping and well drained. They are on narrow ridgetops on uplands. These soils have a dark brown fine sandy loam surface layer. The subsoil is yellowish red sandy clay loam in the upper part; red, mottled sandy clay loam, red sandy clay loam, and light yellowish brown sandy loam in the middle part; and red sandy clay loam in the lower part. The substratum is red sandy loam.

The Smithdale soils are strongly sloping and well drained. They are on side slopes on uplands. These soils have a dark brown fine sandy loam surface layer. The next layer is dark brown and yellowish red fine sandy loam. The subsoil is red sandy clay loam in the upper part and yellowish red sandy loam in the lower part.

The minor soils in this map unit are the well drained Boykin soils on narrow ridgetops, the moderately well drained Gurdon soils on high stream terraces, and the moderately well drained Eastwood and Sacul soils on side slopes. In addition, pits are in areas where sand, gravel, or loamy material has been excavated.

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

The soils in this map unit are well suited to use as woodland. They have few limitations to this use. Moderate competition from understory plants is a minor concern in managing woodland in areas of the Malbis soils.

The Malbis and Ruston soils are moderately well suited to crops. The main limitations are slope, low fertility, and potential aluminum toxicity. The Smithdale soils are poorly suited to crops because of slope and the hazard of erosion.

The Malbis and Ruston soils are well suited to use as pastureland. The Smithdale soils are moderately well suited to use as pastureland because of slope and low fertility.

The soils in this map unit are moderately well suited to urban development and well suited to intensive recreational uses. The main limitations are moderate and moderately slow permeability, wetness, steepness of slope, and low strength for roads and streets.

5. McLaurin-Flo

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

This map unit consists of soils on ridgetops and side slopes on uplands. Slopes range from 1 to 5 percent on the ridgetops and from 3 to 8 percent on the side slopes.

This map unit makes up about 3 percent of the parish. It is about 85 percent McLaurin soils, 7 percent Flo soils, and 8 percent soils of minor extent.

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

The Flo soils are gently sloping and somewhat excessively drained. They are on ridgetops on uplands. These soils have a brown loamy fine sand surface layer and a light yellowish brown loamy fine sand subsurface layer. The subsoil is yellowish brown loamy fine sand in the upper part, light yellowish brown loamy fine sand in the middle part, and pale brown fine sand and yellowish red loamy fine sand in the lower part.

The minor soils in this map unit are the well drained Malbis soils on ridgetops and side slopes and the well drained Ruston soils on some of the ridgetops.

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

The soils in this map unit are moderately well suited to use as woodland. Traction is poor on the sandy surface layer during dry periods, and seedling mortality is moderate because of soil droughtiness.

These soils are moderately well suited to crops. The main limitations are slope, low fertility, and soil droughtiness.

These soils are moderately well suited to use as pastureland. Low soil fertility, slope, and soil droughtiness are the main limitations.

The soils in this map unit dominantly are moderately well suited to most urban and intensive recreational uses. Slope is the main limitation for building sites, seepage is a problem for sanitary facilities, and soil droughtiness is a limitation to growing lawn grasses and ornamentals. In addition, shallow excavations are difficult to construct because cutbanks cave easily. The very gently sloping McLaurin soils are well suited to urban and recreational uses.

6. Gore-Forbing

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

This map unit consists of soils on ridgetops and side slopes on uplands. Slopes range from 1 to 12 percent.

This map unit makes up about 2 percent of the parish. It is about 51 percent Gore soils, 43 percent Forbing soils, and 6 percent soils of minor extent.

The Gore soils are gently sloping to strongly sloping and moderately well drained. These soils have a brown silt loam surface layer. The next layer is yellowish red and light yellowish brown silt loam. The subsoil is red, mottled silty clay loam in the upper part; red, mottled silty clay in the middle part; and red clay in the lower part. The substratum is dark red clay.

The Forbing soils are gently sloping to strongly sloping and moderately well drained. These soils have a brown or very dark grayish brown silt loam surface layer. The subsoil is yellowish red, mottled silty clay in the upper part; dark red and red clay in the middle part; and dark red, mottled clay in the lower part.

The minor soils in this map unit are the moderately well drained Kolin soils on broad ridgetops, the well drained Smithdale soils on side slopes, and the poorly drained Wrightsville soils on broad flats and in slightly depressional areas.

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

The soils in this map unit are moderately well suited to use as woodland. Wetness and the clayey subsoil layers restrict the use of equipment and cause moderate seedling mortality. In addition, the surface layer of these soils can compact when it is moist and heavy equipment is used.

The gently sloping soils in this map unit are poorly suited to crops. Low fertility, poor tilth, and potential aluminum toxicity are the main limitations. The moderately sloping to strongly sloping soils in this map unit are not suited to crops because of slope and the hazard of erosion.

These soils are moderately well suited to use as pastureland. Low fertility and slope are the main limitations.

The soils in this map unit are poorly suited to most urban and intensive recreational uses. The main limitations are the clayey subsoil, very slow permeability, slope, high and very high shrink-swell potential, and low strength for roads and streets.

7. Darley-Sacul-Mahan

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

This map unit consists of soils on gently sloping ridgetops and strongly sloping to steep side slopes on uplands. Slopes range from 1 to 5 percent on the ridgetops and from 5 to 30 percent on the side slopes.

This map unit makes up about 16 percent of the parish. It is about 60 percent Darley soils, 25 percent Sacul soils, 9 percent Mahan soils, and 6 percent soils of minor extent.

The well drained Darley soils are gently sloping to steep. These soils have a dark brown or reddish brown gravelly loamy fine sand surface layer. The subsurface layer is yellowish red gravelly loamy fine sand. The subsoil is yellowish red clay loam in the upper part, red clay and alternating layers of yellowish red clay and fractured ironstone in the middle part, and yellowish red sandy clay loam in the lower part.

The Sacul soils are gently sloping to strongly sloping and moderately well drained. They have a surface layer of dark grayish brown fine sandy loam and a subsurface layer of pale brown fine sandy loam. The subsoil is red clay in the upper part; red, mottled clay in the middle part; and light brownish gray, mottled sandy clay loam in the lower part.

The Mahan soils are gently sloping to strongly sloping and well drained. These soils have a dark brown or yellowish brown fine sandy loam surface layer. The subsurface layer is yellowish red fine sandy loam. The subsoil is red clay loam in the upper part; red sandy clay and red, mottled sandy clay in the middle part; and red, mottled sandy clay loam in the lower part.

The minor soils in this map unit are the well drained Ruple soils and the moderately well drained Malbis and Sacul soils on ridgetops and side slopes. In addition, pits are in areas from which ironstone was excavated.

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

The gently sloping and strongly sloping soils in this map unit are well suited to use as woodland. The Darley soils that are steep are moderately well suited because of the hazard of erosion.

The gently sloping soils in this map unit are poorly suited or moderately well suited to crops. Low or medium fertility and potential aluminum toxicity are the main limitations. The strongly sloping, moderately sloping, and steep soils in this map unit are not suited to crops because of slope and the severe erosion hazard.

The gently sloping soils in this map unit are well suited to use as pastureland. The strongly sloping and moderately sloping soils in this map unit are moderately well suited to use as pastureland. Darley soils that are steep are poorly suited to use as pastureland. Low or medium fertility is the main limitation, and erosion is the main hazard.

The soils in this map unit dominantly are moderately well suited to urban and intensive recreational uses. However, the Sacul soils are poorly suited to urban development. The Darley soils that are steep are poorly suited to intensive recreational uses. The ironstone layers in the subsoil, moderate to slow permeability, steepness of slope, high shrink-swell potential, small stones on the surface, seasonal wetness, and low strength for roads and streets are the main limitations. Erosion is the main hazard.

8. Sacul-Mahan

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

This map unit consists of soils on gently sloping ridgetops and strongly sloping side slopes. Drainage is provided by deeply incised streams. Slopes range from 1 to 5 percent on the ridgetops and from 5 to 12 percent on the side slopes.

This map unit makes up about 6 percent of the parish. It is about 70 percent Sacul soils, 7 percent Mahan soils, and 23 percent soils of minor extent.

The Sacul soils are gently sloping to strongly sloping and moderately well drained. They have a dark grayish brown fine sandy loam surface layer. The subsurface layer is pale brown fine sandy loam. The subsoil is red clay in the upper part; red, mottled clay in the middle part; and light brownish gray, mottled sandy clay loam in the lower part.

The Mahan soils are gently sloping to strongly sloping and well drained. They have a dark brown or yellowish brown fine sandy loam surface layer. The subsurface layer is yellowish red fine sandy loam. The subsoil is red clay loam in the upper part; red sandy clay and red, mottled sandy clay in the middle part; and red, mottled sandy clay loam in the lower part.

The minor soils in this map unit are the well drained

Darley and Ruple soils and the moderately well drained Malbis soils on some of the ridgetops and side slopes.

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

The soils in this map unit are well suited to use as woodland. The surface layer of the Sacul soils is subject to compaction. Competition from understory plants is moderate in areas of the Sacul soils.

The gently sloping soils in this map unit are moderately well suited to crops. The main limitations are low or medium fertility and potential aluminum toxicity. The moderately sloping to strongly sloping soils in this map unit are not suited to crops because the hazard of erosion is too severe.

The gently sloping soils in this map unit are well suited to use as pastureland. The moderately sloping to strongly sloping soils in this map unit are moderately well suited to use as pastureland. The main limitations are low or medium soil fertility and slope. Erosion is the main hazard.

The Mahan soils are moderately well suited to urban and intensive recreational uses. Small stones on the surface are a limitation to intensively-used recreation areas. The Sacul soils are poorly suited to urban development and moderately well suited to intensive recreational uses. The main limitations are slope, moderate and slow permeability, high shrink-swell potential, the clayey subsoil, seasonal wetness, and low strength for roads and streets.

9. Eastwood-Malbis

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

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

This map unit makes up about 1 percent of the parish. It is about 47 percent Eastwood soils, 35 percent Malbis soils, and 18 percent soils of minor extent.

The Eastwood soils are gently sloping to strongly sloping. The surface layer is dark yellowish brown or dark grayish brown very fine sandy loam. The subsoil is red silty clay in the upper part; red, mottled silty clay and mottled red, gray, and yellowish brown clay loam in the middle part; and gray, mottled clay loam in the lower part. The substratum is stratified light brownish gray sandy clay loam and red sandy loam.

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

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

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

The Malbis soils are well suited to use as woodland. The Eastwood soils are moderately well suited to use as woodland. The main limitations are seasonal wetness, which somewhat limits the use of equipment and increases the risk of rutting and soil compaction. Erosion is a hazard in strongly sloping areas of the Eastwood soils.

The soils in this map unit dominantly are moderately well suited to crops. However, the strongly sloping Eastwood soils are not suited to crops. The main limitations are slope and low fertility.

The soils in this map unit dominantly are well suited to use as pastureland. However, the strongly sloping Eastwood soils are moderately well suited to use as pastureland. The main limitations are slope and low fertility.

The Malbis soils are moderately well suited to urban development. The very gently sloping to gently sloping Malbis soils are well suited to intensive recreational uses, and the moderately sloping Malbis soils are moderately well suited to intensive recreational uses. The Eastwood soils are poorly suited to most urban and intensive recreational uses. The main limitations are moderately slow and very slow permeability, very high shrink-swell potential, wetness, slope, and low strength for roads and streets.

10. Sacul-Ruple-Darley

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

This map unit consists of soils on ridgetops and side slopes on uplands. Drainage is provided by deeply incised streams. Slopes range from 1 to 5 percent on the ridgetops and from 5 to 30 percent on the side slopes.

This map unit makes up about 1 percent of the parish. It is about 40 percent Sacul soils, 35 percent Ruple soils, 20 percent Darley soils, and 5 percent soils of minor extent.

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

The Ruple soils are gently sloping to strongly sloping and well drained. They have a dark reddish brown gravelly loam surface layer. The subsoil is dark red gravelly clay in the upper part; dark red clay in the middle part; and alternating layers of fractured ironstone and dark red clay in the lower part.

The well drained Darley soils are gently sloping to steep. These soils have a dark brown or reddish brown gravelly loamy fine sand surface layer. The subsurface layer is yellowish red gravelly loamy fine sand. The subsoil is yellowish red clay loam in the upper part, red clay and alternating layers of yellowish red clay and fractured ironstone in the middle part, and yellowish red sandy clay loam in the lower part.

The minor soils in this map unit are the well drained Mahan soils and the moderately drained Malbis soils on some of the ridgetops and side slopes. In addition, pits are in areas from which ironstone has been excavated.

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

The soils in this map unit dominantly are well suited to use as woodland. However, the Darley soils that are steep are moderately well suited to use as woodland. The main concerns are moderate plant competition and the risk of soil compaction. Erosion is a hazard in areas of the steep Darley soils.

The gently sloping Sacul and Ruple soils are moderately well suited to crops. The main limitations are low or medium fertility, soil droughtiness, and potential aluminum toxicity. The Darley soils and the strongly sloping Sacul and Ruple soils are not suited to crops because the hazard of erosion is too severe.

The gently sloping soils in this map unit are well suited to use as pastureland. The moderately sloping to strongly sloping soils in this map unit are moderately well suited to use as pastureland. The Darley soils that are steep are poorly suited to use as pastureland. The main limitations are slope and low or medium fertility.

The Ruple soils and the gently sloping to strongly sloping Darley soils are moderately well suited to urban development. The Sacul soils and the steep Darley soils are poorly suited to urban development. The main limitations are slope, ironstone layers in the subsoil, and moderately slow and slow permeability. High shrink-swell potential and low strength for roads and streets are additional limitations in areas of the Sacul soils. The soils in this map unit dominantly are moderately well suited to intensive recreational uses. However, the strongly sloping Ruple soils and the steep Darley soils are poorly suited to intensive recreational uses. The main limitations are slope, moderately slow permeability, and small stones on the soil surface.

Detailed Soil Map Units

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

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

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

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

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

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

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

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

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

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

The boundaries of map units in Webster Parish were matched with those of the previously completed surveys of Columbia and Lafayette Counties in Arkansas and Bossier and Claiborne Parishes in Louisiana. In a few places, there are differences in the names of the map units. These differences result mainly from changes in soil series concepts, differences in map unit design, and changes in soil patterns near survey are boundaries.

On the detailed soil maps, all of the soil areas in Webster Parish are mapped at the same level of detail, except for strongly sloping to steeply sloping soils and soils that are frequently flooded. The strongly sloping to steeply sloping soils are in woodland, and the land use is not likely to change. The detail in mapping is adequately for this use. Frequent flooding so limits the use and management that separating each soil would be of little value to the land user.

Bn—Bienville loamy fine sand, 1 to 5 percent slopes

This soil is gently sloping and somewhat excessively drained. It is on narrow ridges on low stream terraces. The areas of this soil range from about 15 to 80 acres.

Typically, the surface layer is dark yellowish brown loamy fine sand about 6 inches thick. The subsurface layer to a depth of about 28 inches is brown loamy fine sand. The next layer to about 48 inches is yellowish red and brown, mottled loamy fine sand. The subsoil to a depth of about 75 inches is yellowish brown, mottled loamy fine sand.

This soil has low fertility. Water and air move through this soil at a moderately rapid rate. Water runs off the surface at a slow rate. Roots penetrate easily. This soil dries quickly after rains, and crops are damaged by lack of water during dry periods in summer and fall of most years. A seasonal high water table is at a depth of about 4 to 6 feet during December through April. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Cahaba and Guyton soils. Cahaba soils are at a slightly higher elevation than the Bienville soil and have a loamy subsoil. The poorly drained Guyton soils are on broad flats and in depressional areas. They are grayish throughout the profile. The included soils make up about 15 percent of the map unit.

This Bienville soil is used mainly as mixed hardwood and pine woodland. A small acreage is used as pastureland or cropland.

This soil is moderately well suited to use as pine woodland. The main concerns in producing and harvesting timber are severe equipment use limitations and moderate seedling mortality. The sandy surface layer restricts the use of wheeled equipment, especially when the soil is saturated or very dry. The very low to moderate available water capacity generally influences seedling survival in areas where understory plants are numerous. Using special planting stock that is larger than is normally used or containerized planting stock reduces seedling mortality.

This soil is moderately well suited to cultivated crops. It is limited mainly by low fertility and soil droughtiness. The main suitable crops are cotton, soybeans, corn, and vegetables. The organic matter content can be maintained by using a suitable cropping system. Most crops respond well to lime and fertilizer. In areas where water of suitable quality is available, supplemental irrigation can prevent damage to crops during dry periods.

This soil is moderately well suited to pasture. The main limitations are low fertility and soil droughtiness. The main suitable pasture plants are improved bermudagrass, common bermudagrass, weeping lovegrass, and crimson clover. Also, bahiagrass and ryegrass can be grown, but establishing the plants is difficult, and forage production is low. Proper grazing, weed control, and fertilizer are needed for maximum quality of forage.

This soil is moderately well suited to urban development. It has moderate limitations for septic tank absorption fields because of seasonal wetness. It has severe limitations for shallow excavations because of unstable cutbanks. Seepage is a problem and ground water can be contaminated if this soil is used for sewage lagoons or sanitary landfills. Revegetating disturbed areas around construction sites as soon as possible helps to control soil erosion. Using self-contained sewage disposal units or a community disposal system reduces the risk of ground-water contamination. Irrigating helps to ensure growth of lawn grasses and ornamentals.

This soil is moderately well suited to intensive recreational uses. It has moderate limitations for camp areas, picnic areas, paths, and playgrounds because of the sandy surface layer. Slope is also a limitation for playgrounds. Adding loamy material to the soil surface improves this soil for intensively used recreational areas. A good vegetative cover helps to control erosion. The cover can be maintained by irrigation and by adding fertilizer.

This Bienville soil is in capability subclass IIIs. The woodland ordination symbol is 10S.

By—Boykin loamy fine sand, 1 to 5 percent slopes

This soil is gently sloping and well drained. It is on ridgetops on uplands. The areas of this soil range from about 10 to 250 acres.

Typically, the surface layer is dark brown loamy fine sand about 4 inches thick. The subsurface layer to a depth of about 22 inches is loamy fine sand. It is yellowish brown in the upper part and light yellowish brown in the lower part. The subsoil to a depth of about 83 inches is yellowish red, mottled fine sandy loam in the upper part; red sandy clay loam in the middle part; and red, mottled sandy clay loam in the lower part.

This soil has low fertility. Water and air move through the subsoil at a moderate rate. Water runs off the surface at a medium rate. This soil dries quickly after rains, and plants suffer from lack of water during summer and fall of most years. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Malbis, Ruston, and Smithdale soils. Malbis and Ruston soils are in positions similar to those of the Boykin soil. Smithdale soils are on side slopes. Malbis, Ruston, and Smithdale soils have loamy surface and subsurface layers. The included soils make up about 15 percent of the map unit.

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

This soil is moderately well suited to use as pine woodland. Poor traction can restrict equipment use during dry periods. Competition from undesirable understory plants is moderate. Seedling mortality is generally moderate because of soil droughtiness. Using special planting stock that is larger than is normally used or containerized planting stock reduces seedling mortality. Competing vegetation can be controlled by proper site preparation and by spraying, cutting, or girdling to eliminate unwanted weeds, brush, or trees.

This soil is moderately well suited to cultivated crops. Droughtiness limits the choice and production of crops. In addition, this soil has low fertility, medium runoff, and is subject to erosion. The main suitable crops are corn, watermelons, and truck crops. Cotton can be grown, but production is low, especially in years of less than normal rainfall. The surface layer of this soil is friable and easy to keep in good tilth. It is easy to work when moist, but traction is poor when the soil is dry. Conservation practices, such as returning all crop residue to the soil surface, help to conserve moisture, control erosion, and improve soil fertility and content of organic matter. Crops respond well to fertilizer and lime. In areas where water of suitable quality is available, supplemental irrigation can prevent damage to crops during dry periods.

This soil is moderately well suited to pasture. The main limitations are low fertility and soil droughtiness. The main suitable pasture plants are improved bermudagrass, weeping lovegrass, and crimson clover. Bahiagrass can also be grown, but establishing the plants is difficult, and forage production is low. Where practical, seedbed preparation should be on the contour or across the slope to control erosion. Fertilizer and lime are needed for optimum forage production.

This soil is well suited to urban use. However, seepage is a problem if this soil is used for sewage lagoons. Slope is a moderate limitation for small commercial buildings. Revegetating disturbed areas around construction sites as soon as possible helps to control soil erosion. The floor and walls of sewage lagoons should be coated with impervious material to prevent seepage of effluent from the lagoons.

This soil is moderately well suited to intensive recreational uses. The sandy surface layer becomes loose when dry and furnishes poor traction. Slope is an additional limitation for playgrounds. Adding loamy material to the soil surface improves this soil for intensively used recreational areas. Maintaining an adequate vegetative cover helps to control erosion. Supplemental irrigation is needed to maintain a good cover.

This Boykin soil is in capability subclass IIIs. The woodland ordination symbol is 10S.

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

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

Typically, the surface layer is grayish brown fine sandy loam about 6 inches thick. The next layer is grayish brown fine sandy loam and yellowish red sandy loam about 4 inches thick. The subsoil to a depth of about 49 inches is yellowish red sandy clay loam in the upper and middle parts and yellowish red, mottled sandy loam in the lower part. The substratum to a depth of about 65 inches is yellowish brown sandy loam.

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

Included with this soil in mapping are a few small areas of Bienville and Guyton soils. The somewhat excessively drained Bienville soils are at a slightly lower elevation than the Cahaba soil and are sandy throughout the profile. The poorly drained Guyton soils are on broad flats and in depressional areas and are grayish throughout the profile. The included soils make up about 15 percent of the map unit.

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

This Cahaba soil is well suited to use as pine woodland and has few limitations for use and management. However, competition from understory plants is moderate. Proper site preparation controls initial plant competition, and spraying controls subsequent growth.

This Cahaba soil is well suited to cultivated crops. It is limited mainly by low fertility, slope, and slight soil droughtiness. Erosion is a moderate hazard. The main suitable crops are cotton, soybeans, corn, and vegetables. Conservation tillage, terraces, diversions, and grassed waterways can help to control erosion. The organic matter content can be maintained by using a suitable cropping system. Most crops respond well to lime and fertilizer. In areas where water of suitable quality is available, supplemental irrigation can prevent damage to crops during dry periods of most years.

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

This soil is well suited to use for building sites, local roads and streets, and septic tank absorption fields. It has few limitations for these uses; however, cutbanks cave easily where shallow excavations are constructed. In addition, seepage is a problem if this soil is used for sewage lagoons or sanitary landfills, and ground water can be contaminated. Revegetating disturbed areas around construction sites as soon as possible helps to control soil erosion. This soil is a probable source of sand for use in construction. The floor and walls of landfills and sewage lagoons should be coated with impervious material to prevent seepage of effluent.

This soil is well suited to recreational uses. It has few limitations for this use; however, slope is a moderate limitation for playgrounds. Maintaining a good vegetative cover on playgrounds helps to control erosion.

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

Da—Darley gravelly loamy fine sand, 1 to 5 percent slopes

This soil is gently sloping and well drained. It is on upland ridgetops. The areas of this soil are irregular in shape and range from 20 to 300 acres.

Typically, the surface layer is dark brown gravelly loamy fine sand about 5 inches thick. The subsurface layer is yellowish red gravelly loamy fine sand about 5 inches thick. The subsoil to a depth of about 32 inches is yellowish red clay loam in the upper part and red clay in the lower part. The next part of the subsoil to a depth of about 44 inches is alternating layers of yellowish red clay and fractured ironstone. The lower part of the subsoil to a depth of about 65 inches is yellowish red sandy clay loam.

This soil has medium fertility and high levels of exchangeable aluminum that are potentially toxic to most crops. Permeability is moderately slow. This soil dries quickly after rains. The large amount of ironstone fragments in the surface layer and subsoil reduces the available water capacity. Water runs off the surface at a medium rate. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Mahan, Ruple, and Sacul soils. Mahan and Sacul soils are at a slightly lower elevation than the Darley soil and do not have ironstone layers in the subsoil. Ruple soils are at a higher elevation than the Darley soil and have a subsoil that is dark red throughout. Also included with this Darley soil in mapping are a few small Pits from which ironstone was removed. The included soils and miscellaneous areas make up about 15 percent of the map unit.

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

This soil is well suited to use as pine woodland and has few limitations for use and management. However, competition from understory plants is moderate. Proper site preparation controls initial plant competition, and spraying controls subsequent growth.

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

This soil is well suited to pasture. Slope and medium fertility are the main limitations for this use. The main suitable pasture plants are common bermudagrass, improved bermudagrass, crimson clover, tall fescue, bahiagrass, and ryegrass. Where practical, seedbed preparation should be on the contour or across the slope to control erosion. Fertilizer and lime are needed for optimum production of forage. Periodic mowing and clipping help to maintain uniform growth, discourage selective grazing, and reduce clumpy growth.

This soil is moderately well suited to urban development. It has slight limitations for building sites and local roads and streets and severe limitations for most sanitary facilities. The main limitations are moderately slow permeability and the ironstone layers. Erosion is the main hazard. Revegetating disturbed areas around construction sites as soon as possible helps to control soil erosion. Plants are difficult to establish in areas where the surface layer has been removed, exposing the clayey subsoil or the ironstone layers. Mulching and fertilizing cut areas help to establish plants. The bottom and walls of lagoons need to be sealed to prevent seepage of effluent. Unless septic tank absorption lines are installed on the contour, effluent can surface in downslope areas and create a hazard to health. Shallow excavations are difficult to construct because of the layers of ironstone in the subsoil. The length of the absorption lines can be increased to overcome the moderately slow permeability.

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

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

DE—Darley gravelly loamy fine sand, 5 to 12 percent slopes

This soil is strongly sloping and well drained. It is on side slopes in the uplands. The areas of this soil are irregular in shape and range from 30 to 250 acres. Fewer observations were made than in other map units because of steep slopes and less intensive use of the soil.

Typically, the surface layer is reddish brown gravelly loamy fine sand about 5 inches thick. The subsurface layer is yellowish red gravelly fine sandy loam about 7 inches thick. The subsoil to a depth of about 50 inches is red sandy clay in the upper part and alternating layers of ironstone and yellowish red clay in the lower part. The subsoil to a depth of about 65 inches is strong brown fine sandy loam.

This soil has medium fertility and high levels of exchangeable aluminum that are potentially toxic to most crops. Permeability is moderately slow. This soil dries quickly after rains. Water runs off the surface at a rapid rate. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Mahan, Ruple, and Sacul soils. Mahan and Sacul soils are at a slightly lower elevation than the Darley soil and do not have continuous ironstone layers in the subsoil. In addition, Sacul soils have grayish mottles in the upper part of the subsoil. Ruple soils are at a higher elevation than the Darley soil and have a subsoil that is dark red throughout. Also included with this Darley soil in mapping are a few small Pits from which ironstone was removed. The included soils and miscellaneous areas make up about 15 percent of the map unit.

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

This soil is well suited to use as pine woodland and has few limitations for use and management. However, plant competition is moderate. Proper site preparation controls initial growth of unwanted plants, and spraying controls subsequent growth.

This soil generally is not suited to cultivated crops. The hazard of erosion is too severe for this use. However, if this soil is adequately protected from erosion, the less sloping areas can be cropped. Medium fertility and potentially toxic levels of exchangeable aluminum in the rooting zone are additional limitations. The main suitable crop is wheat. The surface layer of this soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. However, where coarse fragments are concentrated on the soil surface, seedbed preparation can be difficult and seed germination reduced. Crop residue left on or near the surface helps to reduce runoff and helps to maintain soil tilth and organic matter content. Crops respond well to lime and fertilizer, which improve fertility and reduce the levels of exchangeable aluminum.

This soil is moderately well suited to pasture. It is limited mainly by slope. Erosion is the main hazard. Medium fertility is a minor limitation. Seedbed preparation should be on the contour or across the slope where practical. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, tall fescue, ryegrass, and crimson clover. Proper grazing, weed control, and fertilizer are needed for maximum quality of forage.

This soil is moderately well suited to urban development. It has slight to moderate limitations for dwellings and severe limitations for most sanitary facilities. The main limitations are moderately slow permeability, slope, and the ironstone layers. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed. Mulching and fertilizing cut areas help to establish plants. Effluent from septic tank absorption fields can surface in downslope areas and create a hazard to health. Installing absorption fields on the contour minimizes this problem. Increasing the length of the absorption lines helps to overcome the moderately slow permeability.

This soil is moderately well suited to recreational uses. Small stones on the soil surface are severe limitations to most recreational uses. Slope is an additional limitation for playgrounds. Cuts and fills should be seeded or mulched to control erosion. Plant cover can be maintained by adding fertilizer and by controlling traffic.

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

DR—Darley gravelly loamy fine sand, 12 to 30 percent slopes

This soil is steep and well drained. It is on side slopes in the uplands. Slopes are short and irregular. The areas of this soil range from 40 to 300 acres. Fewer observations were made than in other map units because of steep slopes and less intensive use of the soil.

Typically, the Darley soil has a surface layer of reddish brown gravelly loamy fine sand about 5 inches thick. The subsurface layer is yellowish red gravelly fine sandy loam about 5 inches thick. The subsoil to a depth of about 65 inches is yellowish red sandy clay and sandy clay loam in the upper part, alternating layers of ironstone and yellowish red sandy clay in the middle part, and strong brown fine sandy loam in the lower part.

This soil has medium fertility and high levels of exchangeable aluminum that are potentially toxic to most crops. Permeability is moderately slow. Water runs off the surface at a rapid rate. This soil dries quickly after rains. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Mahan and Sacul soils. Mahan and Sacul soils are at a slightly lower elevation than the Darley soil and do not have ironstone layers in the subsoil. Also included with this Darley soil in mapping are a few small Pits from which ironstone was removed. The included soils and miscellaneous areas make up about 15 percent of the map unit.

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

This soil is moderately well suited to use as pine woodland. The main concerns in producing and harvesting timber are moderate equipment use limitations and a moderate erosion hazard caused by slope. In addition, competition from undesirable understory plants is moderate. Management that minimizes the risk of erosion is essential in harvesting timber. Roads and landings can be protected from erosion by constructing diversions and by seeding cuts and fills. In places, conventional methods of harvesting are difficult to use because of slope. Proper site preparation controls initial growth of unwanted understory plants, and spraying controls subsequent growth.

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

This soil is poorly suited to pasture. The main limitations are slope and the severe hazard of erosion. In places, the slope limits the use of equipment. Suitable pasture plants are common bermudagrass and bahiagrass. Native grasses are best suited to the more sloping areas where seedbed preparation is difficult. Fertilizer and lime are needed for optimum production of forage.

This soil is poorly suited to urban development. The main limitations are steepness of slope, moderately slow permeability, and the ironstone layers. Excavation for roads and buildings increases the hazard of erosion; therefore, disturbed areas around construction sites should be revegetated as soon as possible. Shallow excavations are difficult to construct because of the ironstone layers in the subsoil. Effluent from septic tank absorption fields can surface in downslope areas and create a hazard to health. Using self-contained disposal units can remove this problem.

This soil is poorly suited to most intensive recreational uses because of the severe hazard of erosion and slope. Small stones on the surface are an additional limitation for most recreational uses. Paths and trails should be on the contour or across the slopes to prevent erosion.

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

Ea—Eastwood very fine sandy loam, 1 to 5 percent slopes

This soil is gently sloping and moderately well drained. It is on ridgetops on uplands. The areas of this soil range from about 20 to 200 acres.

Typically, the surface layer is dark yellowish brown very fine sandy loam about 6 inches thick. The subsoil to a depth of about 52 inches is red silty clay in the upper part; red, mottled silty clay and mottled red, gray, and yellowish brown clay loam in the middle part; and gray, mottled clay loam in the lower part. The substratum to a depth of about 75 inches is stratified light brownish gray sandy clay loam and red sandy loam.

This soil has low fertility. Water and air move through this soil at a very slow rate. Water runs off the surface at a medium rate. When dry, this soil cracks to a depth of 20 inches or more. The cracks are 0.5 inch or more wide. The shrink-swell potential is very high.

Included with this soil in mapping are a few small areas of Mahan and Malbis soils. Mahan and Malbis soils are at a lower elevation than the Eastwood soil. When dry, Mahan soils do not crack as deeply as the Eastwood soil. Malbis soils are loamy throughout the profile. The included soils make up about 15 percent of the map unit.

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

This soil is moderately well suited to use as pine woodland. The main concern in producing and harvesting timber is the restricted use of equipment because of the clayey subsoil. Conventional methods of harvesting timber generally are suitable, but this soil can compact if it is wet and heavy equipment is used. Harvesting only during drier periods can reduce rutting and compaction.

This soil is poorly suited to cultivated crops. The main limitations are slope and low fertility. The main suitable crops are cotton, wheat, and corn. Conservation tillage, terraces, and grassed waterways can help to control erosion. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Crops respond well to lime and fertilizer.

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

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

This soil is poorly suited to most intensive recreational uses. It is limited mainly by very slow permeability. Plant cover can be maintained by adding fertilizer and by controlling traffic. If sanitary facilities are provided, self-contained disposal units are better suited than septic tank absorption fields to properly dispose of sewage because of the very slow permeability.

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

EO—Eastwood very fine sandy loam, 5 to 12 percent slopes

This soil is strongly sloping and moderately well drained. It is on side slopes on uplands. The areas of this soil are irregular in shape and range from 50 to 350 acres. Fewer observations were made than in other map units because of slope and less intensive use of the soil.

Typically, the surface layer is dark grayish brown very fine sandy loam about 6 inches thick. The subsoil is about 37 inches thick. It is red silty clay in the upper part; red and mottled red, gray, and brown silty clay in the middle part; and gray, mottled clay loam in the lower part. The substratum to a depth of about 65 inches is gray sandy clay loam. In places, the subsoil is less than 36 inches thick.

This soil has low fertility. Permeability is very slow in the subsoil. Water runs off the surface at a rapid rate. When dry, this soil cracks to a depth of 20 inches or more. The cracks are 0.5 inch or more thick. The shrink-swell potential in the subsoil is very high.

Included with this soil in mapping are a few small areas of Mahan and Malbis soils. Mahan and Malbis soils are at a lower elevation than the Eastwood soil. When dry, Mahan soils do not crack as deeply as the Eastwood soil. Malbis soils are loamy throughout the profile. The included soils make up about 10 percent of the map unit.

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

This soil is moderately well suited to use as pine woodland. The main concerns in producing and harvesting timber are moderate equipment use limitations caused by the clayey subsoil and a moderate hazard of erosion caused by rapid runoff and slope. Soil compaction is also a hazard if logging is done when the soil is moist. Management that minimizes the risk of erosion is essential in harvesting timber. Conventional methods of harvesting trees generally can be used, but equipment use is limited during wet periods. Harvesting only during dry periods can reduce rutting and soil compaction.

This soil is not suited to cultivated crops. The hazard of erosion generally is too severe for this use. The main limitations are slope and low fertility. If special soil-conserving practices are used, small areas of less sloping soils can be cropped. The main suitable crop is wheat. Returning crop residue to the soil or regularly adding other organic matter improves fertility, reduces crusting, and increases the water intake rate. Early fall seeding, conservation tillage, terraces, diversions, and grassed waterways can help to control erosion. All tillage should be on the contour or across the slope. Crops respond well to lime and fertilizer.

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

This soil is poorly suited to urban use. The main limitations are slope, very slow permeability, the clayey subsoil, very high shrink-swell potential, and low strength for roads and streets. Preserving the existing plant cover during construction helps to control erosion. Septic tank absorption fields should be installed on the contour to prevent effluent from surfacing in downslope areas. The very slow permeability can be partially overcome by increasing the size of the absorption field. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. Roads and streets can be designed to offset the limited ability of the soil to support a load.

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

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

Fc—Flo loamy fine sand, 1 to 5 percent slopes

This soil is gently sloping and somewhat excessively drained. It is on ridgetops on uplands. The areas of this soil range from about 10 to 250 acres.

Typically, the surface layer is brown loamy fine sand about 11 inches thick. The subsurface layer is light yellowish brown loamy fine sand about 14 inches thick. The subsoil to a depth of about 61 inches is yellowish brown loamy fine sand in the upper part and light yellowish brown loamy fine sand in the lower part. The subsoil to a depth of about 85 inches is pale brown fine sand and yellowish red loamy fine sand.

This soil has low fertility. Water and air move through this soil at a rapid rate. Water runs off the surface at a very slow rate. This soil dries quickly after heavy rains. Most crops and pasture plants suffer from lack of water during summer and fall of most years. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of McLaurin soils. McLaurin soils are in positions similar to those of the Flo soil and have a subsoil that is loamy in the upper part. The included soils make up about 10 percent of the map unit.

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

This soil is moderately well suited to use as pine woodland. When the surface layer is dry, it causes poor traction. Seedling mortality can be moderate because of soil droughtiness. In addition, competition from undesirable understory plants is moderate. Seedlings should be planted only during moist periods. Organic matter is conserved on this soil by restricting burning and leaving slash distributed. Proper site preparation controls initial growth of unwanted understory plants, and spraying controls subsequent growth.

This soil is moderately well suited to cultivated crops. Low fertility, limited choice of crops, and soil droughtiness are unfavorable features for this use. This soil is well suited to specialty crops, such as watermelons and peanuts. This soil is friable and easy to keep in good tilth. It is easy to work when moist, but traction is poor when the surface layer is dry. Proper management of crop residue helps maintain content of organic matter, improve tilth, and conserve moisture. The response to fertilizer is fair. Lime generally is needed. In areas where water of suitable quality is available, supplemental irrigation can prevent damage to crops during dry periods.

This soil is moderately well suited to pasture. Low fertility and soil droughtiness are the main limitations. The main suitable pasture plants are improved bermudagrass, weeping lovegrass, and crimson clover. Bahiagrass can also be grown, but establishing the plants is difficult, and forage production is low. Proper grazing, weed control, and fertilizer are needed for maximum quality of forage.

This soil is moderately well suited to urban use. It has few limitations for dwellings and local roads and streets and severe limitations for most sanitary facilities because of the rapid permeability and the hazard of seepage. In addition, cutbanks are subject to caving where shallow excavations are made, and soil droughtiness is a limitation for lawn grasses and ornamentals. If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage. Mulching, fertilizing, and irrigation are needed to establish lawn grasses and other small-seeded plants.

This soil is moderately well suited to intensive recreational uses. The sandy surface layer provides poor traction when it is dry. Irrigation is generally needed for golf course fairways and in other areas where landscape plants and lawn grasses are planted. Slope is an additional limitation for playgrounds. Plant cover can be maintained and erosion can be reduced by irrigation and by adding fertilizer.

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

Fn—Forbing silt loam, 1 to 5 percent slopes

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

Typically, the surface layer is very dark grayish brown silt loam about 4 inches thick. The subsoil to a depth of about 61 inches is yellowish red clay in the upper part, dark red silty clay in the middle part, and red silty clay in the lower part.

This soil has low fertility. Water and air move through this soil at a very slow rate. Water runs off the surface at a medium rate. When dry, this soil cracks to a depth of 20 inches or more. The cracks are 0.5 inch or more wide. The shrink-swell potential in the subsoil is very high.

Included with this soil in mapping are a few small areas of Gore and Kolin soils. Gore soils are in positions similar to those of the Forbing soil, and Kolin soils are on slightly broader ridgetops than the Forbing soil. Gore soils have less clay in the subsoil than the Forbing soil. Kolin soils have a subsoil that is loamy in the upper part. The included soils make up about 15 percent of the map unit.

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

This Forbing soil is moderately well suited to use as pine woodland. The main concerns in producing and harvesting timber are moderate equipment use limitations and moderate seedling mortality because of the thin surface layer and the clayey subsoil. Plant competition is moderate. Using standard wheeled and tracked equipment when the soil is moist causes rutting and compaction. Puddling can occur when the soil is wet. Using low-pressure ground equipment or harvesting during drier periods reduces damage to the soil and helps to maintain productivity. Using special planting stock that is larger than is normally used or containerized planting stock improves the rate of seedling survival.

This Forbing soil is poorly suited to cultivated crops. It is limited mainly by low fertility and slope. The main suitable crops are grain sorghum and soybeans. This soil is difficult to keep in good tilth, particularly where part of the subsoil is mixed into the plow layer. 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. Slope and low fertility are the main limitations. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, and wild winter peas. Seedbed preparation should be on the contour or across the slope where practical. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is poorly suited to urban development. The main limitations are very slow permeability, the clayey subsoil, very high shrink-swell potential, and low strength for local roads and streets. Roads can be designed to offset the limited ability of the soil to support a load. If septic tank absorption fields are installed, use of sandy backfill for the trench and long absorption lines help to compensate for the very slow permeability. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. Establishing and maintaining plant cover can be achieved through proper fertilizing, seeding, mulching, and shaping of the slopes.

This soil is poorly suited to recreational uses. It is limited mainly by very slow permeability. Good drainage should be provided in intensively used areas, such as playgrounds and camp areas. Erosion and sedimentation can be controlled and the beauty of the area enhanced by maintaining adequate plant cover.

This Forbing soil is in capability subclass IVe. The woodland ordination symbol is 6C.

FO—Forbing silt loam, 5 to 12 percent slope

This soil is strongly sloping and moderately well drained. It is on side slopes on uplands. The areas of this soil range from about 20 to 400 acres. Fewer observations were made than in other map units because of slope and less intensive use of the soil.

Typically, the surface layer is brown silt loam about 3 inches thick. The subsoil to a depth of about 85 inches is yellowish red, mottled clay in the upper part; dark red and red clay in the middle part; and dark red, mottled clay in the lower part.

This soil has low fertility. Water and air move through this soil at a very slow rate. Water runs off the surface at a rapid rate. When dry, this soil cracks to a depth of 20 inches or more. The cracks are 0.5 inch or more wide. The shrink-swell potential in the subsoil is very high.

Included with this soil in mapping are a few small areas of Gore and Kolin soils. Gore soils are in positions similar to those of the Forbing soil and have less clay in the subsoil. Kolin soils are on ridgetops and have a subsoil that is loamy in the upper part. The included soils make up about 15 percent of the map unit.

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

This soil is moderately well suited to use as pine woodland. The main concerns in producing and harvesting timber are moderate equipment use limitations and moderate seedling mortality caused by the clayey subsoil and thin surface layer. Proper site preparation and harvesting should be done only during dry periods to reduce soil compaction. Using special planting stock that is larger than is normally used or containerized planting stock improves the survival rate of seedlings.

This soil generally is not suited to cultivated crops because of the severe hazard of erosion and slope. However, if this soil is adequately protected from erosion, the less sloping areas can be cropped. Low fertility is an additional limitation for crops. The main suitable crops are wheat and grain sorghum. The plow layer of this soil is sticky when wet and hard when dry, and it becomes cloddy if tilled when too wet or too dry. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Crops respond well to lime and fertilizer. All tillage should be on the contour or across the slope. Limiting tillage for seedbed preparation and weed control reduces runoff and erosion.

This soil is moderately well suited to pasture. It is limited mainly by the hazard of erosion, low fertility, and slope. Suitable pasture plants are common bermudagrass, improved bermudagrass, and bahiagrass. Where practical, seedbed preparation should be on the contour or across the slope to control erosion. Fertilizer and lime are needed for optimum production of forage. Proper stocking and pasture rotation help keep the pasture and soil in good condition.

This soil is poorly suited to urban development. The main limitations are very slow permeability, the clayey subsoil, low strength for road and streets, very high shrink-swell potential, and slope. If septic tank absorption fields are installed, use of sandy backfill for the trench and long absorption lines help to compensate for the very slow permeability. Installing absorption lines on the contour helps to prevent effluent from surfacing in downslope areas. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. Roads can be designed to offset the limited ability of the soil to support a load. Establishing and maintaining plant cover can be achieved through proper fertilizing, seeding, mulching, and shaping of the slopes.

This soil is poorly suited to most intensive recreational uses. It is limited mainly by very slow permeability and slope. This soil erodes easily. Cuts and fills should be seeded or mulched and plant cover maintained to control erosion. The cover can be maintained by adding fertilizer and by controlling traffic.

This Forbing soil is in capability subclass VIe. The woodland ordination symbol is 6C.

Go—Gore silt loam, 1 to 5 percent slopes

This soil is gently sloping and moderately well drained. It is on ridgetops and side slopes on uplands. The areas of this soil are irregular in shape and range from about 10 to 350 acres. Slopes generally are short and smooth.

Typically, the surface layer is brown silt loam about 3 inches thick. The next layer is yellowish red and yellowish brown silty clay loam about 4 inches thick. The subsoil to a depth of about 62 inches is red silty clay in the upper part; red, mottled silty clay in the middle part; and red clay in the lower part. The substratum to a depth of about 85 inches is dark red clay.

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to crops. Water and air move through this soil at a very slow rate. Water runs off the surface at a medium rate. 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. When dry, this soil cracks to a depth of 20 inches or more. The cracks are 0.5 inch or more wide. The shrink-swell potential is high.

Included with this soil in mapping are a few small areas of Forbing, Kolin, and Wrightsville soils. Forbing soils are in positions similar to those of the Gore soil and are on side slopes and contain more clay in the subsoil. Kolin soils are on slightly broader ridgetops and have a subsoil that is loamy in the upper part. Wrightsville soils are on broad flats and in depressional areas and are grayish throughout the profile. The included soils make up about 15 percent of the map unit.

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

This soil is moderately well suited to use as pine woodland. The main concerns in producing and harvesting timber are moderate equipment use limitations and moderate seedling mortality caused by the clayey subsoil and the thin surface layer. Because the clayey subsoil is sticky when wet, planting and harvesting should be done only during dry periods. Using low-pressure ground equipment during rainy periods reduces rutting and compaction of the soil and helps to maintain productivity. Using special planting stock that is larger than is normally used or containerized planting stock improves the rate of seedling survival.

This soil is poorly suited to most cultivated crops. It is limited mainly by the severe erosion hazard, low fertility, and slope. The main suitable crops are grain sorghum and soybeans. Properly managing crop residue, farming on the contour, and constructing grassed waterways and terraces help reduce runoff and soil erosion. Most crops respond well to lime and fertilizer, which improve soil fertility and reduce the levels of exchangeable aluminum in the rooting zone.

This soil is moderately well suited to pasture. The main limitations are slope, low fertility, and the hazard of erosion. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, and crimson clover. Annual grasses, such as ryegrass and wheat, are suitable for winter forage. Lime and fertilizer help to overcome the low fertility and promote good growth of forage plants. Proper stocking and pasture rotation help keep the pasture in good condition.

This soil is poorly suited to urban development. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are very slow permeability, high shrink-swell potential, and low strength for roads and streets. Septic tank absorption fields do not function properly during rainy periods because of the very slow permeability. Lagoons or self-contained disposal units can be used to dispose of sewage properly. If buildings are constructed on this soil, properly designing foundations and footings and diverting runoff away from buildings help prevent structural damage as a result of shrinking and swelling. Roads and streets can be designed to compensate for the limited ability of the soil to support a load.

This soil is poorly suited to most intensive recreational uses. It is limited mainly by very slow permeability. Because water moves very slowly through the soil, runoff and the hazard of erosion are increased. Cuts and fills should be seeded and mulched. Adding loamy material to the surface improves this soil for playgrounds.

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

GR—Gore silt loam, 5 to 12 percent slopes

This soil is strongly sloping and moderately well drained. It is on side slopes on uplands. The areas of this soil range from about 15 to 300 acres. Fewer observations were made than in other map units because of slope and less intensive use of the soil.

Typically, the surface layer is brown silt loam about 2 inches thick. The next layer is yellowish red and light yellowish brown silt loam about 5 inches thick. The subsoil to a depth of about 62 inches is red, mottled silty clay loam in the upper part; red, mottled silty clay and red, mottled clay in the middle part; and red clay in the lower part. The substratum to a depth of about 85 inches is dark red clay.

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to crops.

Water and air move through this soil at a very slow rate. Water runs off the surface at a rapid rate. When dry, this soil cracks to a depth of 20 inches or more. The cracks are 0.5 inch or more wide. The shrink-swell potential is high.

Included with this soil in mapping are a few small areas of Forbing and Kolin soils. Forbing soils are in positions similar to those of the Gore soil and have more clay in the subsoil. Kolin soils are on ridgetops and have a subsoil that is loamy in the upper part. The included soils make up about 10 percent of the map unit.

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

This soil is moderately well suited to use as pine woodland. The main concerns in producing and harvesting timber are a restricted use of equipment and moderate seedling mortality. Because the clayey soil is sticky when wet, planting and harvesting should be done during dry periods to reduce soil compaction. Using special planting stock that is larger than is normally used and containerized planting stock improves the rate of seedling survival.

This soil generally is not suited for cultivated crops. The hazard of erosion is too severe for this use. However, if this soil is adequately protected from erosion, the less sloping areas can be cropped. Low fertility and potentially toxic levels of exchangeable aluminum are soil limitations. In addition, where part of the subsoil is mixed into the plow layer, poor tilth can be a problem. 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 reduces runoff and erosion. Crops respond well to lime and fertilizer.

This soil is moderately well suited to pasture. Slope and low fertility are the main limitations. Suitable pasture plants are bahiagrass, common bermudagrass, ball clover, and crimson clover. Proper grazing, weed control, and fertilizer are needed for maximum quality of forage.

This soil is poorly suited to urban use. The main limitations are the clayey subsoil, very slow permeability, high shrink-swell potential, low strength for roads, and slope. Erosion is a hazard in the more sloping areas. Only that part of the site that is used for construction should be disturbed. Revegetating disturbed areas around construction sites as soon as possible helps to control soil erosion. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. If septic tank absorption fields are installed, the very slow permeability can be overcome to some extent by increasing the size of absorption field. Installing absorption fields on the contour prevents effluent from surfacing in downslope areas. Roads can be designed to offset the limited ability of the soil to support a load.

This soil is poorly suited to recreational uses. Slope and very slow permeability are the main limitations. Paths and trails should extend across the slope. A good plant cover on the soil reduces erosion. The cover can be maintained by controlling traffic.

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

Gt—Gurdon silt loam, l to 3 percent slopes

This soil is very gently sloping and somewhat poorly drained. It is on high stream terraces. The areas of this soil range from 20 to 200 acres. Slopes are long and smooth.

Typically, the surface layer is dark brown silt loam about 9 inches thick. The subsoil to a depth of about 68 inches is yellowish brown, mottled silt loam in the upper part; light brownish gray, mottled silt loam in the middle part; and grayish brown, mottled silt loam in the lower part.

This soil has low fertility. Water and air move through this soil at a moderate rate. Water runs off the surface at a medium rate. The surface layer remains wet for relatively long periods in winter and spring. The seasonal high water table is about 1 to 2 feet below the surface during November through April. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Guyton and Malbis soils. Guyton soils are on broad flats and in depressional areas. They are poorly drained and are grayish throughout the profile. Malbis soils are on nearby uplands and have more clay and sand in the subsoil than the Gurdon soil. The included soils make up about 15 percent of the map unit.

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

This soil is moderately well suited to use as woodland. The main concerns in producing and harvesting timber are moderate equipment use limitations and severe plant competition caused by wetness. Using standard wheeled and tracked equipment when the soil is wet causes rutting and compaction. Using low-pressure ground equipment or harvesting during drier periods reduces damage to the soil and helps to maintain productivity. After harvesting, reforestation can be carefully managed to reduce competition from undesirable understory plants.

This soil is moderately well suited to most cultivated crops. The main limitations are wetness and low fertility, and erosion is a hazard. The main suitable crops are corn, grain sorghum, wheat, cotton, and soybeans. This soil is friable and easy to keep in good tilth. Excessive cultivation can result in the formation of a tillage pan. This pan can be broken by subsoiling when the soil is dry. Wetness can delay planting. Field ditches and suitable outlets can remove excess surface water. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Runoff and erosion can be reduced by fertilizing and seeding a cover crop in the fall. Tillage should be on the contour or across the slope. Most crops respond well lime and fertilizer.

This soil is well suited to pasture. The main limitations are slope, seasonal wetness, and low fertility. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, white clover, and wild winter peas. Annual cool-season grasses, such as ryegrass or wheat, are suitable for winter forage. Seedbed preparation should be on the contour or across the slope to reduce erosion. Grazing when the soil is wet results in puddling of the surface layer. Shallow ditches can remove excess surface water. Lime and fertilizer help to overcome the low fertility and promote good growth of forage plants. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition.

This soil is poorly suited to urban use. It has severe limitations for building sites, local roads and streets, and most sanitary facilities. The main limitations are wetness and moderate permeability. Excess water from low areas can be removed by using shallow ditches or providing the proper grade. Septic tank absorption fields do not function properly during rainy periods because of wetness and the moderate permeability. Lagoons or self-contained disposal units can be used to dispose of sewage properly.

This soil is poorly suited to intensive recreational uses. Wetness is the main limitation for camp areas, picnic areas, and playgrounds. Excess surface water can be removed by using shallow ditches or providing the proper grade.

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

Gu—Guyton silt loam

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

Typically, the surface layer is dark grayish brown silt loam about 5 inches thick. The subsurface layer is about 16 inches thick. It is light brownish gray, mottled silt loam in the upper part and grayish brown, mottled silt loam in the lower part. The next layer to a depth of about 30 inches is light brownish gray silt loam and grayish brown, mottled silty clay loam. The subsoil to a depth of about 75 inches is light brownish gray, mottled silt loam in the upper part and grayish brown, mottled silty clay loam in the lower part. In places, the subsoil contains less clay and more sand than is typical for the Guyton soil. In some low places, this soil is subject to rare flooding. In other places, this soil contains less clay and more sand in the subsoil than is typical for the Guyton soil.

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to crops. Water and air move through this soil at a slow rate. Water runs off the surface at a slow rate. A seasonal high water table ranges from the soil surface to about 1.5 feet below the surface during December through May. The surface layer of this soil remains wet for long periods after heavy rains. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Bienville, Cahaba, and Gurdon soils. The included soils are in higher positions than the Guyton soil. Bienville soils are somewhat excessively drained and sandy throughout the profile. The well drained Cahaba soils have a reddish loamy subsoil. Gurdon soils have a subsoil that is yellowish brown in the upper and middle parts. The included soils make up about 15 percent of the map unit.

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

This soil is moderately well suited to use as pine woodland. The main concerns in producing and harvesting timber are severe equipment use limitations and moderate seedling mortality caused by wetness. In addition, competition from understory plants is severe. Only trees that can tolerate seasonal wetness should be planted. Bedding and surface drainage help to ensure pine seedling survival. Natural regeneration of pine is difficult in wet years. Conventional methods of harvesting timber generally are suitable, but this soil can compact if it is wet and heavy equipment is used. Hardwood understory can be reduced by using controlled burning, applying herbicides, girdling, or by cutting unwanted trees.

This soil is moderately well suited to cultivated crops. The main limitations are wetness, low fertility, and potentially toxic levels of exchangeable aluminum in the rooting zone. The main suitable crops are soybeans and grain sorghum. Surface crusting is a problem. The surface layer of this soil remains wet for long periods after heavy rains. Drainage can improve this soil for most cultivated crops. Crusting of the surface and compacting of the soil can be reduced by returning crop residue to the soil. Crops respond well to lime and fertilizer, which improve fertility and reduce the levels of exchangeable aluminum in the rooting zone.

This soil is moderately well suited to pasture. Wetness limits the choice of plants and the period of grazing. Low fertility is an additional limitation. The main suitable pasture plants are bahiagrass, common bermudagrass, white clover, vetch, wild winter peas, and tall fescue. Grazing when the soil is wet results in compaction of the surface layer and damage to the plant community. Where suitable outlets are available, excess surface water can be removed with 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 growth of grasses and legumes.

This soil is poorly suited to most urban and recreational uses. Wetness, slow permeability, and low strength for roads and streets are the main limitations. Excess water can be removed by using shallow ditches and providing the proper grade. Septic tank absorption fields do not function properly during rainy periods because of wetness and the slow permeability. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Roads can be designed to offset the limited ability of the soil to support a load.

This Guyton soil is in capability subclass IIIw. The woodland ordination symbol is 9W.

GY—Guyton-Ouachita silt loams, frequently flooded

These soils are nearly level and are on the flood plains of major streams. The components of this map unit are so intricately intermingled that it is not practical to map them separately at the scale used. Also, fewer observations were made than in other map units because of frequent flooding and less intensive use of the soils. The areas of these soils range from 40 to 2,000 acres. They are about 50 percent Guyton soil and 35 percent Ouachita soil. These soils are frequently flooded for very brief to long periods. The Guyton soil is poorly drained and is in level areas and in swales and has slopes of less than 1 percent. The Ouachita soil is well drained and is on low ridges or natural levees that are 2 to 6 feet high and from 25 to 150 feet wide. The Ouachita soil has slopes that range from 0 to 2 percent.

Typically, the Guyton soil has a surface layer of dark grayish brown silt loam about 5 inches thick. The subsurface layer is about 17 inches thick. It is light brownish gray, mottled silt loam in the upper part and grayish brown, mottled silt loam in the lower part. The next layer to a depth of about 45 inches is grayish brown, mottled silty clay loam and light brownish gray, mottled silt loam. The subsoil to a depth of about 65 inches is grayish brown, mottled silt loam. In places, the surface layer has a thin overwash of brown silt loam.

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

Typically, the Ouachita soil has a surface layer of brown silt loam about 6 inches thick. The next layer to a depth of about 18 inches is dark yellowish brown silt loam. The subsoil to a depth of about 69 inches is dark yellowish brown, mottled silty clay loam in the upper part; yellowish brown, mottled silty clay loam in the middle part; and yellowish brown, mottled loam in the lower part. The substratum to a depth of about 81 inches is yellowish brown, mottled fine sandy loam.

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

Included with these soils in mapping are a few small areas of Bienville and Cahaba soils and many small areas of Dela and Iuka soils. Bienville and Cahaba soils are on stream terraces or on remnants of stream terraces that appear as islands within the flood plains. Bienville soils are sandy throughout the profile, and Cahaba soils have a reddish loamy subsoil. Dela soils are in positions similar to those of the Ouachita soil and contain less clay and more sand throughout than the Ouachita soil. Iuka soils are in positions slightly lower than those of the Ouachita soil and have a brownish subsoil that contains gray mottles in the upper part. The included soils make up about 15 percent of the map unit.

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

These soils are moderately well suited to use as pine woodland. Frequent flooding and wetness limit the use of equipment and cause moderate to high seedling mortality. Also, competition from understory plants is severe. These soils are subject to compaction when moist and heavy equipment is used. Conventional methods of harvesting timber generally can be used, except sometimes during rainy periods, generally from December to May. Logging should be done in the drier seasons to prevent excessive rutting and compaction of the soils. Natural regeneration of pine is difficult in wet years. Bedding of rows helps to overcome wetness and improves seedling survival. After harvesting, reforestation can be carefully managed to reduce competition from undesirable understory plants.

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

These soils are poorly suited to pasture. Pasture grasses are difficult to establish because of flooding, wetness, and low soil fertility. Wetness also limits the choice of plants and the period of grazing. The main suitable pasture plants are common bermudagrass, singletary peas, and vetch. Native grasses can also provide adequate forage for grazing cattle. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. It generally is not practical to apply high rates of fertilizer because of frequent overflow.

These soils are poorly suited to local roads and streets and most sanitary facilities. They are not suited to dwellings because of the hazard of flooding. The main limitations are wetness, slow permeability, and low strength for roads and streets. Roads and streets should be located above the expected flood level and designed to offset the limited ability of these soils to support a load. Major flood control structures, along with extensive local drainage systems, are needed to control flooding and remove excess water.

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

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

IU—Iuka-Dela association, frequently flooded

These soils are nearly level and moderately well drained. They are on flood plains of major streams. Fewer observations were made than in other map units because of frequent flooding and less intensive use of the soils. The areas of these soils range from 20 to 2,000 acres. They are about 55 percent Iuka soil and 25 percent Dela soil. These soils are frequently flooded from stream overflow. The Iuka soil is in swales and in low positions on natural levees on flood plains. The Dela soil is on low ridges or natural levees on flood plains. The ridges are 1 to 6 feet high and 50 to 200 feet wide. Slopes range from 0 to 2 percent.

Typically, this Iuka soil has a surface layer of dark yellowish brown fine sandy loam about 5 inches thick. The next layer to a depth of about 8 inches is dark brown, mottled silt loam. The underlying material to a depth of about 60 inches is yellowish brown, mottled sandy loam in the upper part; gray, mottled silt loam in the middle part; and grayish brown, mottled silt loam in the lower part. In places, this soil is underlain at moderate depths by an older soil that is grayish and silty.

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

Typically, this Dela soil has a surface layer of dark brown fine sandy loam about 5 inches thick. The next layer to a depth of about 12 inches is dark brown, mottled fine sandy loam. The underlying material to a depth of about 65 inches is dark brown loam in the upper part; brown sandy loam in the middle part; and yellowish brown, mottled sandy loam in the lower part.

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

Included with these soils in mapping are a few small areas of Bienville, Cahaba, and Gurdon soils and many small areas of Guyton and Ouachita soils. Bienville, Cahaba, and Gurdon soils are on stream terraces or on remnants of stream terraces that appear as islands on the flood plain. Bienville soils are sandy throughout the profile, and Cahaba and Gurdon soils have a well developed loamy subsoil. The poorly drained Guyton soils are in slightly lower positions than the Iuka soil and are grayish throughout the profile. Ouachita soils are in positions similar to those of the Dela soil, and they contain less sand and more clay in the subsoil than either the Iuka or Dela soil. The included soils make up about 15 percent of the map unit.

Iuka and Dela soils are used mainly as woodland. A small acreage is used as pastureland or cropland.

These soils are moderately well suited to use as pine woodland. The main concerns in producing and harvesting timber are moderate equipment use limitations and moderate seedling mortality in areas of the Iuka soil caused by wetness and flooding. Plant competition is severe in both the Iuka and Dela soils. Competing vegetation can be controlled by proper site preparation and by spraying, cutting, or girdling to eliminate unwanted weeds, brush, or trees. Conventional methods of harvesting timber generally are suitable, but these soils can compact if they are wet and heavy equipment is used. Special site preparation, such as harrowing and bedding, helps to establish seedlings, reduce seedling mortality, and increase early seedling growth.

The Iuka and Dela soils are poorly suited to cultivated crops. The main limitations are the hazard of frequent flooding, low fertility, wetness, and the potentially toxic levels of exchangeable aluminum in the rooting zone. Levees are needed to adequately control flooding. Unless flooding is controlled and drainage is provided, planting dates are delayed, and crops can be damaged by flooding (Fig. 2). Constructing field ditches and vegetated outlets help to remove excess surface water. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. Crops respond well to lime and fertilizer, which improve fertility and reduce the levels of exchangeable aluminum.

These soils are moderately well suited to pasture. The main limitations are the hazard of overflow, wetness, and low natural fertility. The main suitable pasture plants are bahiagrass, common bermudagrass, tall fescue, singletary peas, and vetch. Grazing when the soil is wet results in

Figure 2.—Cotton in an area of Iuka-Dela association, frequently flooded. Flooding in summer damages crops in some years, but flooding occurs mainly in winter and spring.

puddling of the surface layer and damage to the plant community. A properly designed drainage system can remove excess water. Proper grazing, weed control, and fertilizer are needed for maximum quality of forage.

These soils are poorly suited to most urban and recreational uses. They are generally not suited to use for dwellings because of the hazard of flooding. Wetness is the main soil limitation. Roads and streets should be located above the expected flood level. Flooding can be controlled by major flood control structures, such as levees.

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

Ko—Kolin silt loam, 1 to 3 percent slopes

This soil is very gently sloping and moderately well drained. It is on broad ridgetops on uplands. The areas of this soil range from about 30 to 400 acres.

Typically, the surface layer is dark brown silt loam about 3 inches thick. The subsurface layer is light yellowish brown, mottled silt loam about 4 inches thick. The subsoil to a depth of about 23 inches is yellowish brown, mottled silty clay loam. The next layer to a depth of about 31 inches is yellowish brown, mottled silty clay loam and light gray, mottled silt. The subsoil to a depth of about 85 inches is yellowish brown and gray, mottled clay in the upper part; yellowish brown, mottled silty clay in the middle part; and red clay in the lower part.

This Kolin soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to crops. Water and air move through the upper part of the subsoil at a moderately slow rate and through the lower part of the subsoil at a very slow rate. Water runs off the surface at a medium rate. A seasonal high water table ranges from about 1.5 feet to 3 feet below the soil surface from December to April. The shrink-swell potential in the lower part of the subsoil is high.

Included with this soil in mapping are a few small areas of Forbing, Gore, and Wrightsville soils. Forbing and Gore soils are on slightly narrower ridgetops than the Kolin soil and are on side slopes. Forbing soils are clayey throughout the subsoil, and Gore soils are reddish throughout the subsoil. Wrightsville soils are on broad flats and in slightly depressional areas and are grayish throughout the subsoil. The included soils make up about 10 percent of the map unit.

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

This soil is moderately well suited to use as pine woodland. The main management concerns in producing and harvesting timber are a moderately restricted use of equipment caused by wetness and severe competition from understory plants. Conventional methods of harvesting timber generally are suitable, but this soil can compact if it is moist and heavy equipment is used. After harvesting, reforestation can be carefully managed to reduce competition from undesirable understory plants.

This soil is moderately well suited to cultivated crops. Low fertility, seasonal wetness, a moderate hazard of erosion, and potentially toxic levels of exchangeable aluminum within the rooting zone are the main limitations. The main suitable crops are soybeans, corn, cotton, and sweet potatoes (Fig. 3). This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. Proper arrangement of rows and the use of surface ditches can help remove excess surface water. Crop residue left on or near the surface helps to maintain tilth and control erosion. Crops respond well to fertilizer and lime, which improve fertility and reduce the levels of exchangeable aluminum.

This soil is well suited to pasture. Low fertility is the main limitation, and erosion is a moderate hazard. The main suitable pasture plants are bahiagrass, common bermudagrass, improved bermudagrass, ball clover, crimson clover, and arrowleaf clover. Lime and fertilizer are needed for good growth of forage plants. Seedbed preparation should be on the contour or across the slope where practical. Rotation grazing helps to maintain the quality of forage.

This soil is poorly suited to urban use. Wetness, very slow permeability, low strength for roads and streets, and high shrink-swell potential are the main limitations. Drainage improves this soil for roads and buildings. Septic tank absorption fields do not function properly during rainy periods because of wetness and the very slow permeability. If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of the water supplies. Roads can be designed to offset the limited ability of the soil to support a load. If buildings are constructed on this soil, properly designing foundations and footings and diverting runoff away from buildings help to prevent structural damage as a result of shrinking and swelling.

This soil is poorly suited to recreational uses. This soil remains wet for long periods after rains because of its very slow permeability. Drainage improves this soil for camp areas, picnic areas, and playgrounds.

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

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

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

Figure 3.—Cotton grows well in areas of Kolin silt loam, 1 to 3 percent slopes.

Typically, the surface layer is dark brown fine sandy loam about 7 inches thick. The subsurface layer is yellowish red fine sandy loam about 4 inches thick. The subsoil to a depth of about 75 inches is red clay loam in the upper part; red, mottled sandy clay in the middle part; and red, mottled sandy clay loam in the lower part. Pebbles and fragments of ironstone exist throughout the profile.

This Mahan soil has medium fertility. Water and air move through this soil at a moderate rate. Water runs off the surface at a medium rate. This soil dries quickly after rains. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Darley, Ruple, and Sacul soils. Darley and Ruple soils typically are at a slightly higher elevation than the Mahan soil and have more ironstone fragments in the surface, subsurface, and subsoil layers. Sacul soils have grayish mottles in the upper part of the subsoil and are at a lower elevation than the Mahan soil. The included soils make up about 15 percent of the map unit.

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

This soil is well suited to use as pine woodland and has few limitations for use and management (Fig. 4).

This soil is moderately well suited to cultivated crops. The main limitations are the erosion hazard and medium soil fertility. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture

Figure 4.—Loblolly pine trees in an area of Mahan fine sandy loam, 1 to 5 percent slopes.

content. Crop residue left on or near the surface helps to reduce runoff and helps to maintain soil tilth and organic matter content. Crops respond well to lime and fertilizer. Conservation tillage, terraces, diversions, and grassed waterways can help to control erosion.

This soil is well suited to pasture. The main limitations are steepness of slope and medium fertility. The main suitable pasture plants are common bermudagrass, bahiagrass, crimson clover, and ryegrass. Grasses and legumes grow well if adequate fertilizer is provided. Rotation grazing helps to maintain the quality of forage. Seedbed preparation should be on the contour or across the slope to reduce erosion.

This soil is moderately well suited to urban development. It has slight to moderate limitations for dwellings and for sanitary facilities. Slope, moderate permeability, the clayey subsoil, and low strength for roads and streets are the main limitations. Shallow excavations are somewhat difficult to construct because of the clayey subsoil. Seepage is a hazard in sewage lagoons. The hazard of erosion is increased if the soil is left exposed during site development. Roads can be designed to offset the limited ability of the soil to support a load. Increasing the size of the septic tank absorption field helps to compensate for the moderate permeability of the soil.

This soil is moderately well suited to recreational uses. Slope and small stones on the soil surface are limitations for playgrounds. Erosion can be controlled in intensively used areas by maintaining a good plant cover on the soil. The cover can be maintained by adding fertilizer and by controlling traffic. Scraping small stones from the surface or adding loamy material to the soil surface improves this soil for playgrounds.

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

MN—Mahan fine sandy loam, 5 to 12 percent slopes

This soil is strongly sloping and well drained. It is on side slopes on uplands. The areas of this soil are irregular in shape and range from 40 to 300 acres. Fewer observations were made than in other map units because of slope and less intensive use of the soil.

Typically, the surface layer is yellowish brown, fine sandy loam about 8 inches thick. The subsurface layer is yellowish red fine sandy loam about 6 inches thick. The subsoil to a depth of about 75 inches is yellowish red sandy clay loam in the upper part, red sandy clay in the middle part, and red sandy clay loam in the lower part.

This soil has medium fertility. Water and air move through this soil at a moderate rate. Water runs off the surface at a rapid rate. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Darley and Sacul soils. Darley soils are at a slightly higher elevation than the Mahan soil and have ironstone layers in the subsoil. Sacul soils are at a lower elevation than the Mahan soil and have grayish mottles in the upper part of the subsoil. The included soils make up about 15 percent of the map unit.

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

This soil is well suited to use as pine woodland and has few limitations for use and management.

This soil generally is not suited to cultivated crops because of medium fertility and the severe erosion hazard. However, if this soil is adequately protected from erosion, less sloping areas can be used to grow small grains. Erosion can be reduced if fall grains or winter pasture grasses are seeded early, conservation tillage is used, and tillage and seeding are done on the contour or across the slope. Also, waterways should be shaped and seeded to perennial grass. Crops respond well to lime and fertilizer.

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

This soil is moderately well suited to urban development. The main limitations are the clayey subsoil, moderate permeability, slope, and low strength for roads and streets. Excavation for roads and buildings increases the hazard of erosion. Preserving the existing plant cover during construction and revegetating disturbed areas around construction sites as soon as possible help to control erosion. Roads can be designed to overcome the limited capacity of the soil to support a load. Shallow excavations are somewhat difficult to construct because of the clayey subsoil. Where septic tanks are installed, the limitation of moderate permeability can be overcome by increasing the size of the absorption field. Unless septic tank absorption lines are installed on the contour, effluent can surface in downslope areas and create a hazard to health.

This soil is moderately well suited to recreational uses. It is limited mainly by slope. Cuts and fills should be seeded or mulched to reduce erosion. Plant cover can be maintained by adding fertilizer and by controlling traffic. Small stones on the surface is a limitation for playgrounds. Adding loamy material to the soil surface helps to overcome this limitation.

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

Mp—Malbis fine sandy loam, 1 to 3 percent slopes

This soil is very gently sloping and moderately well drained. It is on narrow or broad ridgetops on uplands. The areas of this soil range from about 20 to 200 acres.

Typically, the surface layer is brown fine sandy loam about 7 inches thick. The next layer to a depth of about 13 inches is yellowish brown and light yellowish brown loam. The subsoil to a depth of about 81 inches is strong brown clay loam in the upper part; yellowish brown, mottled clay loam in the middle part; and mottled yellowish brown, light yellowish brown, light brownish gray, and red clay loam in the lower part. Nodules of plinthite are in the middle part of the subsoil.

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to crops. Water and air move through the subsoil at a moderately slow rate. A seasonal high water table is about 2.5 to 4 feet below the soil surface during December through March. Water runs off the surface at a medium rate. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Boykin, Eastwood, Gurdon, Ruston, and Sacul soils. Boykin soils are in positions similar to those of the Malbis soil, Ruston soils are on narrower and more convex ridgetops, and both soils have a reddish subsoil. In addition, Boykin soils have sandy surface and subsurface layers more than 20 inches thick. Eastwood and Sacul soils are at a slightly lower elevation than the Malbis soil and have a clayey and loamy subsoil. Gurdon soils are on high stream terraces and contain less clay and sand in the subsoil than the Malbis soil. The included soils make up about 15 percent of the map unit.

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

This soil is well suited to use as pine woodland and has few limitations for use and management. Competition from understory plants is moderate. Competing vegetation can be controlled by proper site preparation and by spraying, cutting, or girdling to eliminate unwanted weeds, brush, and trees.

This soil is moderately well suited to crops. Slope, low soil fertility, and potentially toxic levels of exchangeable aluminum in the rooting zone are the main limitations. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. Properly managing crop residue, stripcropping, contour farming, and terracing help reduce the soil loss by erosion (Fig. 5). Most crops respond well to lime and fertilizer, which improve fertility and reduce the levels of exchangeable aluminum.

This soil is well suited to pasture. Slope and low fertility are the main limitations. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, ryegrass, and crimson clover.

Seedbed preparation should be on the contour to help control erosion. Fertilizer and lime are needed for optimum production of forage.

This soil is well suited to urban use. It has few limitations to dwellings without basements. However, wetness and the moderately slow permeability of the subsoil are limitations where this soil is used as absorption fields for septic tanks. This limitation can be overcome by providing drainage and enlarging the size of the absorption field. Where sewage lagoons are constructed, the walls and bottom of the lagoon should be sealed to prevent effluent from seeping through the soil and contaminating nearby ground water.

This soil is well suited to intensive recreational uses; however, slope is a moderate limitation for playgrounds. Maintaining a good plant cover protects the soil from erosion.

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

Ms—Malbis fine sandy loam, 3 to 8 percent slopes

This soil is moderately sloping and moderately well drained. It is on short, irregular side slopes on uplands. The areas of this soil range from about 20 to 200 acres.

Typically, the surface layer is brown fine sandy loam about 5 inches thick. The subsurface layer to a depth of about 8 inches is light yellowish brown fine sandy loam. The subsoil to a depth of about 75 inches is strong brown sandy clay loam in the upper part; yellowish brown, mottled sandy clay loam in the middle part; and mottled light brownish gray, red, and yellowish brown clay loam in the lower part.

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to crops. Water and air move through this soil at a moderately slow rate. Water runs off the surface at a medium rate. A seasonal high water table is 2.5 to 4 feet below the soil surface during December through March. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Eastwood, Gurdon, Ruston, and Sacul soils. Eastwood and Sacul soils are at a slightly lower elevation than the Malbis soil, and they have a clayey and loamy subsoil. Gurdon soils are on high stream terraces and have less clay and sand in the subsoil than the Malbis soil. Ruston soils are on narrow ridgetops and have a reddish subsoil. The included soils make up about 15 percent of the map unit.

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

This soil is well suited to use as pine woodland and has few limitations for use and management. Competition from understory plants is moderate. Proper site preparation controls initial growth of unwanted plants; and spraying, cutting, and girdling control subsequent growth.

This soil is moderately well suited to crops. Slope, low soil fertility, and potentially toxic levels of exchangeable aluminum in the rooting zone are the main limitations. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. Properly managing crop residue, stripcropping, contour farming, and terracing help reduce soil loss by erosion. Most crops respond well to lime and fertilizer, which improve fertility and reduce the levels of exchangeable aluminum.

This soil is well suited to pasture. Slope and low fertility are the main limitations. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, ryegrass, and crimson clover. Seedbed preparation should be on the contour to help control erosion until pasture grasses become established. Fertilizer and lime are needed for optimum production of forage.

This soil is moderately well suited to urban use. It has few limitations to dwellings without basements. However, wetness and the moderately slow permeability of the

Figure 5.—An area of Malbis fine sandy loam, 1 to 3 percent slopes. Gradient terraces reduce runoff and control erosion in this field of harvested sweet potatoes.

subsoil are limitations where this soil is used as septic tank absorption fields. These limitations can be overcome by providing drainage and enlarging the size of the absorption field. Slope is a limitation for small commercial buildings. Revegetating disturbed areas around construction sites as soon as possible helps to control soil erosion. Where sewage lagoons are constructed, the bottom and sides of the lagoon should to be sealed to prevent effluent from seeping through the soil and contaminating nearby ground-water supplies.

This soil is moderately well suited to intensive recreational uses. Slope is a moderate limitation for playgrounds. Maintaining a good plant cover on the soil reduces runoff and helps to control erosion.

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

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

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

Typically, the surface layer is dark brown loamy fine sand about 4 inches thick. The subsurface layer is strong brown loamy fine sand about 5 inches thick. The next layer to a depth of about 18 inches is strong brown fine sandy loam. The subsoil to a depth of about 60 inches is red fine sandy loam. To a depth of about 72 inches, the subsoil is yellowish red and pale brown loamy fine sand. To a depth of 90 inches, the subsoil is yellowish red sandy loam.

This soil has low fertility. Water and air move through this soil at a moderate rate. Water runs off the surface at a medium rate. This soil dries quickly after rains, and plants generally suffer from a lack of water during dry periods in summer and fall of most years. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Flo soils. Flo soils are in positions similar to those of the McLaurin soil and are sandy throughout the profile. The included soils make up about 15 percent of the map unit.

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

This soil is moderately well suited to use as pine woodland. The main concern is the moderate equipment use limitation caused by the sandy surface layer. Trafficability is poor when the sandy surface layer is dry. Organic matter is conserved on this soil by restricting burning and leaving slash well distributed.

This soil is moderately well suited to cultivated crops. The main limitations are slope, low fertility, and soil droughtiness. Suitable crops are corn, cotton, soybeans, watermelons, sweet potatoes, and wheat. This soil is very friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. In areas where water of suitable quality is available, supplemental irrigation can prevent damage to crops during dry periods of most years. The organic matter content can be maintained by using all crop residue, plowing under cover crops, and using a suitable cropping system. The risk of sheet and rill erosion can be reduced by the use of gradient terraces and contour farming. Crops respond well to lime and fertilizer.

This soil is well suited to pasture. The main limitations are low fertility, slope, and soil droughtiness. The main pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, crimson clover, and wheat. Proper grazing, weed control, and fertilizer are needed for maximum quality of forage. Seedbed preparation should be on the contour to help control soil erosion until pasture grasses become established.

This soil is well suited to urban development and has few limitations for this use. Revegetating disturbed areas around construction sites as soon as possible helps to control soil erosion. Cutbanks are not stable and are subject to slumping. The floor of sewage lagoons should be sealed with impervious material to prevent seepage of effluent and contamination of nearby ground-water supplies. Mulching, fertilizing, and irrigating are needed to establish lawn grasses and other small-seeded plants.

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

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

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

This soil is moderately sloping and well drained. It is on side slopes on uplands. The areas of this soil are irregular in shape and range from 20 to 250 acres. Fewer observations were made than in other map units because of slope and less intensive use of the soil.

Typically, the surface layer is dark brown loamy fine sand about 3 inches thick. The subsurface layer is strong brown loamy fine sand about 5 inches thick. The subsoil to a depth of about 50 inches is red sandy loam. To a depth of about 59 inches, the subsoil is red and light yellowish brown sandy loam. To a depth of about 75 inches, the subsoil is red sandy loam.

This soil has low fertility. Water and air move through this soil at a moderate rate. Water runs off the surface at a medium rate. This soil dries quickly after rains, and plants generally suffer from a lack of water during dry periods in summer and fall of most years. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Flo soils. Flo soils are on ridgetops and are sandy throughout the profile. The included soils make up about 15 percent of the map unit.

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

This soil is moderately well suited to use as pine woodland. The main concern is the moderate equipment use limitation caused by the sandy surface layer. The sandy soil surface provides poor traction when the soil is dry. Roads and landings can be protected from erosion by constructing diversions and by seeding cuts and fills. Sloping skid trails and firebreaks are subject to rilling and gullying unless they are provided with adequate water bars, or are protected by plant cover, or both. Organic matter is conserved on this soil by restricting burning and leaving slash well distributed.

This soil is moderately well suited to crops. The main limitations are slope, low fertility, and soil droughtiness. This soil is very friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. Erosion can be reduced if fall grains or winter pasture grasses are seeded early, conservation tillage is used, and tillage and seeding are on the contour or across the slope. Also, waterways should be shaped and seeded to perennial grass. Crops respond well to lime and fertilizer.

This soil is moderately well suited to pasture. It is limited mainly by low fertility, slope, and soil droughtiness. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, and crimson clover. Proper grazing, weed control, and fertilizer are needed for maximum quality of forage. Lime generally is needed. Seedbed preparation should be on the contour to help control erosion until pasture grasses become established.

This soil is moderately well suited to urban development. Slope is a moderate limitation for small commercial buildings. Revegetating disturbed areas around construction sites as soon as possible helps to control soil erosion. Cutbanks are not stable and are subject to slumping. The floor of sewage lagoons should be sealed with impervious material to prevent seepage of effluent and contamination of nearby ground-water supplies.

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

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

Pt—Pits

This map unit consists of gravel pits, sand pits, and borrow pits. The areas of this map unit range from 5 to 1,000 acres.

Gravel pits are open excavations from which gravel or fragments of ironstone has been mined. The largest of these are on the terraces and flood plains of Bayou Dorcheat and Bayou Bodcau. Sand pits are areas from which mostly sand has been removed. Borrow pits are areas from which soil material has been removed for use in construction of roads and in the development of commercial and residential areas.

Pits require major reclamation before they can be used for crops or pasture. Pine trees can be planted to protect the soil against erosion, but they grow slowly because of low fertility and low available water capacity. Numerous areas are partially covered with pines, shrubs, and native grasses.

Re—Ruple gravelly loam, 1 to 5 percent slopes

This soil is gently sloping and well drained. It is on ridgetops on uplands. The areas of this soil are irregular in shape and range from 300 to 400 acres.

Typically, the surface layer is dark reddish brown gravelly loam about 6 inches thick. The subsoil to a depth of about 28 inches is dark red gravelly clay in the upper and middle parts and dark red clay in the lower part. To a depth of about 63 inches, the subsoil consists of alternating layers of fractured ironstone and dark red clay.

This soil has medium fertility. Water and air move through this soil at a moderately slow rate. Root growth is limited somewhat by the ironstone layers. Plants suffer from a lack of water during dry periods in summer and fall of most years, because the fragments of ironstone reduce the available water capacity of the soil. Water runs off the surface at a medium rate. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Darley, Mahan, and Sacul soils. Darley soils are in positions similar to those of the Ruple soil and have a red and yellowish subsoil. Mahan soils are on ridgetops and side slopes at a slightly lower elevation than the Ruple soil. Mahan soils do not have large amounts of ironstone fragments in the subsoil. Sacul soils are on ridgetops and side slopes at a lower elevation than the Ruple soil. Sacul soils have grayish mottles in the upper part of the subsoil and do not have layers of ironstone in the subsoil. Also included with the Ruple soil in mapping are a few small areas of Pits from which ironstone has been removed. The included soils and miscellaneous areas make up about 15 percent of the map unit.

This soil is used mainly as woodland. A small acreage is used as cropland or pastureland. Many areas are mined, or previously were mined, for ironstone gravel for use on roadbeds and oil well construction sites.

This soil is well suited to use as pine woodland and has few limitations for use and management.

This soil is moderately well suited to cultivated crops. Slope and medium fertility are the main limitations. In addition, root growth and the amount of water available to plants are restricted by the layers and fragments of ironstone. Suitable crops are cotton, corn, and wheat. This soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. However, where fragments of ironstone on the soil surface are too numerous, seedbed preparation can be difficult and seed germination is reduced. In areas where water of suitable quality is available, supplemental irrigation can reduce damage to crops during dry periods. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. Most crops respond well to fertilizer. Terraces reduce runoff and the risk of erosion and help to conserve moisture.

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

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

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

This Ruple soil is in capability subclass IIIe. The woodland ordination symbol is 10A.

RP—Ruple gravelly loam, 5 to 12 percent slopes

This soil is strongly sloping and well drained. It is on side slopes on uplands. The areas of this soil are irregular in shape and range from 40 to 300 acres. Fewer observations were made than in other map units because of slope and less intensive use of the soil.

Typically, the surface layer is dark reddish brown gravelly loam about 7 inches thick. The subsoil to a depth of about 25 inches is dark red gravelly sandy clay. The lower part of the subsoil to a depth of about 60 inches consists of alternating layers of fractured ironstone and dark red clay.

This soil has medium fertility. Water and air move through this soil at a moderately slow rate. Plants suffer from a lack of water during dry periods in summer and fall of most years. The coarse fragments in the soil reduce the available water capacity, and the layers of ironstone restrict root development to some extent. Water runs off the surface at a rapid rate. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Darley, Mahan, and Sacul soils. Darley soils are in positions similar to those of the Ruple soil and have a red or yellowish red subsoil. Mahan soils are at a slightly lower elevation than the Ruple soil and do not contain layers of ironstone or large amounts of ironstone fragments. Sacul soils are at a lower elevation than the Ruple soil and have grayish mottles in the upper part of the subsoil and do not have layers of ironstone in the subsoil. Also included with this Ruple soil in mapping are a few small areas of Pits from which ironstone has been removed. The included soils and miscellaneous areas make up about 15 percent of the map unit.

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

This soil is well suited to use as pine woodland and has few limitations for use and management.

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

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

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

This soil is poorly suited to recreational uses. The main limitations are slope, small stones on the surface, and moderately slow permeability. Erosion is the main hazard. Cuts and fills should be seeded or mulched. Plant cover can be maintained by adding fertilizer and by controlling traffic. Adding a thin layer of loamy material to the soil surface improves this soil for intensively used recreational areas.

This Ruple soil is in capability subclass VIe. The woodland ordination symbol is 10A.

Rs—Ruston fine sandy loam, 1 to 3 percent slopes

This soil is very gently sloping and well drained. It is on narrow ridgetops on uplands. The areas of this soil are irregular in shape and range from 5 to 300 acres.

Typically, the surface layer is dark brown fine sandy loam about 5 inches thick. The subsoil to a depth of about 38 inches is yellowish red sandy clay loam in the upper part and red, mottled sandy clay loam in the lower part. The next layer is red sandy clay loam and light yellowish brown sandy loam. To a depth of about 77 inches, the subsoil is red sandy clay loam. The substratum to a depth of about 85 inches is red sandy loam.

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to crops. Water and air move through this soil at a moderate rate. Water runs off the surface at a medium rate. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Boykin, Malbis, and Smithdale soils. Boykin soils are in positions similar to those of the Ruston soil and have sandy surface and subsurface layers more than 20 inches thick. Malbis soils are on slopes that are less convex than those of the Ruston soil and have a brownish subsoil that contains more than 5 percent plinthite. Smithdale soils are on side slopes and do not have a bisequum in the subsoil. The included soils make up about 15 percent of the map unit.

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

This soil is well suited to use as pine woodland and has few limitations for use and management.

This soil is moderately well suited to cultivated crops. It is limited mainly by the severe erosion hazard and low fertility. The main suitable crops are cotton, corn, soybeans, 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. Properly managing crop residue, contour farming, and terracing help reduce soil loss by erosion. Most crops respond well to lime and fertilizer, which improve fertility and reduce the levels of exchangeable aluminum in the rooting zone.

This soil is well suited to pasture and has few limitations for use and management. However, soil erosion is a hazard before pasture grasses become established, and low fertility is a soil limitation. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, and crimson clover. Annual cool-season grasses, such as ryegrass and wheat, are suitable for winter forage. Seedbed preparation should be on the contour or across the slope where practical. Lime and fertilizer help to overcome the low fertility and promote good growth of forage plants. Proper stocking and pasture rotation help keep the pasture in good condition.

This soil is moderately well suited to urban development. It has slight limitations for building sites and moderate limitations for local roads and streets and most sanitary facilities. The main limitations are low strength for roads and streets and moderate permeability. Seepage of effluent is a hazard to sewage lagoons. Septic tank absorption fields may not function properly during rainy periods because of the moderate permeability. This can be overcome by increasing the length of the absorption lines. Roads and streets can be designed to overcome the moderate load-supporting capacity of the soil. The floor and walls of sewage lagoons should be sealed with impervious material to prevent seepage of effluent and contamination of nearby ground-water supplies.

This soil is well suited to recreational uses. Slope and small stones on the soil surface are limitations for playgrounds. Erosion can be controlled in intensively used areas by maintaining a good plant cover on the soil. The cover can be maintained by adding fertilizer and by controlling traffic. Adding loamy fill to the soil surface improves this soil for playgrounds.

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

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

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

Typically, the surface layer is dark grayish brown fine sandy loam about 3 inches thick. The subsurface layer is pale brown fine sandy loam about 9 inches thick. The subsoil to a depth of about 69 inches is red clay in the upper part; red, mottled clay in the middle part; and light brownish gray, mottled sandy clay loam in the lower part.

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to crops. Water and air move through this soil at a slow rate. Water runs off the surface at a medium rate. A seasonal high water table is 2 to 4 feet below the soil surface for short periods during December through April. The shrink-swell potential is high.

Included with this soil in mapping are a few small areas of Darley, Mahan, and Malbis soils. All of these soils are at a slightly higher or higher elevation than the Sacul soil. Darley soils have layers of ironstone in the subsoil. Mahan soils do not have grayish mottles in the upper part of the subsoil. Malbis soils are loamy throughout the profile. The included soils make up about 15 percent of the map unit.

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

This soil is well suited to use as pine woodland (Fig. 6). The main concern is the moderate equipment use limitation caused by wetness and the clayey subsoil. Competition from understory plants is moderate. In addition, the surface layer of the soil can compact if it is moist and heavy equipment is used. Rutting and soil compaction can be minimized by logging during the drier seasons. Competing vegetation can be controlled by proper site preparation and by spraying, cutting, or girdling to eliminate unwanted weeds, brush, or trees.

This soil is poorly suited to cultivated crops. The main limitations are slope, low fertility, and potentially toxic levels of exchangeable aluminum in the rooting zone. Because permeability through the subsoil is slow, rainwater runs off the surface at a medium rate, and the hazard of erosion is severe. Suitable crops are cotton, soybeans, and corn. This soil is friable and easy to keep in good tilth. Properly managing crop residue, stripcropping, contour farming, and terracing help reduce soil loss by erosion. Most crops respond well to lime and fertilizer, which improve fertility and reduce the levels of exchangeable aluminum.

This soil is well suited to pasture. Slope, low fertility, and seasonal wetness are the main limitations. Suitable pasture plants are common bermudagrass, improved

Figure 6.—This well-managed forest of loblolly pine is on Sacul fine sandy loam, 1 to 5 percent slopes.

bermudagrass, bahiagrass, crimson clover, and ryegrass. Fertilizer and lime are needed for optimum production of forage. Seedbed preparation should be on the contour to reduce erosion.

This soil is poorly suited to urban use. The main limitations are the clayey subsoil, slow permeability, seasonal wetness, high shrink-swell potential, and low strength for roads and streets. Slow permeability and the seasonal high water table increase the possibility for septic tank absorption fields to fail. Lagoons or self-contained disposal units can be used to dispose of sewage properly. Buildings and roads should be designed to withstand the effects of shrinking and swelling of the soil. Also, roads can be designed to offset the limited ability of the soil to support a load. Shallow excavations are difficult to construct because of the clayey subsoil.

This soil is moderately well suited to intensive recreational uses. Slope is a limitation for playgrounds. Slow permeability is an additional limitation for most recreational uses. Maintaining a good vegetative cover on the soil reduces runoff and helps to control erosion.

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

SC—Sacul fine sandy loam, 5 to 12 percent slopes

This soil is strongly sloping and moderately well drained. It is on side slopes on uplands. The areas of this soil are irregular in shape and range from 40 to 350 acres. Fewer observations were made than in most other map units because of slope and less intensive use of the soil.

Typically, the surface layer is dark grayish brown fine sandy loam about 2 inches thick. The subsurface layer is yellowish brown fine sandy loam about 10 inches thick. The subsoil to a depth of about 60 inches is red clay in the upper part; red, mottled clay in the middle part; and light brownish gray and red, mottled silty clay in the lower part. The substratum to a depth of about 75 inches is mottled red and gray clay loam.

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to crops. Water and air move through the subsoil at a slow rate. Water runs off the surface at a rapid rate. A seasonal high water table is 2 to 4 feet below the soil surface during December through April. This soil dries quickly after rains. The shrink-swell potential is high.

Included with this soil in mapping are a few small areas of Darley, Mahan, and Malbis soils. All of these soils are at a slightly higher or higher elevation than the Sacul soil. Darley soils have ironstone layers in the subsoil. Mahan soils do not have grayish mottles in the upper part of the subsoil. Malbis soils are loamy throughout the profile. The included soils make up about 15 percent of the map unit.

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

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

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

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

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

This soil is moderately well suited to recreational uses. It is limited mainly by slow permeability and slope. Cuts and fills should be seeded or mulched. Maintaining a plant cover by adding fertilizer and by controlling traffic helps to control erosion.

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

SM—Smithdale fine sandy loam, 5 to 12 percent slopes

This soil is strongly sloping and well drained. It is on side slopes on uplands. The areas of this soil are irregular in shape and range from 20 to 200 acres. Fewer observations were made than in most other map units because of slope and less intensive use of the soil.

Typically, the surface layer is dark brown fine sandy loam about 6 inches thick. The next layer is dark brown and yellowish red fine sandy loam about 3 inches thick. The subsoil to a depth of about 80 inches is red sandy clay loam in the upper part and yellowish red sandy loam in the lower part.

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to crops. Water and air move through this soil at a moderate rate. Water runs off the surface at a rapid rate. The shrink-swell potential is low.

Included with this soil in mapping are a few small areas of Boykin and Ruston soils. Both of these soils are on ridgetops. Boykin soils have sandy surface and subsurface layers more than 20 inches thick. Ruston soils have a bisequum in the subsoil. The included soils make up about 15 percent of the map unit.

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

This soil is well suited to use as pine woodland and has few limitations for use and management.

This soil is poorly suited to cultivated crops. The main limitations are slope, low fertility, and high levels of exchangeable aluminum that are potentially toxic to crops. The surface layer of this soil is friable and easy to keep in good tilth. It can be worked throughout a wide range of moisture content. Properly managing crop residue, contour farming, and terracing help reduce soil loss by erosion. Most crops respond well to lime and fertilizer, which improve fertility and reduce the levels of exchangeable aluminum in the rooting zone.

This soil is moderately well suited to pasture. The main limitations are slope and low fertility. Soil erosion is a hazard before pasture grasses become established. The main suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, and crimson clover. Annual cool-season grasses, such as ryegrass and wheat, are suitable for winter forage. Seedbed preparation should be on the contour or across the slope where practical. Lime and fertilizer help to overcome the low fertility and promote good growth of forage plants. Proper stocking and pasture rotation help keep the pasture in good condition.

This soil is moderately well suited to urban development. It has moderate limitations for building sites, local roads and streets, and most sanitary facilities. The main limitation is slope, and seepage is a hazard to sewage lagoons. Effluent from septic tank absorption fields can surface in downslope areas and create a hazard to health. Septic tank absorption fields can be installed on the contour to minimize this problem. The hazard of erosion is increased if the soil is left exposed during site development. Revegetating disturbed areas around construction sites as soon as possible helps to control soil erosion. The floor and walls of sewage lagoons should be coated with impervious material to reduce seepage of effluent.

This soil is moderately well suited to recreational uses. Slope and small stones on the soil surface are the main limitations. Erosion can be controlled in intensively used areas by maintaining a good plant cover on the soil. The cover can be maintained by adding fertilizer and by controlling traffic. Adding a thin layer of loamy fill to the soil surface improves this soil for playgrounds.

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

Wr—Wrightsville silt loam

This soil is level and poorly drained. It is on broad flats and in slightly depressional areas on uplands. It is subject to rare flooding. The areas of this soil are irregular in shape and range from 20 to more than 400 acres. Slopes are less than 1 percent.

Typically, the surface layer is dark grayish brown silt loam about 3 inches thick. The subsurface layer is light brownish gray, mottled silt loam about 14 inches thick. The next layer to a depth of about 26 inches is light brownish gray, mottled silty clay loam and light gray silt loam. The subsoil to a depth of about 60 inches is light brownish gray, mottled silty clay. The substratum to a depth of about 88 inches is dark red, mottled clay.

This soil has low fertility and high levels of exchangeable aluminum that are potentially toxic to crops. Water runs off the surface at a slow rate and stands in low places for long periods after heavy rains. Water and air move very slowly through this soil. A seasonal high water table is 0.5 to 1.5 feet below the soil surface from December to April. Flooding is rare but can occur during unusually wet periods. The shrink-swell potential in the subsoil is high.

Included with this soil in mapping are a few small areas of Forbing, Gore, and Kolin soils. Forbing and Gore soils are on ridgetops and side slopes and have a reddish clayey subsoil. Kolin soils are in higher positions than the Wrightsville soil and have a subsoil that is brownish in the upper part. The included soils make up about 15 percent of the map unit.

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

This soil is moderately well suited to use as pine woodland. The main concerns in producing and harvesting timber are severe equipment use limitations and severe seedling mortality caused by wetness. In addition, competition from understory plants is severe.

Conventional methods of harvesting timber generally can be used, except sometimes during rainy periods, generally from December to April. Using standard wheeled and tracked vehicles when the soil is moist causes rutting and soil compaction. Puddling can occur when the soil is wet. Using low-pressure ground equipment reduces damage to the soil and helps to maintain productivity. Logging roads require suitable surfacing for year-round use. Unless drainage is provided, tree seedlings have a low rate of survival because of wetness. Planting trees on bedded rows lowers the effective depth of the water table and increases root growth and seedling survival. After harvesting, reforestation can be carefully managed to reduce competition from undesirable understory plants. Site preparation, such as chopping, burning, applying herbicide, and bedding, can reduce debris, reduce immediate competition, and facilitate mechanical planting.

This soil is moderately well suited to cultivated crops. The main limitations are wetness and low fertility. The main suitable crops are grain sorghum and soybeans. Drainage can improve this soil for most cultivated crops. Returning crop residue to the soil or regularly adding other organic matter improves fertility, reduces crusting, and increases the water intake rate. Most crops respond well to lime and fertilizer, which improve soil fertility and reduce the levels of exchangeable aluminum in the rooting zone.

This soil is moderately well suited to pasture. The main limitations are wetness and low fertility. The main suitable pasture plants are common bermudagrass, bahiagrass, white clover, and wild winter peas. Wetness limits the choice of plants and the period of grazing. Excessive 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. Use of lime and fertilizer help to overcome the low fertility and promote good growth of forage plants.

This soil is poorly suited to most urban and recreational uses. It has severe limitations for 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 for roads and streets. Flooding is a hazard. Excess surface water can be removed by using shallow ditches and providing the proper grade. Very slow permeability and the seasonal high water table increase the possibility for septic tank absorption fields to fail. Properly designed lagoons or self-contained disposal units can be used to dispose of sewage properly. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. Roads can be designed to offset the limited ability of the soil to support a load. Flooding can be controlled by constructing levees and diversions.

This Wrightsville soil is in capability subclass IIIw. The woodland ordination symbol is 4W.

Prime Farmland

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

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

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

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

Prime farmland soils usually receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are frequently flooded during the growing season. The slope ranges mainly from 0 to 8 percent.

The following map units are considered prime farmland in Webster Parish. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 5. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

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

The soils identified as prime farmland in Webster Parish are:

Ca	Cahaba fine sandy loam, 1 to 3 percent slopes
Da	Darley gravelly loamy fine sand, 1 to 5 percent slopes
Gu	Guyton silt loam (if adequately drained)
Ko	Kolin silt loam, 1 to 3 percent slopes
Mh	Mahan fine sandy loam, 1 to 5 percent slopes
Mp	Malbis fine sandy loam, 1 to 3 percent slopes
Ms	Malbis fine sandy loam, 3 to 8 percent slopes
Mt	McLaurin loamy fine sand, 1 to 3 percent slopes
Re	Ruple gravelly loam, 1 to 5 percent slopes
Rs	Ruston fine sandy loam, 1 to 3 percent slopes
Sa	Sacul fine sandy loam, 1 to 5 percent slopes
Wr	Wrightsville silt loam (if adequately drained)

Use and Management of the Soils

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

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

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

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

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

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

Crops and Pasture

Richard C. Aycock, soil conservationist, Natural Resources Conservation Service, helped prepare this section.

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

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

About 77,874 acres in Webster Parish was in farms in 1982, according to the United States Census of Agriculture. The average farm size was 153 acres. The Louisiana Summary of Agriculture reported that 1,985 acres of row crops were grown in Webster Parish in 1987 (17). Cotton, corn, grain sorghum, wheat, sweet potatoes, and soybeans are the main row crops. Additionally, 270 acres was devoted to commercial vegetable production and 1,200 acres was devoted to commercial hay production. The remaining farmland is devoted to improved and native pasture, small orchards of pecan or peach trees, small woodlots, and wooded pasture.

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

Common and improved bermudagrass and Pensacola bahiagrass are the summer perennials most commonly grown (Fig. 7). Most of these grasses produce good quality forage. Tall fescue, the main winter perennial grass, grows well only on soils that have a favorable moisture content. All of these grasses respond well to fertilizers, particularly nitrogen.

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

Proper grazing is essential for high quality forage, stand survival, and erosion control. Brush and weed control,

Figure 7.—This pasture of improved bermudagrass is on Ruston and Malbis soils.

application of fertilizer and lime, and renovation of the pasture are also important.

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

Forage production can be increased by grazing the understory native plants in woodland. According to the 1982 United States Census of Agriculture, there is approximately 28,000 acres of woodland being grazed in Webster Parish. Forage volume varies with the woodland site, the condition of the native forage, and the density of the timber stand. Although most woodland is managed mainly for timber, substantial volumes of forage can be obtained if these areas are properly managed. Stocking rates and grazing periods need to be carefully managed for optimum forage production and to maintain an adequate cover of understory plants to control erosion.

Fertilizing and liming. Most of the soils in Webster Parish are highly weathered and leached. Soil reaction in the surface layer ranges from very strongly acid to slightly acid. The reaction in only a few of the soils ranges to neutral. Calcium content ranges from very low to low. Many of the soils contain high levels of exchangeable aluminum and manganese that are toxic to some plants. Soil acidity combined with low calcium levels necessitates that a liming program is used to reduce the levels of aluminum and manganese in the soils. Generally, all of the soils of Webster Parish need lime and a complete fertilizer to improve them for crops. The amount of fertilizer needed depends on the kind of crops to be grown, on past cropping history, on the level of yield desired, and on the kind of soil. It should be determined on the basis of soil test results. Information and instructions on collecting and testing soil samples can be obtained from the Cooperative Extension Service.

Organic matter content. Organic matter is an important source of nitrogen for plant growth. It also increases the rate of water intake, reduces surface crusting, and improves tilth. Most of the soils in Webster Parish range from low (0.5 percent - 1.0 percent) to moderate (1.0 percent - 2.0 percent) in organic matter content. To a limited extent, the content of organic matter can be increased and maintained by leaving plant residue on the soil, by growing crops that produce an extensive root system and an abundance of foliage, by adding barnyard manure, and by growing perennial grasses and legumes in rotation with other crops.

Soil tillage. Soils should be tilled only enough to prepare a seedbed and control weeds. Excessive tillage commonly destroys soil structure. Some of the soils in the parish become cloddy when they are plowed when too wet or too dry. A compacted layer, generally known as a plow pan or traffic pan, sometimes develops just below the plow layer in loamy soils. It can be avoided by not plowing when the soil is wet or by varying the depth of plowing. Plow pans can be broken up by subsoiling or chiseling. The use of tillage implements which stir the surface and leave crop residue in place protects the soil from beating rains. This helps to control erosion, reduce run-off, increase infiltration, and reduce surface crusting.

Water for plant growth. The available water capacity of the soils in the parish ranges from low in the Bienville, Boykin, Flo, and McLaurin soils to very high in the Guyton and Kolin soils. In many years, however, sufficient water is not available at the critical time for optimum plant growth. Plentiful amounts of rain falls in winter and spring, and sufficient rain falls in summer and autumn of most years. However, during dry periods, soil moisture deficits of as much as 4 inches occur. This rainfall pattern favors the growth of early maturing crops.

Cropping system. A good cropping system includes a legume for nitrogen, a cultivated crop to aid in weed control, a deep-rooted crop to utilize the fertility and maintain the permeability in the subsoil, and a close-growing crop to help maintain the organic matter content. In a good cropping system the soil has a plant cover during as much of the year as possible.

A suitable cropping system varies according to the needs of the farmer and characteristics of the soil. Livestock producers, for example, generally use a cropping system that includes more pasture and annual forages than that used on a cash-crop farm. Grasses, legumes, and other green manure crops can be grown during the fall and winter to control erosion and increase the content of organic matter in the soils.

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

Control of erosion. Soil erosion is a hazard to using most of the soils of the uplands in Webster Parish. It is not a serious hazard on soils of the flood plains because the topography is level or nearly level. Sloping soils are susceptible to erosion when left without plant cover for extended periods. If the surface layer is lost through erosion, most of the available plant nutrients and most of the organic matter are also lost. In addition, where the surface layer is removed from soils, such as Darley, Eastwood, Gore, Ruple, Sacul, Forbing, and Mahan, the clayey subsoil or ironstone layers can become exposed.

Sheet and rill erosion can be severe in fallow-plowed fields. Gully erosion can also occur in areas of the more sloping soils. Sheet, rill, and gully erosion can be reduced by maintaining a cover of vegetation or plant residue on the soil, farming on the contour, terracing, stripcropping, and using no-till farming or conservation tillage. Disturbed areas around construction sites should be seeded and mulched immediately after construction to control erosion. Water-control structures should be installed in drainageways and ditches to control gullying.

Drainage and flood control. Approximately 33,000 acres in Webster Parish can be improved for crops and pasture by improving the drainage. A properly designed system of field ditches can remove excess water from seasonally wet soils such as the Guyton, Wrightsville, Gurdon, Kolin, and Gore soils. Where controlling flooding is environmentally acceptable, major flood-control structures can be used to protect the flooded phases of the Guyton soils and the Dela, Iuka, and Ouachita soils from stream overflow.

Yields per Acre

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

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

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

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

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

Land Capability Classification

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

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

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

Class I soils have few limitations that restrict their use.

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

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

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

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

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

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

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

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

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

Woodland Management and Productivity

Don Lawrence, forester, Natural Resources Conservation Service, helped prepare this section.

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

Soils directly influence the growth, management, harvesting, and multiple use 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 use.

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

These soil characteristics, in combination, largely determine the forest stand species composition and influence management and utilization decisions.

Sweetgum, for example, is tolerant of many soils and sites, but grows best on rich, moist, loamy alluvial 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.

Oaks grow on a variety of soils. White oak, for example, grows on flood plains, uplands, and stream terraces. It grows best on well drained loamy soils. Water oak and willow oak grow on poorly drained, as well as on well drained, alluvial soils. Swamp chestnut oak is widely distributed on well drained, loamy, alluvial soils and on well drained, loamy soils on stream terraces. At the other extreme, southern red oak grows best on dry, sandy, or clayey soils on uplands; but also grows on a variety of other soils. Post oak is well adapted to uplands and grows best on sandy soils and on southern exposures.

Loblolly pine and shortleaf pine are the predominant and most widely grown trees in Webster Parish. The ability of these pines to grow on a variety of soils partly accounts for their wide distribution.

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

Shortleaf pine grows well on well drained soils that have a sandy or loamy surface layer. The least productive sites are the shallow, rocky upland soils. Site indexes at age 50 on better sites can exceed 100 feet. Shortleaf pine does not grow well on alkaline soils.

There are no natural or commercial stands of longleaf pine or slash pine in Webster Parish.

Proper forest management is that which adequately maintains forest litter and soil organic matter and prevents compaction of the soils. Management practices should include: (1) using technical methods for site preparation rather than mechanical; (2) using the roller drum chopper rather than the shear and windrow method of mechanical site preparation; (3) delaying harvesting and site preparation activities on wet soils; (4) using logging slash to protect and conserve the soils; (5) healing critically eroding areas; (6) leaving filter strips along streams; and (7) properly installing logging and access roads, water-control and drainage systems, and stream crossings. Silvicultural practices that can be used to improve production include: (1) using sanitation cutting to remove trees killed or injured by fire, insects, and fungi; (2) using improvement cutting to improve species composition and stand condition; and (3) thinning to increase the rate of growth, reduce tree competition, and improve the species composition and quality. All of these practices result in long-term increases in total yield of timber.

Woodland Resources

Webster Parish was once totally wooded. During the early 1900's, a large portion of the wooded area was cleared to make way for agricultural crops and pastures. For a time, Webster Parish was the leading cotton-producing parish in Louisiana, and several cotton gins were in operation within the parish. During the 1950's and 1960's, the major land use changed to southern pine woodlands. Today, the uplands are, again, almost totally wooded, and only a few scattered areas are devoted to crops, pastures, small villages, and homesteads. The woodland in Webster Parish is primarily managed for pine, although some small stream bottoms produce limited quantities of hardwood.

Webster Parish has about 290,500 acres of commercial woodland (26, 28). Commercial woodland is defined as that producing or capable of producing crops of industrial wood and not withdrawn from timber use. About 15 percent of the commercial woodland is owned by the federal government, 17 percent by forest industry, 10 percent by private farms, 4 percent by corporations, and 52 percent by individuals.

The U.S. Department of Army has approximately 13,174 acres in Webster Parish. This area is primarily pine woodland. Small tracts of hardwood forest are along the stream bottoms. The Bodcaw Wildlife Management Area, a 7,459-acre tract managed by the Corps of Engineers, is in the northwestern part of Webster Parish. This tract is primarily bottom land hardwoods.

Commercial woodland may be further divided into forest types (26, 28). Types can be based on tree species, site quality, or age. As used in this survey, forest types are stands of trees of similar character, composed of the same species, and growing under the same ecological and biological conditions. The forest types are named for the dominant trees.

The *loblolly-shortleaf pine* forest type makes up about 101,000 acres or 35 percent of the forest land in Webster Parish. Loblolly pine is generally dominant except on drier sites. Scattered hardwoods, such as sweetgum, blackgum, southern red oak, post oak, white oak, mockernut hickory, and pignut hickory, can be mixed with pines on well drained soils. On the more moist sites, sweetgum, red maple, water oak, and willow oak can be mixed with the pines. American beech and ash are associated with this forest type along stream bottoms.

The *oak-pine* forest type makes up about 82,100 acres or 28 percent of the forest land in the parish. About 50 to 75 percent of the stocking is hardwoods, generally upland oaks, and 25 to 50 percent is softwoods that do not include cypress. The species that make up the oak-pine forest type are primarily the result of soil, slope, and

Figure 8.—Loblolly pine logs are loaded onto transport trucks and hauled to nearby sawmills. The trees are on Malbis fine sandy loam, 1 to 3 percent slopes.

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 sites, white oak, southern red oak, and black oaks are the main hardwood components. Blackgum, winged elm, red maple, and various hickories are associated with the oak-pine forest type on both of these broad site classifications.

The *oak-hickory* forest type makes up about 69,500 acres or 24 percent of the forest land in the parish. Upland oaks or hickory, singly or in combination, make up a plurality of the stocking. Common associates include elm and maple.

The *oak-gum-cypress* forest type covers 37,900 acres or 13 percent of the forest land in Webster Parish. This type is on the bottom lands of major streams. Dominant trees are blackgum, sweetgum, oak, and baldcypress. Associated trees include black willow, ash, hackberry, maple, and elm.

The marketable timber volume is about 58 percent pine and 42 percent hardwood (Fig. 8). The sawtimber volume is 76 percent pine and 24 percent hardwood. About 50 percent of the forest acreage is in sawtimber, 35 percent is in pole timber, and 15 percent is saplings and seedlings.

The productivity of forest land is the amount of wood produced per acre per year measured in cubic feet. In Webster Parish, about 4 percent of the forest land produces 165 cubic feet or more of wood per acre, 30 percent produces 120 to 165 cubic feet per acre, 44 percent produces 85 to 120 cubic feet per acre, and 17 percent produces 50 to 85 cubic feet per acre. The remaining forest land in Webster Parish produces less than 50 cubic feet per acre.

The importance of timber production to the economy of the parish is significant. Most of the upland pine sites are owned by private landowners. Most of these tracts are producing below their potential and would benefit if stands were improved by thinning out mature trees and undesirable species. Protection from overgrazing, fire, insects, and diseases; tree planting; prescribed burning; and timber stand improvement are needed to improve stands. Forest land owned by forest industries and forest land owned by the federal government generally are well managed.

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

Environmental Impact

Woodland is valuable for wildlife habitat, recreation, natural beauty, forage, and conservation of soil and water. The commercial forest land of Webster Parish provides food and shelter for wildlife and offers opportunity for sport and recreation to many users annually. Hunting clubs in the parish lease or otherwise use the forest land. This forest land provides watershed protection, helps to control 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, reduce the velocity of wind, muffle the sound of traffic, and lend beauty to the landscape. They produce fruits and nuts for use by people as well as wildlife. Trees and forests help filter out airborne dust and other impurities, convert carbon dioxide into life-giving oxygen, and provide shade from the sun's hot rays.

Woodland Production

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to applications of fertilizer than others, and some are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special reforestation efforts. In the section "Detailed Soil Map Units," the description of each map unit in the survey area suitable for timber includes information about productivity, limitations in harvesting timber, and management concerns in producing timber. Table 7 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate,* and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

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

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation affecting use and management. The letter *R* indicates a soil that has a significant limitation because of steepness of slope. The letter *W* indicates a soil in which excessive water, either seasonal or year-round, causes a significant limitation. The letter *C* indicates a soil that has a limitation because of the kind or amount of clay in the upper part of the profile. The letter *S* indicates a dry, sandy soil. The letter *F* indicates a soil that has a large amount of coarse fragments. The letter *A* indicates a soil having no significant limitations that affect forest use and management. If a soil has more than one limitation, the priority is as follows: R, W, C, S, and F.

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

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

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

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

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

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands. The estimates of the productivity of the soils in this survey are based on the site index that was determined at age 30 years for eastern cottonwood, 35 years for American sycamore, and 50 years for all other species.

The *volume* is the yield likely to be produced by the most important trees, expressed in cubic feet per acre per year calculated at the age of culmination of mean annual increment.

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

Recreation

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

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

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

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

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

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

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

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

Wildlife Habitat

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

The combination of forest land, pastureland, cropland, streams, ponds, and man-made lakes in Webster Parish provides habitat for a large and varied population of wildlife. Hunting and other outdoor pursuits are popular activities for both parish and nonparish residents.

The 183,100 acres of upland pine forests is managed primarily for loblolly pine. Woodland management practices, such as periodic thinning and prescribed burning, are beneficial to wildlife, especially white-tailed deer, bobwhite quail, and wild turkey. Even-aged management utilizing "block clearcutting" is practiced on forest land owned by individuals and the U.S. Forest Service. This practice is beneficial to deer, bobwhite quail, and turkey if the "clearcuts" are kept relatively small.

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

The hardwood forests along creek bottoms provide the primary habitat for wild turkey, squirrel, and white-tailed deer. Dorcheat Creek is a typical example of this habitat type. Dominant trees include water oak, willow oak, cherrybark oak, shagbark hickory, overcup oak, white oak, swamp chestnut oak, beech, and magnolia.

About 12,071 acres of forest land in the parish is owned by the U.S. Forest Service. This forest land is managed for multiple use of the resources. Designated campgrounds are available and the area offers some excellent public hunting.

About 15,776 acres of pastureland is in the parish. Pasture grasses include bahiagrass, improved bermudagrass, and common bermudagrass. The cover and seed production provided by these areas offer limited habitat to bobwhite quail, rabbit, mourning dove, white-tailed deer, and many other nongame birds and animals. Pastures provide excellent brood habitat for turkey poults because of the high population of insects commonly in pastures. The primary value of pastures to wildlife is the contrasting "edge effect" provided by these small open areas in an otherwise forested environment.

The many ponds, lakes, and creeks of the parish support low to high populations of largemouth bass, white bass, striped bass, bluegill, white and black crappie, gar, bowfin, buffalo, shad, carp, pickerel, warmouth, and several species of shiners and minnows (Fig. 9). Lake Bistinaeau, a man-made lake, offers excellent fishing. Well-managed farm ponds on private land offer some of the best fishing in the parish. Most of the farm ponds are stocked with bluegill, redear sunfish, and largemouth bass.

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

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

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

Figure 9.—Dorcheat Bayou is one of many streams in the parish that supports game and pan fish.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Engineering

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

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

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

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

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

This information can be used to evaluate the suitability of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil;

plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

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

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

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

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

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

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

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

Sanitary Facilities

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

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

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

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

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

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

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

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

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

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

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

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

Construction Materials

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

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

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

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

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

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

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to a cemented pan (ironstone) or to other layers that affect the rate of water movement, permeability, depth to a high water table, slope, and susceptibility to flooding. Excavating and grading and the stability of ditchbanks are affected by depth to a cemented pan (ironstone), 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 aluminum. Availability of drainage outlets is not considered in the ratings.

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

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

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Wetness, slope, and depth to a cemented pan (ironstone) affect the construction of grassed waterways. Low available water capacity, restricted rooting depth, aluminum, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

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

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

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

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

Engineering Index Properties

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.55. 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 the table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Soil and Water Features

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

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

The four hydrologic soil groups are:

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

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

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

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

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

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

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional,* or *frequent. None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than a 50 percent in any year). *Common* is used when the occasional and frequent classes are grouped for certain purposes. Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

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

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

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

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

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

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

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

Physical and Chemical Analyses of Selected Soils

The results of physical analysis of several typical pedons in the survey area are given in table 18 and the results of chemical analysis in table 19. The data are for soils sampled at carefully selected sites. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." Soil samples were analyzed by the Soil Characterization Laboratory, Agronomy Department, Louisiana Agricultural Experiment Station, Louisiana State University Agricultural Center; and the National Soil Survey Laboratory, Natural Resources Conservation Service.

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an ovendry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods *(30)*.

Sand—(0.05-2.0 mm fraction) weight percentages of material less than 2 mm (3A1).
Silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all material less than 2 mm (3A1).
Clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of material less than 2 mm (3A1).
Water retained—pressure extraction, percentage of ovendry weight of less than 2 mm material; 1/3 or 1/10 bar (4B1), 15 bars (4B2).
Water-retention difference—between 1/3 bar and 15 bars for whole soil (4C1).
Moist bulk density—of less than 2 mm material, saran-coated clods (4A1).
Moist bulk density—of less than 2 mm material, saran-coated clods at field moisture (4A3A), air-dry (4A1b), and ovendry (4A1R) conditions
Coefficient of linear extensibility (COLE)—change in clod dimension based on whole soil (4D).
Organic carbon—potassium dichromate, sulfuric acid wet digestion (6A1a).
Extractable cations—ammonium acetate pH 7.0, atomic absorption; calcium (6N2e), magnesium (6O2d), sodium (6P2d), potassium (6Q2b).
Extractable acidity—barium chloride-triethanolamine (BaC12-TEA) solution (6G2b).
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 and hydrogen—potassium chloride extraction (6G2), and aluminum (6G7a).
Iron—oxides as Fe-sodium extract (6C2b).
Available phosphorus—(Bray 1 and Bray 2 extraction reagents).

Soil Fertility Levels

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This section contains information on both the environmental factors and the physical and chemical properties of the soils that affect the potential for crop production. It also lists the methods used to obtain the chemical analyses of the sampled soils.

Factors Affecting Crop Production

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

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

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

Soil factors—physical properties:
- Particle-size distribution and texture
- Structure
- Surface area
- Bulk density
- Water retention and flow
- Aeration

Soil factors—chemical properties:
- Quantity factor. This factor 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 factor is related to 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 that have identical quantities of an element's available supply but have different element intensity factors will differ in element availability to the plant.
- Quantity/Intensity relationship factor. The relationship includes the reactions between the soil surface and soil water that control the distribution of element species between the available supply in the soil and the soil water. A special quantity—intensity relationship is the buffer capacity of the soil for a given element. The buffer capacity is the amount of a given element that must be added to or removed from the available supply to produce a given change in the intensity factor for that element.
- Replenishment factor. This factor is the rate of replenishment of the available supply and intensity factors by weathering reactions, fertilizer additions, and transport by mass flow and diffusion.

These soil factors are interdependent. The magnitude of the factors and the interactions among them control crop response. The relative importance of each factor changes from soil to soil, crop to crop, and environment to environment. The soil factors are only part of the overall system.

The goal of soil testing is to provide information for a soil and crop management program that establishes and maintains optimum levels and balance of the essential elements in 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 one or more nutrients in the 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 upon 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 environment factors, physical properties of the plow layer, and physical and chemical properties of the subsoil.

Chemical Analyses Methods

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. Soil profiles were sampled during the soil survey and analyzed for pH; organic matter content; extractable phosphorus; exchangeable cations of calcium, magnesium, potassium, sodium, aluminum, and hydrogen; total acidity; and cation exchange capacity. These results are summarized in Table 17. More detailed information on chemical analysis of soils is available *(1, 5, 15, 16, 19, 24, 25)*. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods *(30)*.

Reaction (pH)—1:1 soil-water solution (8C1a).
Organic matter—potassium dichromate-sulfuric acid wet digestion (6A1a).
Extractable phosphorus—Bray 2 extractant (0.03 molar ammonium fluoride-0.1 molar hydrochloric acid.
Exchangeable bases—pH 7, 1 molar ammonium acetate-calcium (6N2), magnesium (602), potassium (6Q2), sodium (6P2).
Exchangeable aluminum and hydrogen—1 molar potassium chloride (6G2).
Total acidity—pH 8.2, barium chloride-triethanlolamine (6H1a).
Effective cation-exchange capacity—sum of bases plus exchangeable aluminum and hydrogen (5A3b).
Sum cation-exchange capacity—sum of bases plus total acidity (5A3a).
Base saturation—sum of bases/sum cation-exchange capacity (5C3).
Sodium saturation—exchangeable sodium/sum cation-exchange capacity.
Aluminum saturation—exchangeable aluminum/effective cation-exchange capacity.

Characteristics of Soil Fertility

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

The second type includes soils that have relatively low levels of available nutrients in the surface layer, but generally have increasing levels with depth through the soil profile. These soils have relatively fertile parent material but are older soils that have been subjected either to weathering over a longer period of time or to more intense weathering. If the levels of available nutrients in the surface layer are low, crops may exhibit deficiency symptoms early in the growing season. Deficiency symptoms often disappear if the crop roots are able to penetrate to the more fertile subsoil as the growing season progresses.

The third type includes soils that have adequate or relatively high levels of available nutrients in the surface layer but have relatively low levels in the subsoil. Such soils developed from low fertility parent material, or they are older soils that have been subjected to more intense weathering over a longer period of time. The higher nutrient levels in the surface layer generally are a result of fertilization in agricultural soils or biocycling in undisturbed soils.

The fourth type includes soils that have relatively low levels of available nutrients throughout the soil profile. These soils developed from low fertility parent material, or they are older soils that have been subjected to intense weathering over a long period of time. Neither fertilization nor biocycling has contributed to nutrient levels in the surface layer of these soils.

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

Nitrogen. Generally, over 90 percent of the nitrogen in the surface layer is in the form of organic nitrogen. Most of the nitrogen in the subsoil is in the form of fixed ammonium compounds. These forms of nitrogen are unavailable for plant uptake, but they can be converted to readily available ammonium and nitrate species.

Nitrogen generally is the most limiting nutrient element in crop production because plants have a high demand for it. Nitrogen fertilizer recommendations are nearly always based on the nitrogen requirement of the crop rather than nitrogen soil test levels, since no reliable nitrogen soil tests are available.

Despite the lack of an adequate nitrogen soil test, the amounts of readily available ammonium and nitrate nitrogen in soils, the amount of organic nitrogen, the rate of mineralization of organic nitrogen to available forms of nitrogen, and the rate of conversion of fixed ammonium nitrogen to available forms of nitrogen provide information on the fertility status of a soil with respect to nitrogen. Unfortunately, since the amounts and rates of transformation of the various forms of nitrogen in the soils of Webster 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 soil test interpretation guidelines, the Bray 2 extractable phosphorus content of most of the soils in Webster Parish is in the very low to low range. Only the Bienville and Flo series contain medium or high levels of extractable phosphorus in the A horizon. A response to added phosphorus can be obtained where the level of extractable phosphorus is very low or low in the surface and subsurface horizons. High levels of extractable phosphorus throughout the soil profile should not be interpreted as an indication that the soil never needs phosphorus fertilizer because the available supply of phosphorus in the soil can be reduced through continuous cropping with no additions of phosphorus. If the available supply of phosphorus is in the medium to high range, it should be maintained by adding phosphorus to account for crop removal of phosphorus and the fixation of some added phosphorus as unavailable phosphorus in the soil. If the available supply of phosphorus is low, then available phosphorus levels should be gradually built up and maintained where possible.

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 inter-layers, and structural potassium within the crystal lattice of minerals. The exchangeable form of potassium in soils can be 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 supply available to plants. According to soil test interpretation guidelines, the available supply of potassium in most of the mineral soils of Webster Parish is mainly in the very low or low range, depending on the soil texture. Exceptions to this are the Dela, Iuka, and Ouachita soils on the flood plains. These soils may have received additional sediment from recent floods that was high in available potassium. Also, the exchangeable potassium content in the Gore, Ruston, and Wrightsville soils is medium or high and remains about the same or increases with depth. Increases in exchangeable potassium with depth can be associated with increasing clay content. Soils that have a relatively low clay content, such as the Bienville 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 enough fertilizer potassium to account for crop removal, fixation of exchangeable potassium to nonexchangeable potassium, and leaching losses. Most of the soils in Webster Parish contain a sufficient amount of clay; therefore, they have a sufficiently high cation-exchange capacity to maintain adequate quantities of available potassium for crop production. However, some of the soils, such as the Bienville, Dela, Flo, Iuka, and Smithdale soils, have a low cation-exchange capacity. More frequent additions of fertilizer potassium are needed to maintain exchangeable potassium levels in these soils.

Magnesium. Magnesium exists in soils as exchangeable magnesium associated with negatively charged sites on clay mineral surfaces and as structural magnesium in mineral crystal lattices. Exchangeable magnesium is generally readily available for plant uptake while structural magnesium must be converted to exchangeable magnesium during mineral weathering reactions.

According to soil test interpretation guidelines, the exchangeable magnesium content in the upper part of most of the soils of Webster Parish is low, medium, or high depending upon soil texture. Generally, the exchangeable magnesium content of the soils on uplands, such as the Gore, Mahan, and Ruston soils, increases with depth. This increase is associated with an increasing clay content in the subsoil. In soils formed in alluvium, such as the Dela, Iuka, and Ouachita soils, the exchangeable magnesium levels generally decrease with depth or the levels remain about the same throughout the profile.

Medium levels of exchangeable magnesium are adequate for crop production. Where levels are low, some plants have magnesium deficiencies; thus, additions of fertilizer magnesium can be beneficial to crop production on many of the soils of Webster Parish.

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

The exchangeable calcium levels in the mineral soils of Webster Parish are low, medium, or high, depending on soil texture. Calcium deficiencies in plants are rare. Thus, the levels of exchangeable calcium in the mineral soils of Webster Parish are adequate for crop production. Calcium is normally added to soils when they are limed to correct problems associated with soil acidity.

Higher levels of exchangeable calcium in the surface layer than in the subsoil generally are associated with higher pH levels. 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 the moisture-holding capacity, cation-exchange capacity, and nitrogen content.

Increasing the organic matter content is very difficult because organic matter is continually subject to microbial degradation. This is especially true in Louisiana where higher temperatures increase microbial activity. The rate of 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 is needed to raise the organic matter content in the upper 6 inches of soil by just 1 percent. Since breakdown of organic matter does occur in the soil, several decades of adding large amounts of organic matter to the soil are needed to produce a small increase in the organic matter content. Conservation tillage and cover crops slowly increase the organic matter content over time, or at least prevent further declines.

The organic matter content of most of the loamy soils of Webster Parish is low or moderate. It decreases sharply with depth because fresh organic matter is confined to the surface layer. These low or moderate 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 sodium is generally not strongly retained by soils, well drained soils subjected to a moderate or more intense degree of weathering from rainfall do not normally contain significant amounts of sodium. Soils in low rainfall environments, soils that have restricted drainage in the subsoil, and soils of the Coastal Marsh contain significant to substantial amounts of sodium. High levels of exchangeable sodium in soils are associated with undesirable physical properties, such as poor structure, slow permeability, and restricted drainage.

Although some of the soils in Webster Parish contain more exchangeable sodium than exchangeable potassium, none of the soils contain excessive levels of exchangeable sodium.

pH, exchangeable aluminum and hydrogen, and exchangeable and total acidity. The pH of the soil solution in contact with the soil affects other soil properties. Soil pH is an intensity factor rather than a quantity factor. The lower the pH, the more acidic the soil. Soil pH controls the availability of essential and nonessential elements for plant uptake by controlling mineral solubility, ion exchange, and adsorption/desorption reactions with the 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 the plants. The toxic effects of aluminum on plant growth can be alleviated by adding lime to the soil to convert exchangeable aluminum to nonexchangeable polymeric hydrolysis species. High levels of organic matter can also alleviate aluminum toxicity.

Sources of exchangeable hydrogen in soils include hydrolysis of exchangeable and nonexchangeable aluminum and pH-dependent exchange sites on metal oxides, certain layer silicates, and organic matter. Exchangeable hydrogen, as determined by extraction with such neutral salts as potassium chloride, is normally not a major component of soil acidity 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 exchangeable sites makes up the exchangeable acidity in soils. Exchangeable acidity is determined by the pH of the soil. Titratable acidity is the amount of acidity neutralized to a selected pH, generally pH 7 or 8.2, and constitutes the total potential acidity of a soil determined up to a given pH. All sources of soil acidity, including hydrolysis of monomeric and polymeric aluminum species and hydrogen from pH-dependent exchange sites on metal oxides, layer silicates, and organic matter, contribute to the total potential acidity. Total potential acidity in soils is determined by titration with base or incubation with lime; extraction with a buffered extractant followed by titration of the buffered extractant (pH 8.2, barium chloride-triethanolamine method); or equilibration with buffers followed by estimation of acidity from changes in buffer pH.

Potentially toxic levels of exchangeable aluminum are in the subsoils of many of the soils in Webster Parish.

Soil treatments or other cultural methods that reduce or avoid problems associated with high levels of exchangeable aluminum have not been thoroughly studied in Louisiana. Liming soil to pH 5.5 is probably the most widespread method of reducing exchangeable aluminum levels. There is a wide range of susceptibility to aluminum phytotoxicity among many agronomic crops depending, in some cases, upon the particular cultivar grown. Planting crops or cultivars that are tolerant of high aluminum levels can help avoid phytotoxicity problems.

Cation-exchange capacity. The cation-exchange capacity represents the available supply of nutrient and non-nutrient cations in the soil. It is the amount of cations on permanent and pH-dependent negatively charged sites on the soil surface. Permanent charge cation-exchange sites occur because a net negative charge develops on mineral surfaces from substitution of ions within the crystal lattice. A negative charge developed from ionization of surface hydroxyl groups on minerals and organic matter produces pH-dependent cation-exchange sites.

Methods for determining cation-exchange capacity are available and can be classified as one of two types: methods that use unbuffered salts to measure the cation-exchange capacity at the pH of the soil and methods that use buffered salts to measure the cation-exchange capacity at a specified pH. These methods produce different results since unbuffered salt methods include only a part of the pH-dependent cation-exchange capacity and the buffered salt methods include all of the pH-dependent cation-exchange capacity up to the pH of the buffer (generally pH 7 or 8.2). Errors in the saturation, washing, and replacement steps can also cause different results.

The effective cation-exchange capacity is the sum of exchangeable bases determined by extraction with pH 7, 1 molar ammonium acetate plus the sum of neutral salt exchangeable aluminum and hydrogen (exchangeable acidity). The sum cation-exchange capacity is the sum of exchangeable bases plus the total acidity determined by extraction with pH 8.2, barium chloride-triethanolamine. The effective cation-exchange capacity is generally less than the sum cation-exchange capacity and includes only that part of the pH-dependent cation-exchange capacity that is determined by exchange of hydrogen with a neutral salt. The sum cation-exchange capacity includes all of the pH-dependent cation-exchange capacity up to pH 8.2. If a soil contains no pH-dependent exchange sites or the pH of the soil is about 8.2, the effective and sum cation-exchange capacity will be about the same. The larger the cation-exchange capacity, the larger the capacity to store nutrient cations.

The soil cation-exchange capacity is almost entirely a result of the amount and kind of clay and organic matter present. Most of the mineral soils mapped in the parish have a surface layer that contains more organic matter than the subsoil, resulting in a greater cation-exchange capacity in the surface layer than in the subsurface layer. Many of these same soils have a subsoil that is more clayey than the surface and subsurface layers; therefore, the cation-exchange capacity is high in the surface layer, lower in the subsurface layer, and higher again in the subsoil.

Some of the soils on narrow flood plains have content of clay and organic matter that are irregular with depth. The cation-exchange capacity of these soils, therefore, is also irregular with depth.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(29)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 20 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

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

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

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Udifluvents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-loamy, siliceous, nonacid, thermic Typic Udifluvents.

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

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" *(27)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(29)*. 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."

Bienville Series

The Bienville series consists of somewhat excessively drained, moderately rapidly permeable soils that formed in sandy sediment of late Pleistocene age. These soils are on low stream terraces. Slopes range from 1 to 5 percent. Soils of the Bienville series are sandy, siliceous, thermic Psammentic Paleudalfs.

Bienville soils commonly are near Cahaba and Guyton soils. Cahaba soils are at a slightly higher elevation than the Bienville soils and are fine-loamy. Guyton soils are in lower positions, are grayish throughout the profile, and are fine-silty.

Typical pedon of Bienville loamy fine sand, 1 to 5 percent slopes; 3.25 miles northwest of Dixie Inn, 1,400 feet north and 4,675 feet east of the southwest corner of sec. 14, T. 19 N., R. 10 W.

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

E—6 to 28 inches; brown (7.5YR 5/4) loamy fine sand; weak fine granular structure; very friable; many fine and medium roots; medium acid; clear wavy boundary.

B/E—28 to 48 inches; yellowish red (5YR 5/6) loamy fine sand (Bt) and brown (7.5YR 5/4) (E) loamy fine sand; common fine prominent light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; very friable; few spots of dark brown (7.5YR 4/4) finer-textured material; slightly acid; clear wavy boundary.

Bt—48 to 75 inches; yellowish brown (10YR 5/6) loamy fine sand; common fine distinct yellowish red (5YR 5/6) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; very friable; few spots of uncoated sand grains; few sand grains bridged with clay; medium acid.

The solum is 60 to 80 inches thick.

The Ap horizon has value of 4 or 5 and chroma of 2 to 4. Reaction ranges from very strongly acid to medium acid. Thickness ranges from 5 to 10 inches.

The E horizon and the E part of the B/E horizon have hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 or 4. Reaction ranges from very strongly acid to slightly acid. Thickness ranges from 10 to 30 inches.

The Bt horizon has hue of 10YR, 7.5YR, or 5YR, value of 4 or 5, and chroma of 4 to 6. The Bt part of the B/E horizon has hue of 5YR or 7.5YR. Streaks of E material make up 15 to 40 percent of the B/E horizon. Typically, the texture of the Bt horizon is loamy fine sand or fine sand. In some pedons, it is fine sandy loam in the lower part. In some pedons, the lower part of the Bt horizon contains lamellae that are dark reddish brown, reddish brown, or brown. Reaction in the Bt horizon ranges from very strongly acid to medium acid.

Boykin Series

The Boykin series consists of well drained soils that formed in sandy and loamy sediment of early Pleistocene age. Permeability is rapid in the upper part of the soil and moderate in the lower part of the soil. These soils are on uplands. Slopes range from 1 to 5 percent. Soils of the Boykin series are loamy, siliceous, thermic Arenic Paleudults.

Boykin soils commonly are near Malbis, Ruston, and Smithdale soils. Malbis and Ruston soils are in positions similar to those of the Boykin soils. Smithdale soils are on side slopes. Malbis soils have a strong brown and yellowish brown subsoil that contains more than 5 percent plinthite. Ruston and Smithdale soils do not have sandy surface and subsurface layers more than 20 inches thick.

Typical pedon of Boykin loamy fine sand, 1 to 5 percent slopes; 2 miles north of Minden, 1,750 feet north and 2,400 feet east of the southwest corner of sec. 4, T. 19 N., R. 9 W.

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

E1—4 to 9 inches; yellowish brown (10YR 5/4) loamy fine sand; weak fine granular structure; very friable; common fine roots; common fine and medium pores; medium acid; clear smooth boundary.

E2—9 to 22 inches; light yellowish brown (10YR 6/4) loamy fine sand; weak fine subangular structure; very friable; few fine and medium roots; common fine and medium pores; medium acid; gradual wavy boundary.

Bt1—22 to 28 inches; yellowish red (5YR 5/6) fine sandy loam; common fine prominent light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; few fine roots; few medium discontinuous random tubular pores; common distinct discontinuous clay films on surfaces of peds; strongly acid; clear wavy boundary.

Bt2—28 to 51 inches; red (2.5YR 4/8) sandy clay loam; moderate medium subangular blocky structure; friable; few fine roots; common distinct discontinuous clay films on surfaces of some peds; strongly acid; clear smooth boundary.

Bt3—51 to 83 inches; red (2.5YR 4/8) sandy clay loam; common medium prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; common distinct discontinuous clay films on surfaces of some peds; light yellowish brown (10YR 6/4) and pale brown (10YR 6/3) loamy fine sand in pockets 1 inch to 1½ inches in diameter; strongly acid.

The solum is greater than 60 inches thick. Clay content in the upper 20 inches of the argillic horizon ranges from 18 to 30 percent.

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

The E horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 or 4. Thickness ranges from 16 to 30 inches. Reaction ranges from very strongly acid to slightly acid.

The Bt horizon has hue of 2.5YR, 5YR, or 7.5YR, value of 4 or 5, and chroma of 6 or 8. Some pedons have a BC horizon. The BC horizon has the same range in texture, color, and reaction as the Bt horizon. Reaction ranges from very strongly acid to medium acid.

Cahaba Series

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

Cahaba soils are similar to McLaurin and Smithdale soils and commonly are near Bienville and Guyton soils. Bienville soils are at a slightly lower elevation than the Cahaba soils and are sandy throughout the profile. Guyton soils are in lower positions and are fine-silty and grayish throughout the profile. McLaurin and Smithdale soils are on uplands. McLaurin soils are coarse-loamy, and Smithdale soils have a thicker solum than the Cahaba soils.

Typical pedon of Cahaba fine sandy loam, 1 to 3 percent slopes; 4.25 miles north of Dixie Inn, 3,500 feet north and 2,200 feet east of the southwest corner of sec. 12, T. 19 N., R. 10 W.

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

A/B—6 to 10 inches; grayish brown (10YR 5/2) fine sandy loam (A); yellowish red (5YR 4/6) sandy loam (B); weak medium subangular blocky structure; friable; common fine and few medium roots; many fine tubular pores; strongly acid; clear smooth boundary.

Bt1—10 to 24 inches; yellowish red (5YR 4/6) sandy clay loam; weak coarse prismatic structure parting to moderate medium subangular blocky; friable; many fine and common medium roots; common medium tubular pores; common distinct discontinuous clay films on surfaces of peds; strongly acid; clear wavy boundary.

Bt2—24 to 37 inches; yellowish red (5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; few medium roots, common fine tubular pores; common distinct discontinuous clay films on surfaces of peds; very strongly acid; gradual wavy boundary.

BC—37 to 49 inches; yellowish red (5YR 5/6) sandy loam; few medium distinct brownish yellow (10YR 6/6) mottles; weak fine subangular blocky structure; very friable; faint patchy clay films on surfaces of some peds; common pebbles of chert; very strongly acid; gradual wavy boundary.

C—49 to 65 inches; yellowish brown (10YR 5/8) sandy loam; massive; very friable; few small pockets of uncoated pale brown (10YR 6/3) sand grains; common pebbles of chert; thin bedding planes; very strongly acid.

The solum is 36 to 60 inches thick. Reaction ranges from very strongly acid to medium acid throughout the solum.

The Ap horizon has value of 3 to 5 and chroma of 2 to 4. Thickness ranges from 4 to 8 inches.

The A/B horizon is 4 to 8 inches thick. The A part of this horizon has the same colors as the Ap horizon and the B part has the same colors as the Bt horizon.

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

The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8. Texture is sandy clay loam, loam, or clay loam.

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

The C horizon has hue of 2.5YR, 5YR, 7.5YR, or 10YR, value of 4 or 5, and chroma of 4 to 8. Texture is sand, loamy sand, or sandy loam. In some pedons, it is stratified.

Darley Series

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

Darley soils commonly are near Mahan, Ruple, and Sacul soils. Mahan and Sacul soils are at a slightly lower elevation than the Darley soils and do not have layers of ironstone in the solum. Ruple soils are in positions similar to those of the Darley soils and have an argillic horizon that is dark red throughout the profile.

Typical pedon of Darley gravelly loamy fine sand, 1 to 5 percent slopes; 0.5 mile northeast of Old Shongaloo, 2,200 feet north and 2,350 feet east of the southwest corner of sec. 9, T. 23 N., R. 9 W.

A—0 to 5 inches; dark brown (7.5YR 4/4) gravelly loamy fine sand; weak fine granular structure; very friable; many fine and common medium roots; about 18 percent, by volume, angular ironstone fragments about 1/8 inch to 2 inches in diameter; about 50 percent of fragments larger than 3/4 inch (do not pass 3/4-inch sieve); strongly acid; clear smooth boundary.

E—5 to 10 inches; yellowish red (5YR 5/6) gravelly loamy fine sand; weak medium subangular blocky structure; very friable; few coarse and medium roots, many fine roots; common fine pores; about 16 percent, by volume, angular ironstone fragments about 1/8 to 1/2 inch in diameter; about 50 percent of fragments larger than 3/4 inch (do not pass 3/4-inch sieve); strongly acid; clear wavy boundary.

Bt1—10 to 18 inches; yellowish red (5YR 4/6) clay loam; strong coarse prismatic structure parting to moderate medium subangular blocky; friable; common fine and medium roots; about 5 percent, by volume, angular ironstone fragments about 1/8 to 1 inch in diameter; few distinct discontinuous clay films on surfaces of peds; very strongly acid; clear wavy boundary.

Bt2—18 to 32 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; friable; few fine and medium roots, few fine pores; few distinct discontinuous clay films on surfaces of peds; common pockets of yellowish brown (10YR 5/6) sandy loam 1/4 to 1 inch in diameter; few small angular ironstone fragments; extremely acid; abrupt smooth boundary.

Bt/Bsm—32 to 44 inches; alternating layers of yellowish red (5YR 4/8) clay (Bt) and nearly continuous layers of fractured ironstone (Bsm); Bt part has moderate medium subangular blocky structure and is friable; Bsm part consists of two ironstone layers, 4 and 12 inches thick, separated by clay material; distinct patchy clay films on vertical surfaces of peds; common small pockets of gray (10YR 6/1) clay (kaolin) embedded with Bt material; very strongly acid; abrupt smooth boundary.

BC—44 to 65 inches; yellowish red (5YR 4/8) sandy clay loam; weak medium subangular blocky structure; friable; faint patchy clay films on surfaces of peds; a few peds weakly cemented and brittle; common pockets of brownish yellow (10YR 6/6) sandy clay loam; few pockets and seams of light gray (10YR 7/1) clay surrounded by dark red (10R 3/6) clay; extremely acid.

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

The A horizon has hue of 5YR, 7.5YR, or 10YR, value of 4 or 5, and chroma of 3 to 8. Reaction ranges from strongly acid to slightly acid. Thickness ranges from 2 to 8 inches.

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

The Bt horizon has hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 3 to 8. Texture is sandy clay loam, clay loam, sandy clay, clay, or their gravelly counterparts. Content of clay ranges from 35 to 60 percent. Ironstone fragments make up from less than 1 percent to 20 percent of the volume. Reaction ranges from extremely acid to strongly acid.

The Bt/Bsm horizon consists of alternating layers of ironstone and sandy clay, clay, or their gravelly counterparts. Ironstone fragments, including fragments that make up the ironstone layers, make up from 20 to 60 percent of the volume of this horizon. The ironstone layers are fractured and range in thickness from 1/2 inch to 12 inches. The lateral distance between fractures ranges from 2 to 20 inches and averages 4 to 8 inches. Typically, the ironstone layers are continuous for several feet; but in some pedons they are intermittent and extend only a few feet horizontally. In some pedons, the layers are parts of large spheroidal configurations that are separated from one another by vertical flows of red clay, sandy clay, or clay loam. The less than 2 millimeter fraction has hue of 5YR, 2.5YR, or 7.5YR, value of 3 to 5, and chroma of 4 to 8. Few to many small pockets and strata of whitish or grayish kaolin are in most pedons. Pockets and strata of loamy or sandy material range from none to common. Reaction is very strongly acid or strongly acid.

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

Dela Series

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

Dela soils commonly are near Bienville, Cahaba, Guyton, Iuka, and Ouachita soils. Bienville and Cahaba soils are on nearby stream terraces and have an argillic horizon. Guyton soils are in lower positions than the Dela soils, are grayish throughout the profile, and are fine-silty. Iuka soils are in slightly lower positions and have grayish mottles within 20 inches of the soil surface. Ouachita soils are in positions similar to those of the Dela soils and are fine-silty.

Typical pedon of Dela fine sandy loam, in an area of Iuka-Dela association, frequently flooded; 4.75 miles northeast of Minden, 3,100 feet north and 1,050 feet east of the southwest corner of sec. 6, T. 19 N., R. 8 W.

Ap—0 to 5 inches; dark brown (10YR 4/3) fine sandy loam; weak fine and medium granular structure; very friable; many fine and medium roots; medium acid; clear smooth boundary.

A—5 to 12 inches; dark brown (10YR 4/3) fine sandy loam; few fine faint brown mottles; weak fine subangular blocky structure; very friable; common fine and few medium roots; few fine tubular pores; medium acid; clear wavy boundary.

C1—12 to 24 inches; dark brown (7.5YR 4/4) loam; structureless; very friable; common fine roots; few fine tubular pores; medium acid; clear wavy boundary.

C2—24 to 42 inches; brown (7.5YR 5/4) sandy loam; structureless; very friable; few fine roots; strongly acid; clear smooth boundary.

C3—42 to 65 inches; yellowish brown (10YR 5/6) sandy loam; few fine distinct light brownish gray (10YR 6/2) mottles and few fine prominent yellowish red (5YR 5/6) mottles; structureless; very friable; very strongly acid.

The Ap and A horizons have value of 4 or 5 and chroma of 2 to 4. Reaction ranges from strongly acid to slightly acid. Combined thickness of the Ap and A horizons ranges from 5 to 18 inches.

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

Eastwood Series

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

Eastwood soils are similar to Sacul soils and commonly are near Mahan and Malbis soils. Mahan and Malbis soils are at a lower elevation than the Eastwood soils. Mahan soils have a base saturation of less than 35 percent. Malbis soils are fine-loamy. Sacul soils are in a different watershed than the Eastwood soils and have a base saturation of less than 35 percent.

Typical pedon of Eastwood very fine sandy loam, 1 to 5 percent slopes; 3.5 miles east of Old Shongaloo, 5,200 feet north and 3,600 feet east of the southwest corner of sec. 13, T. 23 N., R. 9 W.

Ap—0 to 6 inches; dark yellowish brown (10YR 4/4) very fine sandy loam; weak fine granular structure; very friable; few fine roots, common fine and medium pores; medium acid; clear smooth boundary.

Bt1—6 to 16 inches; red (2.5YR 4/8) silty clay; weak medium subangular blocky structure; firm; few fine and medium roots; common distinct clay films on surfaces of peds; strongly acid; clear wavy boundary.

Bt2—16 to 25 inches; red (2.5YR 4/6) silty clay; common medium prominent gray (10YR 6/1) mottles; weak medium subangular blocky structure; firm; few fine roots; common distinct clay films on surfaces of peds; strongly acid; clear wavy boundary.

Bt3—25 to 34 inches; mottled red (2.5YR 4/6), gray (10YR 6/1), and yellowish brown (10YR 5/4) clay loam; moderate medium subangular blocky structure; firm; few fine roots; common distinct clay films on surfaces of peds; very strongly acid; clear wavy boundary.

Bt4—34 to 52 inches; gray (10YR 6/1) clay loam; many coarse prominent red (2.5YR 4/8) mottles; weak medium subangular blocky structure; firm; few distinct discontinuous clay films on surfaces of peds; very strongly acid; clear wavy boundary.

C—52 to 75 inches; stratified light brownish gray (2.5Y 6/2) sandy clay loam and red (2.5YR 4/8) sandy loam; massive; firm; very strongly acid.

The solum is 40 to 60 inches thick. When the soil is dry, it cracks to a depth of 20 inches or more. The cracks are 1/2 inch or more wide.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 to 4. Reaction ranges from very strongly acid to medium acid. Thickness ranges from 3 to 6 inches.

A thin E horizon is in some pedons. Where present, it has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 to 6. Texture is firm sandy loam or very fine sandy loam. Reaction ranges from very strongly acid to medium acid.

The upper part of the Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. The lower part of the Bt horizon has hue of 2.5Y or 10YR, value of 6, and chroma of 1 or 2. Texture of the Bt horizon is clay, silty clay, silty clay loam, or clay loam. Reaction ranges from extremely acid to strongly acid in the upper part of the Bt horizon and from extremely acid to slightly acid in the lower part of the Bt horizon.

The C horizon has dominant colors in shades of brown, red, or gray with mottles and/or strata of these colors, and with or without yellowish colors. Texture is fine sandy loam, sandy loam, sandy clay loam, or shaly silty clay loam. Reaction ranges from very strongly acid to neutral.

Flo Series

The Flo series consists of somewhat excessively drained, rapidly permeable soils that formed in sandy sediment of Tertiary age. These soils are on uplands. Slopes range from 1 to 5 percent. Soils of the Flo series are sandy, siliceous, thermic Psammentic Paleudalfs.

Flo soils commonly are near McLaurin soils. McLaurin soils are on ridgetops in positions similar to those of the Flo soils and are coarse-loamy.

Typical pedon of Flo loamy fine sand, 1 to 5 percent slopes; 4.3 miles southeast of Dubberly, 3,700 feet north and 3,000 feet east of the southwest corner of sec. 3, T. 17 N., R. 8 W.

A—0 to 11 inches; brown (10YR 5/3) loamy fine sand; weak fine granular structure; very friable; common fine and medium roots; strongly acid; clear wavy boundary.

E—11 to 25 inches; light yellowish brown (10YR 6/3) loamy fine sand; single grained; very friable; common fine and medium roots; slightly acid; gradual wavy boundary.

Bw—25 to 45 inches; yellowish brown (10YR 5/4) loamy fine sand; single grained; very friable; few fine and medium roots; few pockets of uncoated sand grains; medium acid; gradual wavy boundary.

Bt—45 to 61 inches; light yellowish brown (10YR 6/4) loamy fine sand; common yellowish red (5YR 5/6) lamellae 1/10 to 1/2 inch thick, spaced 2 to 4 inches apart; coarse subangular blocky structure; very friable; coated sand grains and clay bridging in lamellae; strongly acid; gradual smooth boundary.

E and Bt—61 to 85 inches; pale brown (10YR 6/3) fine sand (E) makes up 60 percent of the volume; yellowish red (5YR 5/6) loamy fine sand (Bt) makes up 40 percent of the volume; single grained; very friable; coatings on sand grains and clay bridging throughout most of Bt part; strongly acid.

The solum is 60 to 100 inches or more thick. Reaction ranges from very strongly acid to medium acid throughout the solum. Texture of the family textural control section is loamy fine sand or fine sand.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. Thickness ranges from 4 to 21 inches.

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

The Bw horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. Spots or pockets and streaks of uncoated sand grains are few or common.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 3 to 6. Texture is loamy fine sand with a noticeable clay increase compared to the overlying horizons. This horizon contains few or common reddish lamellae.

The E part of the E and Bt horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 3 or 4. The Bt part has hue of 5YR, 7.5YR, or 10YR, value of 4 or 5, and chroma of 6 or 8. The lamellae are loamy fine sand or fine sandy loam. Typically, a clay increase is noticeable throughout the Bt part.

Forbing Series

The Forbing series consists of moderately well drained, very slowly permeable soils that formed in loamy and clayey sediment of late Pleistocene age. These soils are on uplands. Slopes range from 1 to 12 percent. Soils of the Forbing series are very-fine, montmorillonitic, thermic Vertic Paleudalfs.

Forbing soils commonly are near Gore and Kolin soils. Gore soils are on slightly broader ridgetops and on side slopes in positions similar to those of the Forbing soils. Gore soils have a fine-textured control section. Kolin soils are on slightly broader ridgetops and are fine-silty.

Typical pedon of Forbing silt loam, 5 to 12 percent slopes; 2.5 miles west of Springhill, 1,900 feet north and 3,200 feet east of the southwest corner of sec. 9, T. 23 N., R. 11 W.

Ap—0 to 3 inches; brown (7.5YR 4/4) silt loam; weak medium granular structure; friable; common fine and medium roots; medium acid; clear wavy boundary.

Bt1—3 to 10 inches; yellowish red (5YR 4/6) clay; few medium prominent yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; firm, plastic, and sticky; few fine and medium roots;

common fine pores; faint patchy clay films on surfaces of peds; medium acid; clear wavy boundary.

Bt2—10 to 17 inches; dark red (2.5YR 3/6) clay; weak medium subangular blocky structure; firm, plastic, and sticky; few fine and medium roots; faint patchy clay films on surfaces of peds; common fine black stains; slightly acid; clear wavy boundary.

Bt3—17 to 28 inches; red (2.5YR 4/6) clay; weak medium subangular blocky structure; firm, very sticky, and very plastic; few fine and medium roots; common black stains in channels and on surfaces of peds; faint patchy clay films on surfaces of peds; strong effervescence; moderately alkaline; gradual wavy boundary.

Btkss1—28 to 40 inches; dark red (2.5YR 3/6) clay; weak medium subangular blocky structure; very sticky and very plastic; faint patchy clay films on surfaces of peds; few slickensides that do not intersect; few fine and medium nodules of calcium carbonate; common masses of soft powdery calcium carbonate; strong effervescence; moderately alkaline; gradual wavy boundary.

Btkss2—40 to 62 inches; red (2.5YR 4/6) clay; weak medium subangular blocky structure; sticky, very firm; few fine roots; few slickensides that do not intersect; common masses of soft powdery calcium carbonate; strong effervescence; moderately alkaline; gradual wavy boundary.

BC—62 to 85 inches; dark red (2.5YR 3/6) clay; common fine prominent dark gray (10YR 4/1) mottles; thin strata of red (2.5YR 4/6) very fine sandy loam in parts of horizon; weak coarse subangular blocky structure; firm; few slickensides that do not intersect; strong effervescence; moderately alkaline.

The solum is 60 to 80 inches thick.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 to 4. In undisturbed areas, some pedons have a thin E horizon. Thickness of the Ap horizon ranges from 2 to 6 inches. Reaction ranges from strongly acid to slightly acid.

The Bt horizon has value of 3 to 5 and chroma of 4 to 6. Brownish mottles range from none to common. Reaction ranges from medium acid to moderately alkaline.

The Btkss horizon has the same color as the Bt horizon. Calcium carbonate nodules or masses make up 1 to 5 percent of this horizon. Texture is clay or silty clay. Reaction ranges from neutral to moderately alkaline. Brownish mottles range from none to common.

The BC horizon has hue of 5YR or 2.5YR, value of 3 or 4, and chroma of 4 to 6. Grayish mottles range from few to many. Texture is clay or silty clay. Reaction is mildly alkaline or moderately alkaline. Accumulations of calcium carbonate are none to few.

Gore Series

The Gore series consists of moderately well drained, very slowly permeable soils that formed in loamy and clayey sediments of late Pleistocene age. These soils are on uplands. Slopes range from 1 to 12 percent. Soils of the Gore series are fine, mixed, thermic Vertic Paleudalfs.

Gore soils commonly are near Forbing, Kolin, and Wrightsville soils. Forbing soils are on slightly narrower ridgetops and on side slopes in positions similar to those of the Gore soils. Forbing soils have a very-fine textured control section. Kolin soils are on slightly broader ridgetops and are fine-silty. Wrightsville soils are on broad flats, in depressional areas, and are grayish throughout the solum.

Typical pedon of Gore silt loam, 5 to 12 percent slopes; about 2.3 miles southwest of Cotton Valley, 3,900 feet north and 3,100 feet east of the southwest corner of sec. 31, T. 21 N., R. 10 W.

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

B/E—2 to 7 inches; B part about 70 percent and E part about 30 percent, by volume; yellowish red (5YR 4/8) silt loam (Bt) and light yellowish brown (10YR 6/4) silt loam (E); weak medium subangular blocky structure; firm; common fine and medium roots; very strongly acid; clear smooth boundary.

Bt1—7 to 15 inches; red (2.5YR 4/6) silty clay loam; common medium distinct brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; firm; common fine and medium roots; faint discontinuous clay films on vertical faces of peds; very strongly acid; clear wavy boundary.

Bt2—15 to 25 inches; red (2.5YR 4/8) silty clay; few fine prominent gray (10YR 6/1) and light yellowish brown (10YR 6/4) mottles; moderate fine subangular blocky structure; firm; common fine and medium roots; faint discontinuous clay films on vertical surfaces of peds; very strongly acid; clear wavy boundary.

Bt3—25 to 38 inches; red (2.5YR 4/8) clay; common medium prominent gray (10YR 6/1) mottles and few fine prominent light yellowish brown (10YR 6/4) mottles; weak fine subangular blocky structure; firm; faint patchy clay films on vertical surfaces of peds; very strongly acid; gradual wavy boundary.

BC—38 to 62 inches; red (2.5YR 4/6) clay; weak angular blocky structure; firm; faint patchy clay films on vertical faces of peds; extremely acid; clear wavy boundary.

C—62 to 85 inches; dark red (2.5YR 3/6) clay; massive; firm; few pockets of very fine sandy loam; extremely acid.

The solum is 40 to 60 inches thick. In at least one subhorizon within 30 inches of the soil surface, the level of aluminum saturation is 20 to 50 percent of the effective cation-exchange capacity.

The Ap horizon has value of 3 to 5 and chroma of 1 to 3. The E horizon, where present, has hue of 10YR, value of 5 to 7, and chroma of 1 to 3. Texture is silt loam or very fine sandy loam. Reaction in the Ap and E horizons ranges from very strongly acid to medium acid. Thickness of the Ap horizon ranges from 2 to 4 inches.

The B/E horizon has hue of 10YR, 7.5YR, or 5YR, value of 4 to 6, and chroma of 4 to 8. Texture is silty clay loam, silt loam, loam, or very fine sandy loam. Reaction ranges from very strongly acid to medium acid.

The upper part of the Bt horizon has hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 4 to 8. The lower part of the Bt horizon has the same range in colors or has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. Mottles in the Bt horizon are in shades of red, brown, and gray and range from few to many. Subhorizons of the Bt horizon have 1 or 2 chroma mottles. The Bt horizon is clay, silty clay, or silty clay loam. Reaction ranges from very strongly acid to medium acid.

The BC horizon has hue of 2.5YR or 5YR, value of 4 to 6, and chroma of 4 to 6. In some pedons, the upper part of the BC horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. Texture is clay or silty clay. Reaction ranges from extremely acid to moderately alkaline.

The C horizon has hue of 2.5YR or 5YR, value of 4 to 6, and chroma of 4 to 6. Texture is clay or silty clay. Concretions of calcium carbonate range from none to common in the C horizon. Brownish or grayish mottles range from none to common. Reaction ranges from extremely acid to moderately alkaline.

Gurdon Series

The Gurdon series consists of somewhat poorly drained, moderately permeable soils that formed in loamy sediment of mid to late Pleistocene age. These soils are on high stream terraces. Slopes range from 1 to 3 percent. Soils of the Gurdon series are coarse-silty, siliceous, thermic Aquic Paleudults.

Gurdon soils commonly are near Guyton and Malbis soils. Guyton soils are on broad flats, in depressional areas, and in drainageways. Guyton soils are poorly drained and grayish throughout the profile. Malbis soils are on nearby uplands, are fine-loamy, and have more than 5 percent plinthite in the subsoil.

Typical pedon of Gurdon silt loam, 1 to 3 percent slopes; 4.7 miles west of Leton, 3,100 feet north and 2,775 feet east of the southwest corner of sec. 31, T. 22 N., R. 9 W.

Ap—0 to 9 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; very friable; common fine and medium roots; very strongly acid; clear smooth boundary.

Bt1—9 to 18 inches; yellowish brown (10YR 5/6) silt loam; common fine distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; few fine and medium pores, common distinct discontinuous clay films on surfaces of peds; very strongly acid; gradual smooth boundary.

Bt2—18 to 30 inches; yellowish brown (10YR 5/6) silt loam; common fine distinct strong brown (7.5YR 5/6) mottles and common medium distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; few fine roots; common distinct discontinuous clay films on surfaces of peds; about 3 percent, by volume, of plinthite nodules; very strongly acid; gradual smooth boundary.

Bt3—30 to 45 inches; yellowish brown (10YR 5/6) silt loam; common medium prominent red (2.5YR 4/8) mottles and many coarse distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; faint patchy clay films on surfaces of peds; about 3 percent, by volume, of plinthite nodules; very strongly acid; clear wavy boundary.

Btg1—45 to 58 inches; light brownish gray (10YR 6/2) silt loam; few medium prominent red (2.5YR 4/8) mottles and common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; faint patchy clay films on surfaces of peds; about 3 percent, by volume, of plinthite nodules; very strongly acid; clear wavy boundary.

Btg2—58 to 68 inches; grayish brown (10YR 5/2) silt loam; many medium distinct yellowish brown (10YR 5/6) mottles and few fine distinct strong brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; firm; very strongly acid.

The solum is 60 to 90 inches thick. Except where the soil has been limed, the reaction ranges from extremely acid to medium acid throughout the solum.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. Thickness ranges from 2 to 6 inches.

The E horizon, where present, has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. Texture is silt loam or very fine sandy loam.

The upper part of the Bt horizon has value of 5 or 6 and chroma of 4 to 8. Mottles with chroma of 2 or less range from none to many. Texture is silt loam, loam, or very fine sandy loam. The lower part of the Bt horizon has value of 5 or 6, and chroma of 4 or 6, with common to many mottles of chroma 2 or less, or it is mottled in shades of brown and gray. Texture is silt loam, loam, or silty clay loam.

The Btg horizon has value of 5 or 6 and chroma of 2, with common to many mottles in shades of brown and gray. Texture is silt loam, loam, or silty clay loam.

Guyton Series

The Guyton series consists of poorly drained, slowly permeable soils that formed in loamy sediment of late Pleistocene and Holocene age. These soils are on stream terraces and on narrow flood plains of streams. Slopes are less than 1 percent. Soils of the Guyton series are fine-silty, siliceous, thermic Typic Glossaqualfs.

Guyton soils commonly are near Bienville, Cahaba, Dela, Gurdon, Iuka, and Ouachita soils. Bienville, Cahaba, and Gurdon soils are on stream terraces in higher positions than the Guyton soils. Bienville soils are sandy throughout the profile, and Cahaba soils are fine-loamy. Gurdon soils have a brownish subsoil. Dela, Iuka, and Ouachita soils are on flood plains in higher positions than the Guyton soils. Dela and Iuka soils are coarse-loamy. Ouachita soils are brownish throughout the profile.

Typical pedon of Guyton silt loam, in a area of Guyton-Ouachita silt loams, frequently flooded; 6.5 miles south of Leton, 4,800 feet north and 2,800 feet east of the southwest corner of sec. 36, T. 21 N., R. 9 W.

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

Eg1—5 to 14 inches; light brownish gray (10YR 6/2) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; common medium roots; common medium and fine tubular pores; few spots of organic stains; extremely acid; clear wavy boundary.

Eg2—14 to 22 inches; grayish brown (10YR 5/2) silt loam; few fine prominent strong brown (7.5YR 5/6) mottles and few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few coarse roots; common medium tubular pores; few spots of organic stains; extremely acid; abrupt irregular boundary.

Bt/E—22 to 45 inches; Bt and E parts about equal in volume; grayish brown (10YR 5/2) silty clay loam (Bt) and light brownish gray (10YR 6/2) silt loam (E); E material mainly in wide vertical seams; common medium prominent strong brown (7.5YR 5/6) mottles; weak medium and coarse subangular blocky structure; firm silty clay loam and friable silt loam; common fine roots; common medium tubular pores; common distinct discontinuous clay films on surfaces of some peds; common fine organic stains; extremely acid; clear irregular boundary.

Btg—45 to 65 inches; grayish brown (2.5Y 5/2) silt loam; few medium prominent strong brown (7.5YR 5/6) mottles; many fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; common distinct discontinuous clay films on surfaces of some peds; few slightly brittle peds; few vertical seams 1 to 3 inches wide of light brownish gray (10YR 6/2) silt loam; few coatings of dark grayish brown (10YR 4/2) silty clay loam on vertical surfaces of some peds; extremely acid.

The solum is 55 to 80 inches thick. Reaction ranges from extremely acid to medium acid throughout the solum. In at least one subhorizon within 30 inches of the soil surface, the level of aluminum saturation is 50 percent or more of the effective cation-exchange capacity.

The A horizon has value of 4 to 6 and chroma of 2 or 3. Thickness ranges from 3 to 8 inches.

The Eg horizon has value of 5 to 8 and chroma of 1 or 2. Mottles in shades of brown range from few to many. Texture is silt loam, loam, or very fine sandy loam. Thickness ranges from 11 to 27 inches.

The E and Bt parts of the Bt/E horizon have colors and textures similar to those of the Eg and Bt horizons respectively. Some pedons do not have a B/E horizon. Mottles in shades of brown or gray range from few to many in the Bt/E horizon.

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

Iuka Series

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

Iuka soils commonly are near Bienville, Cahaba, Dela, Gurdon, Guyton, and Ouachita soils. Bienville, Cahaba, and Gurdon soils are on stream terraces. Bienville soils are sandy throughout the profile. Cahaba soils are fine-loamy, and Gurdon soils are fine-silty. Dela soils are in higher positions than the Iuka soils, and they do not have mottles of 2 chroma or less within 20 inches of the soil surface. Guyton soils are on nearby stream terraces and in low positions on flood plains. Guyton soils are fine-silty and grayish throughout the profile. Ouachita soils are in slightly higher positions than the Iuka soils and are fine-silty.

Typical pedon of Iuka fine sandy loam, in an area of Iuka-Dela association, frequently flooded; 4.75 miles northeast of Minden, 3,000 feet north and 1,200 feet east of the southwest corner of sec. 6, T. 19 N., R. 8 W.

Ap—0 to 5 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine granular structure; friable; common medium and fine roots; strongly acid; clear smooth boundary.

A—5 to 8 inches; dark brown (10YR 4/3) silt loam; common fine faint dark yellowish brown (10YR 4/4) mottles; weak fine subangular blocky structure; friable; common fine and medium roots; common dark brown (7.5YR 4/4) organic stains on surfaces of peds and in root channels; strongly acid; clear wavy boundary.

C1—8 to 24 inches; yellowish brown (10YR 5/4) sandy loam; few medium distinct light yellowish brown (10YR 6/4) mottles and few fine distinct strong brown (7.5YR 5/6) mottles; few medium light brownish gray (10YR 6/2) mottles in lower part; structureless; very friable; many medium concretions of iron-manganese in lower part; strongly acid; clear wavy boundary.

Cg1—24 to 39 inches; gray (10YR 6/1) silt loam; common medium prominent yellowish brown (10YR 5/6) mottles and common fine prominent strong brown (7.5YR 5/6) mottles; structureless; friable; few fine roots; common medium irregular pores; very strongly acid; clear wavy boundary.

Cg2—39 to 60 inches; grayish brown (10YR 5/2) silt loam; common medium prominent strong brown (7.5YR 5/6) mottles and few fine distinct yellowish brown (10YR 5/6) mottles; structureless; friable; few medium and fine roots; common medium irregular pores; very strongly acid.

Reaction of the Iuka soil is very strongly acid or strongly acid, except the surface layers that are limed. Thin bedding planes of contrasting textures are in some pedons. In at least one subhorizon within 30 inches of the soil surface, the level of aluminum saturation is 20 to 50 percent of the effective cation-exchange capacity.

The Ap and A horizons have hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 or 4; or they have hue of 10YR or 7.5YR, value of 4, and chroma of 2. Texture of the A horizon is fine sandy loam, sandy loam, loamy sand, silt loam, or loam. Combined thickness of the Ap and A horizons is 7 to 15 inches.

The C horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 3 to 6; or it has hue of 7.5YR or 10YR, value of 4, and chroma of 2. Mottles with chroma of 2 or less are within 20 inches of the surface. Texture is sandy loam, fine sandy loam, loam, or silt loam.

The Cg horizon has colors similar to those of the C horizon; or it is mottled in shades of gray, brown, or red; or it can be dominantly gray with few to many brown, red, and yellow mottles. Texture is sandy loam, fine sandy loam, loam, silt loam, or loamy sand. Some pedons have thin sandy strata, or they have textures of sandy clay loam or clay loam at depths below 40 inches. Some pedons have buried A horizons below 20 inches.

Kolin Series

The Kolin series consists of moderately well drained soils that formed in silty sediment overlying clayey sediment of late Pleistocene age. Permeability is moderately slow in the upper part of the subsoil and very slow in the lower part of the subsoil. Slopes range from 1 to 3 percent. Soils of the Kolin series are fine-silty, siliceous, thermic Glossaquic Paleudalfs.

Kolin soils commonly are near Forbing, Gore, and Wrightsville soils. Forbing and Gore soils are on slightly narrower ridgetops than the Kolin soils, are on side slopes, and are clayey throughout the subsoil. Wrightsville soils are on broad flats, in slightly depressional areas, and are poorly drained and grayish throughout the profile.

Typical pedon of Kolin silt loam, 1 to 3 percent slopes; 2.25 miles west of Springhill, 2,200 feet north and 3,600 feet east of the southwest corner of sec. 4, T. 23 N., R. 11 W.

A—0 to 3 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; very friable; few medium roots and common fine roots; medium acid; clear wavy boundary.

E—3 to 7 inches; light yellowish brown (10YR 6/4) silt loam; common medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few medium roots; common medium and fine pores; very strongly acid; clear wavy boundary.

Bt1—7 to 14 inches; yellowish brown (10YR 5/8) silty clay loam; common medium distinct yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; firm; common fine roots; common medium and fine pores; common distinct discontinuous clay films on surfaces of peds; very strongly acid; clear wavy boundary.

Bt2—14 to 23 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct yellowish brown (10YR 5/8) mottles and common fine prominent red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; firm; few medium roots; common distinct discontinuous clay films on surfaces of peds; very strongly acid; abrupt wavy boundary.

Bt/E—23 to 31 inches; yellowish brown (10YR 5/6) silty clay loam (Bt) and light gray (10YR 7/1) silt (E); E material occurs as coatings surrounding peds and makes up about 30 percent of the volume; common medium prominent red (2.5YR 4/8) and gray (10YR 6/1) mottles: weak medium subangular blocky structure; firm; few medium roots; common medium and fine pores; common distinct discontinuous clay films on surfaces of peds; mildly alkaline; clear wavy boundary.

B't1—31 to 48 inches; yellowish brown (10YR 5/4) and gray (10YR 6/1) clay; common medium prominent red (2.5YR 4/8) mottles; weak medium subangular blocky structure; firm; few medium roots; common distinct discontinuous clay films on vertical faces of peds; moderately alkaline; clear wavy boundary.

B't2—48 to 78 inches; yellowish brown (10YR 5/4) silty clay; common medium distinct gray (10YR 6/1) mottles and common fine prominent red (2.5YR 4/8) mottles; weak medium subangular blocky structure; firm; common distinct discontinuous clay films on vertical faces of peds; moderately alkaline; abrupt wavy boundary.

B't3—78 to 85 inches; red (2.5YR 4/6) clay; weak medium subangular blocky structure; firm; faint patchy clay films on vertical faces of peds; moderately alkaline.

The solum is 60 to 100 inches thick. Depth to B't horizon ranges from 20 to 40 inches. In at least one subhorizon within 30 inches of the soil surface, the level of aluminum saturation is 50 percent or more of the effective cation-exchange capacity.

The A horizon has value of 3 or 4 and chroma of 1 or 2, or it has value of 4 and chroma of 3. Reaction ranges from strongly acid to slightly acid. Thickness ranges from 3 to 7 inches.

The E horizon has value of 5 or 6 and chroma of 1 to 4, or it has value of 5 and chroma of 2. The E horizon is absent in some pedons. Reaction ranges from strongly acid to slightly acid. Thickness ranges from 2 to 6 inches.

The Bt horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 8. Texture is silty clay loam or silt loam. Reaction ranges from very strongly acid to medium acid.

The Bt part of the Bt/E horizon has hue of 7.5YR or 10YR, value and chroma of 4 to 8; the E part has value of 6 or 7 and chroma of 1 or 2 and occurs as silt coatings on faces of peds or tongues between structural units. Texture of the Bt part is silty clay loam or silt loam. Reaction ranges from very strongly acid to mildly alkaline.

Typically, the B't horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. In some pedons, the hue is 5YR. Mottles in shades of red or gray range from none to common. Reaction ranges from very strongly acid to moderately alkaline.

The C horizon, where present, is mottled with shades of red, brown, and gray. This horizon has the same texture and reaction as the B't horizon.

Mahan Series

The Mahan series consists of well drained, moderately permeable soils that formed in loamy and clayey sediment of Tertiary age. These soils are on uplands. Slopes range from 1 to 12 percent. Soils of the Mahan series are clayey, kaolinitic, thermic Typic Hapludults.

Mahan soils commonly are near Darley, Ruple, and Sacul soils. Darley and Ruple soils have ironstone layers in the subsoil and are at a slightly higher elevation than the Mahan soils. Sacul soils are mainly at a lower elevation and have grayish mottles in the upper part of the subsoil.

Typical pedon of Mahan fine sandy loam, 1 to 5 percent slopes; 0.75 mile north of Evergreen, 2,800 feet north and 3,850 feet east of the southwest corner of sec. 4, T. 21 N., R. 9 W.

Ap—0 to 7 inches; dark brown (7.5YR 4/4) fine sandy loam; weak fine granular structure; very friable; few fine and medium roots; 10 percent, by volume, ironstone pebbles; few ironstone fragments about 3 to 5 inches in diameter; very strongly acid; clear smooth boundary.

E—7 to 11 inches; yellowish red (5YR 5/6) fine sandy loam; weak medium subangular blocky structure; very friable; common fine and medium roots; 7 percent, by volume, ironstone pebbles; few ironstone fragments about 3 to 5 inches in diameter; strongly acid; clear wavy boundary.

Bt1—11 to 23 inches; red (2.5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; few fine and medium roots, common distinct continuous clay films on vertical faces of peds; common fine and medium pores; few ironstone fragments 3 to 10 inches in diameter; strongly acid; clear smooth boundary.

Bt2—23 to 35 inches; red (2.5YR 4/8) sandy clay; few fine prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; friable; few fine and medium roots; common distinct continuous clay films on most faces of peds; common fine and medium pores; few ironstone fragments 3 to 10 inches in diameter; strongly acid; clear wavy boundary.

Bt3—35 to 43 inches; red (2.5YR 4/6) sandy clay; many coarse prominent strong brown (7.5YR 5/8) mottles; strong medium subangular blocky structure; firm; common distinct continuous clay films on most faces of peds; common fine and medium pores; few ironstone fragments 3 to 5 inches in diameter; few fine pockets of gray (10YR 6/1) clay; very strongly acid; clear wavy boundary.

BC—43 to 75 inches; red (2.5YR 4/6) sandy clay loam; common medium prominent gray (10YR 6/1) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; firm; few ironstone fragments 3 to 5 inches in diameter; very strongly acid.

The solum is 40 to more than 60 inches thick. Gravelsized ironstone fragments make up from 1 to 40 percent of the volume of the Ap and E horizons and from 0 to 15 percent of the Bt and BC horizons. A few coarse ironstone fragments 3 to 20 inches in diameter are in the Ap, Bt, and BC horizons of most pedons. The particle-size control section is 35 to 60 percent clay.

The Ap horizon has hue of 10YR, 7.5YR, or 5YR, value of 3 to 5, and chroma of 2 to 6. Reaction is strongly acid or medium acid, except where limed. Thickness ranges from 4 to 8 inches.

The E horizon has hue of 10YR, 7.5YR, or 5YR, value of 4 or 5, and chroma of 3 to 6. Texture is loamy fine sand, sandy loam, or fine sandy loam. Reaction is strongly acid or medium acid. Thickness ranges from 2 to 6 inches. Some pedons do not have an E horizon.

The Bt horizon has hue of 5YR, 2.5YR, or 10R, value of 4 or 5, and chroma of 6 or 8. Texture is clay, sandy clay loam, sandy clay, clay loam, or loam. Silt content of the Bt horizon is less than 30 percent. Mottles in shades of brown range from none to many. Reaction ranges from very strongly acid to medium acid.

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

The C horizon, where present, is stratified sandy clay loam, sandy loam, or clay loam. The loamy materials are reddish or brownish. Small pockets and horizontal seams of whitish clay (kaolin) range from none to many. Thin to thick layers of weakly cemented sandstone are in some pedons. Reaction ranges from very strongly acid to medium acid.

Malbis Series

The Malbis series consists of moderately well drained, moderately slowly permeable soils that formed in loamy sediment of early Pleistocene age. These soils are on uplands. Slopes range from 1 to 8 percent. Soils of the Malbis series are fine-loamy, siliceous, thermic Plinthic Paleudults.

Malbis soils commonly are near Boykin, Eastwood, Gurdon, Ruston, and Sacul soils. Boykin soils are on higher ridgetops than the Malbis soils and have sandy surface and subsurface layers more than 20 inches thick. Eastwood and Sacul soils have a clayey subsoil and are at a slightly lower elevation. Gurdon soils are on terraces adjacent to drainageways and are fine-silty. Ruston soils are on more convex ridgetops that are at a higher elevation than the Malbis soils and have a reddish loamy subsoil.

Typical pedon of Malbis fine sandy loam, 1 to 3 percent slopes; 5.5 miles south of Leton, 2,875 feet north and 2,000 feet east of the southwest corner of sec. 25, T. 21 N., R. 9 W.

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

Bt/E—7 to 13 inches; yellowish brown (10YR 5/6) loam (Bt) and light yellowish brown (10YR 6/4) loam (E); weak fine subangular blocky structure; very friable; common fine and medium roots; common fine and medium pores; very strongly acid; gradual smooth boundary.

Bt1—13 to 19 inches; strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; friable; common fine roots; common fine and medium pores; common distinct continuous clay films on surfaces of peds; very strongly acid; gradual smooth boundary.

Bt2—19 to 23 inches; yellowish brown (10YR 5/6) clay loam; few medium prominent red (2.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; common distinct continuous clay films on surfaces of peds; few fine concretions of iron-manganese; very strongly acid; clear wavy boundary.

Btv1—23 to 39 inches; yellowish brown (10YR 5/6) clay loam; many medium prominent red (2.5YR 4/8) mottles and few medium distinct pale brown (10YR 6/3) mottles; weak coarse prismatic structure parting to moderate medium angular blocky; friable in red part, firm in yellowish brown part; few fine roots; few fine pores; common distinct clay films on surfaces of peds; about 10 percent, by volume, of plinthite; very strongly acid; clear wavy boundary.

Btv2-39 to 55 inches; yellowish brown (10YR 5/6) clay loam; many medium prominent red (2.5YR 4/8) mottles and common medium distinct light brownish gray (10YR 6/2) mottles; weak coarse prismatic structure parting to weak medium angular blocky; firm; slightly brittle in and around red part and around plinthite; few fine roots; few fine pores; common distinct discontinuous clay films on surfaces of peds; about 8 percent, by volume, of plinthite; few pebbles; very strongly acid; clear wavy boundary.

B't1—55 to 70 inches; yellowish brown (10YR 5/6) clay loam; many coarse distinct light brownish gray (10YR 6/2) mottles and common medium prominent red (2.5YR 5/8) mottles; weak coarse prismatic structure parting to weak coarse angular blocky; firm; faint patchy clay films on surfaces of peds; very strongly acid; clear wavy boundary.

B't2—70 to 81 inches; mottled yellowish brown (10YR 5/6), light yellowish brown (10YR 6/4), light brownish gray (10YR 6/2), and red (2.5YR 4/8) clay loam; weak medium subangular blocky structure; firm; faint patchy clay films on surfaces of peds; very strongly acid.

The solum is more than 60 inches thick. Depth to a horizon with 5 percent or more plinthite ranges from 20 to 48 inches. In at least one subhorizon within 30 inches of the soil surface, the level of aluminum saturation is 20 to 50 percent of the effective cation-exchange capacity.

The Ap horizon has value of 3 to 5 and chroma of 2 or 3. Some pedons have a yellowish brown or light yellowish brown E horizon ranging to as much as 11 inches thick. Texture of the E horizon is fine sandy loam or loam. Reaction of the A and E horizons ranges from very strongly acid to medium acid. Thickness of the Ap horizon ranges from 4 to 8 inches.

The Bt part of the Bt/E horizon and the Bt and B't horizons have hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. The E part of the Bt/E horizon has value of 6 or 7 and chroma of 3 or 4. Texture is loam, sandy clay loam, or clay loam. Reaction is very strongly acid or strongly acid.

The Btv horizon has colors similar to the Bt horizon and includes hue of 10YR, value of 6, and chroma of 6 or 8. Mottles in shades of brown, yellow, gray, or red range from few to many. Chroma 2 mottles occur only at depths greater than 30 inches. Texture is loam, sandy clay loam, or clay loam. Nodules of plinthite, by volume, range from 5 to 25 percent. Reaction is very strongly acid or strongly acid.

McLaurin Series

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

McLaurin soils are similar to Cahaba soils and commonly are near Flo soils. Cahaba soils are on stream terraces and are fine-loamy. Flo soils are in positions similar to those of the McLaurin soils and are sandy throughout the profile.

Typical pedon of McLaurin loamy fine sand, 1 to 3 percent slopes; 4.7 miles southeast of Dubberly, 350 feet north and 4,225 feet east of the southwest corner of sec. 3, T. 17 N., R. 8 W.

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

E—4 to 9 inches; strong brown (7.5YR 5/4) loamy fine sand; weak fine subangular blocky structure; very friable; common medium roots; few medium discontinuous random tubular pores; strongly acid; clear wavy boundary.

BE—9 to 18 inches; strong brown (7.5YR 5/6) fine sandy loam; weak fine subangular blocky structure; very friable; common fine roots; common fine discontinuous random tubular pores; strongly acid; clear wavy boundary.

Bt1—18 to 30 inches; red (2.5YR 4/8) fine sandy loam; weak medium subangular blocky structure; very friable; common fine roots; common fine discontinuous random tubular pores; clay bridging of sand grains and faint patchy clay films on surfaces of peds; strongly acid; gradual wavy boundary.

Bt2—30 to 46 inches; red (2.5YR 4/6) fine sandy loam; weak medium subangular blocky structure; friable; few fine roots; common fine discontinuous random tubular pores; clay bridging of sand grains and faint clay films on surfaces of peds; strongly acid; gradual wavy boundary.

Bt3—46 to 60 inches; red (2.5YR 4/8) fine sandy loam; weak coarse subangular blocky structure; very friable; few fine roots; few fine discontinuous random tubular pores; clay bridging of sand grains and faint patchy clay films on vertical surfaces of peds; common skeletons on faces of peds; strongly acid; gradual wavy boundary.

Bt/E—60 to 72 inches; yellowish red (5YR 5/6) loamy fine sand (Bt); weak medium subangular blocky structure; very friable; few fine discontinuous random tubular pores; clay bridging of sand grains; common medium pale brown (10YR 6/3) pockets of uncoated sand grains (E); strongly acid; gradual wavy boundary.

B't—72 to 90 inches; yellowish red (5YR 5/8) sandy loam; weak medium subangular blocky structure; very friable; sand grains coated and bridged with clay; strongly acid.

The solum is 60 inches or more thick. In some pedons, ironstone fragments and gravel make up from 1 to 10 percent of the volume of the solum. Reaction is very strongly or strongly acid throughout the solum.

The A horizon has value of 3 or 4 and chroma of 2 or 3. Thickness ranges from 3 to 5 inches.

The E horizon has value of 4 or 5 and chroma of 2 to 6; or it has hue of 7.5YR, value of 5, and chroma of 4. Texture is sandy loam, fine sandy loam, loamy fine sand, or loamy sand. Thickness ranges from 2 to 5 inches.

The B/E horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. Texture is sandy loam, fine sandy loam, loamy sand, or loamy fine sand.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8. Texture is loam, sandy loam, or fine sandy loam.

The Bt part of the Bt/E horizon has colors similar to the Bt horizon. The E material makes up about 10 to 25 percent, by volume, of the horizon. Texture of the Bt/E horizon is loamy sand, loamy fine sand, sandy loam, or fine sandy loam.

The B't horizon has colors similar to the Bt horizon. Texture is sandy loam, loam, or sandy clay loam.

Ouachita Series

The Ouachita series consists of well drained, moderately slowly permeable soils that formed in loamy alluvium. These soils are on flood plains. Slopes range from 0 to 2 percent. Soils of the Ouachita series are fine-silty, siliceous, thermic Fluventic Dystrochrepts.

Ouachita soils commonly are near Bienville, Cahaba, Dela, Guyton, and Iuka soils. Bienville and Cahaba soils are on stream terraces and have an argillic horizon. Dela soils are in positions similar to those of the Ouachita soils and are coarse-loamy. Guyton soils are in lower positions than the Ouachita soils and are poorly drained and grayish throughout the profile. Iuka soils are in slightly lower positions and have grayish mottles within 20 inches of the soil surface.

Typical pedon of Ouachita silt loam, in an area of Guyton-Ouachita silt loams, frequently flooded; 8 miles north of Minden, 400 feet north and 4,450 feet east of the southwest corner of sec. 31, T. 21 N., R. 9 W.

A1—0 to 6 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; many fine and few medium roots; strongly acid; clear smooth boundary.

A2—6 to 18 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; common fine and few medium roots; few fine pores; few fine distinct yellowish brown (10YR 5/6) oxidation stains along abandoned root channels; few worm casts; very strongly acid; clear wavy boundary.

Bw1—18 to 30 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine faint pale brown mottles; weak medium subangular blocky structure; friable; few fine roots; few fine tubular pores; very strongly acid; clear wavy boundary.

Bw2—30 to 41 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles and few fine distinct grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine tubular pores; very strongly acid; clear wavy boundary.

Bw3—41 to 69 inches; yellowish brown (10YR 5/8) loam; common medium prominent grayish brown (10YR 5/2) mottles; weak fine subangular blocky structure; friable; few fine roots; very strongly acid; abrupt wavy boundary.

C—69 to 81 inches; yellowish brown (10YR 5/8) fine sandy loam; common medium prominent gray (10YR 6/1) mottles; structureless; friable; very strongly acid.

The solum is 40 to 80 inches or more thick. Reaction of the Ouachita soil is very strongly acid or strongly acid throughout the solum, except where the surface layer has been limed. The content of organic matter decreases irregularly with depth. In at least one subhorizon within 30 inches of the soil surface, the level of aluminum saturation is 50 percent or more of the effective cation-exchange capacity.

The A horizon has value of 4 and chroma of 2 to 4, or it has value of 5 and chroma of 3. Texture of the A2 horizon is silt loam, loam, or very fine sandy loam. Thickness of the A1 horizon ranges from 2 to 6 inches. Thickness of the A2 horizon ranges from 8 to 15 inches.

The Bw horizon has value of 4 or 5 and chroma of 3 to 8, or it has value of 4 and chroma of 2. Brownish mottles range from none to many in the Bw horizon. Gray mottles range from none to common in the lower part of the Bw horizon. Texture is silt loam, very fine sandy loam, loam, or silty clay loam.

The C horizon has colors similar to those of the Bw horizon. Texture is silt loam, loam, very fine sandy loam, fine sandy loam, or loamy fine sand.

Ruple Series

The Ruple series consists of well drained, moderately slowly permeable soils that formed in iron-rich, loamy and clayey, marine sediment of Tertiary age. These soils are on uplands. Slopes range from 1 to 12 percent. Soils of the Ruple series are clayey, oxidic, thermic Typic Rhodudults.

Ruple soils commonly are near Darley, Mahan, and Sacul soils. Darley soils are in positions similar to those of the Ruple soils and have kaolinitic mineralogy. Mahan and Sacul soils are at a slightly lower and lower elevation respectively, and they do not have layers of ironstone in the subsoil.

Typical pedon of Ruple gravelly loam, 1 to 5 percent slopes; 4 miles south of Leton, 200 feet north and 1,400 feet east of the southwest corner of sec. 14, T. 21 N., R. 9 W.

Ap—0 to 6 inches; dark reddish brown (2.5YR 3/4) gravelly loam, moderate fine granular structure; friable; many fine and common medium roots; about 20 percent, by volume, small angular and flattened ironstone fragments about 1/8 inch to 3 inches in diameter; about 5 percent of fragments are larger than 3/4 inch; slightly acid; abrupt smooth boundary.

Bt1—6 to 14 inches; dark red (2.5YR 3/6) gravelly clay; moderate medium and fine subangular blocky structure; friable; many fine and common medium roots; few fine pores; distinct patchy clay films on all faces of peds; about 20 percent, by volume, flattened and angular ironstone fragments about 1/8 inch to 3 inches in diameter; about 5 percent of flattened fragments have at least one dimension larger than 3/4 inch; slightly acid; clear wavy boundary.

Bt2—14 to 23 inches; dark red (2.5YR 3/6) gravelly clay; moderate medium and fine subangular blocky structure; friable; common fine and few medium roots; few fine pores; distinct patchy clay films on all faces of peds; about 20 percent, by volume, flattened and angular ironstone fragments about 1/8 inch to 3 inches in diameter; about 25 percent of fragments are larger than 3/4 inch; slightly acid; clear wavy boundary.

Bt3—23 to 28 inches; dark red (2.5YR 3/6) clay; weak medium and fine subangular blocky structure; friable; common fine roots; few fine pores; distinct patchy clay films mostly on vertical faces of peds; about 5 percent, by volume, flattened and angular ironstone fragments about 1/10 inch to 3 inches in diameter; slightly acid; clear wavy boundary.

Bsm/Bt1—28 to 42 inches; alternating layers of fractured ironstone (Bsm) about 1/4 inch to 8 inches thick and dark red (2.5YR 3/6) clay (Bt); petroferric (ironstone) layers fractured into flattened fragments ranging in length from 1 to 8 inches; average lateral distance between fractures is about 4 to 6 inches; clay part (Bt) has moderate coarse and medium subangular blocky structure; friable; few fine and medium roots in clay flows between cracks in the ironstone layers; distinct patchy clay films on vertical faces of the clayey peds; few pockets and layers of partially weathered yellowish red (5YR 5/6) loamy and sandy material enclosed within or sandwiched between rinds of ironstone; few fine pockets and streaks of whitish kaolin; medium acid; clear wavy boundary.

Bsm/Bt2—42 to 63 inches; alternating layers of fractured ironstone (Bsm) about 1/4 inch to 8 inches thick and dark red (2.5YR 3/6) clay (Bt); petroferric (ironstone) layers are fractured into flattened fragments ranging in length from 1 to 8 inches; average lateral distance between fractures is about 4 to 6 inches; clay part (Bt) has weak coarse and medium subangular blocky structure; friable; distinct patchy clay films on vertical faces of the clayey peds; common pockets and layers of partially weathered yellowish red (5YR 5/6) loamy and sandy material enclosed within or sandwiched between rinds of ironstone; few fine pockets and streaks of whitish kaolin; medium acid.

The solum is more than 60 inches thick. Average clay content of the textural control section ranges from 45 to 70 percent. Clay content decreases with depth in the profile. Coarse fragments (ironstone) make up from 15 to 35 percent of the volume of the surface layer and the textural control section. The base saturation by sum is typically greater than 45 percent throughout the textural control section. Base saturation decreases with depth. The depth to the first nearly continuous layer of ironstone ranges from about 20 to 40 inches.

The Ap horizon has hue of 10R or 2.5YR, value of 2 or 3, and chroma of 2 to 6. Reaction ranges from medium acid to neutral. Thickness ranges from 3 to 8 inches.

The Bt horizon, above the layers of ironstone, has hue of 10R or 2.5YR, value of 3, and chroma of 3 to 6. Texture typically is gravelly clay loam, gravelly sandy clay, or gravelly clay. Content of clay ranges from 40 to 80 percent and averages about 45 to 70 percent. Angular and flattened ironstone fragments range from 1/8 inch to 2 inches in thickness and from 1/2 inch to 8 inches in length. Ironstone fragments can make up from 5 to 35 percent of the volume of any subhorizon, but the average is greater than 15 percent. Reaction ranges from strongly acid to slightly acid.

The Bsm/Bt horizon consists of alternating layers of clayey material and fractured ironstone layers. The clayey part has the same range in colors as the Bt horizon. Texture is clay, sandy clay, or clay loam. The ironstone layers are fractured and range in thickness from 1/4 inch to 12 inches. The lateral distance between fractures ranges from 2 to 20 inches and averages 4 to 8 inches. Typically, the layers are continuous for many feet. In some pedons, the layers are intermittent and extend only a few feet horizontally. In other pedons, the layers are parts of large spheroidal configurations that are separated from one another by vertical flows of clay, sandy clay, or clay loam. The partially weathered loamy and sandy material, which is in pockets and layers, has hue of 5YR, 7.5YR, or 10YR, value of 4 or 5, and chroma of 4 to 8. Texture is fine sand, loamy fine sand, sandy loam, fine sandy loam, sandy clay loam, or clay loam that contains large amounts of siderite. Pockets and streaks of whitish or grayish kaolin range from fine to medium and from few to common. Reaction ranges from very strongly acid to slightly acid.

Ruston Series

The Ruston series consists of well drained, moderately permeable soils that formed in loamy marine or stream sediment of early Pleistocene age. These soils are on uplands. Slopes range from 1 to 3 percent. Soils of the Ruston series are fine-loamy, siliceous, thermic Typic Paleudults.

Ruston soils commonly are near Boykin, Malbis, and Smithdale soils. Boykin soils are in positions similar to those of the Ruston soils and have sandy surface and subsurface layers more than 20 inches thick. Malbis soils are on a slightly lower elevation, have slightly less convex slopes, and have a brownish subsoil that contains more than 5 percent plinthite. Smithdale soils are on side slopes and do not have a bisequum in the subsoil.

Typical pedon of Ruston fine sandy loam, 1 to 3 percent slopes; 1.25 miles west of Springhill, 5,000 feet north and 30 feet east of the southwest corner of sec. 11, T. 23 N., R. 11 W.

Ap—0 to 5 inches; dark brown (7.5YR 4/4) fine sandy loam; weak fine granular blocky structure; very friable; many fine and medium roots; common fine and medium pores; strongly acid; clear smooth boundary.

Bt1—5 to 16 inches; yellowish red (5YR 5/8) sandy clay loam; weak coarse prismatic structure parting to moderate medium subangular blocky; friable; few fine and medium roots; common distinct discontinuous clay films on surfaces of peds; strongly acid; clear smooth boundary.

Bt2—16 to 38 inches; red (2.5YR 4/8) sandy clay loam; few medium distinct yellowish red (5YR 5/8) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few fine and medium pores; common distinct discontinuous clay films on surfaces of peds; very strongly acid; clear wavy boundary.

B/E—38 to 54 inches; red (2.5YR 4/6) sandy clay loam (Bt); 30 percent light yellowish brown (10YR 6/4) sandy loam (E); moderate medium subangular blocky structure; firm; few fine and medium pores; common distinct discontinuous clay films on surfaces of peds; very strongly acid; gradual wavy boundary.

B't—54 to 77 inches; red (2.5YR 4/8) sandy clay loam; weak medium subangular blocky structure; firm; common faint discontinuous clay films on surfaces of peds; few medium pockets of very pale brown (10YR 7/3) sand grains; very strongly acid; clear wavy boundary.

C—77 to 85 inches; red (2.5YR 4/8) sandy loam; massive; friable; very strongly acid.

The solum is greater than 60 inches thick. In at least one subhorizon within 30 inches of the soil surface, the level of aluminum saturation is 20 to 50 percent of the effective cation-exchange capacity.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 4. Reaction ranges from very strongly acid to slightly acid. Thickness ranges from 3 to 6 inches.

Some pedons have an E horizon or a B/E horizon. Where present, the E horizon and E part of the B/E horizon have value of 5 or 6 and chroma of 3 or 4. Texture is fine sandy loam, loamy sand, or sandy loam. Reaction ranges from very strongly acid to slightly acid.

The Bt horizon has value of 4 to 6 and chroma of 4 to 8. Texture is sandy clay loam, loam, or clay loam. Reaction ranges from very strongly acid to medium acid.

The Bt part of the B/E horizon and the B't horizon have hue of 5YR or 2.5YR, value of 4 to 6, and chroma of 4 to 8. Texture is sandy clay loam, fine sandy loam, loam, or clay loam. Some pedons have mottled B't horizons in shades of gray, brown, red, or yellow. The clay content decreases from the Bt horizon to the B/E horizon and increases again in the B't horizon. Reaction ranges from very strongly acid to medium acid.

The C horizon has color similar to that of the B't horizon. Texture is fine sandy loam, loam, 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. Slopes range from 1 to 12 percent. Soils of the Sacul series are clayey, mixed, thermic Aquic Hapludults.

Sacul soils are near Darley, Mahan, and Malbis soils. Darley soils are at a slightly higher elevation than the Sacul soils and have nearly continuous ironstone layers in the subsoil. Mahan soils are at a higher elevation and have kaolinitic mineralogy. Malbis soils are at a slightly higher elevation and are fine-loamy.

Typical pedon of Sacul fine sandy loam, 1 to 5 percent slopes; 6.6 miles south of Leton, 2,600 feet north and 1,400 feet east of the southwest corner of sec. 1, T. 20 N., R. 9 W.

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

E—3 to 12 inches; pale brown (10YR 6/3) fine sandy loam; weak fine subangular blocky structure; friable; common fine and medium roots, few coarse roots; common fine and medium pores; very strongly acid; clear wavy boundary.

Bt1—12 to 22 inches; red (2.5YR 4/8) clay; coarse prismatic structure parting to moderate medium subangular blocky; friable; common fine and medium roots, few coarse roots; common fine and medium pores; common distinct continuous clay films on surfaces of peds; very strongly acid; clear wavy boundary.

Bt2—22 to 36 inches; red (2.5YR 4/8) clay; common medium prominent light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm; common fine and medium roots; common distinct discontinuous clay films on surfaces of peds; very strongly acid; clear wavy boundary.

Bt3—36 to 51 inches; red (2.5YR 4/6) clay; common medium prominent grayish brown (10YR 5/2) and light brownish gray (10YR 6/2) mottles; weak medium angular blocky structure; firm; few distinct discontinuous clay films on surfaces of peds; few fine roots; very strongly acid; clear wavy boundary.

BC—51 to 69 inches; light brownish gray (10YR 6/2) sandy clay loam; common medium prominent strong brown (7.5YR 5/6) and red (2.5YR 4/8) mottles; weak medium angular blocky structure; friable; few faint patchy clay films on horizontal surfaces of peds; gray (10YR 6/1) silty clay is interlaced with abandoned root channels that contain yellowish red (5YR 5/6) oxidation stains; very strongly acid.

The solum is 40 to 72 inches or more thick. Gray mottles begin 7 to 24 inches from the top of the Bt horizon. Reaction is very strongly acid or strongly acid throughout the solum. Ironstone fragments range from 1 to 10 percent, by volume, in the solum. In at least one subhorizon within 30 inches of the soil surface, the level of aluminum saturation is 50 percent or more of the effective cation-exchange capacity.

The A horizon has value of 3 or 4 and chroma of 2 or 3. Thickness ranges from 2 to 6 inches.

The E horizon has value of 4 to 6 and chroma of 3 or 4. Texture is fine sandy loam, sandy loam, or loam. Thickness ranges from 4 to 10 inches.

The Bt horizon has hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 6 or 8. Typically, texture is clay, silty clay, sandy clay, or clay loam. Content of clay in the textural control section ranges from 35 to 60 percent. Mottles in shades of brown and gray range from none to common.

The BC horizon is mottled in shades of brown, red, and gray. Texture is sandy clay loam or clay loam. These colors range from about equal to either the red or gray being dominant.

Some pedons have a C horizon. Where present, it has colors in shades of brown, red, or gray. Texture is sandy loam, sandy clay loam, or clay loam.

Smithdale Series

The Smithdale series consists of well drained, moderately permeable soils that formed in loamy sediment of early Pleistocene age. These soils are on side slopes on uplands. Slopes range from 5 to 12 percent. Soils of the Smithdale series are fine-loamy, siliceous, thermic Typic Hapludults.

Smithdale soils are similar to Cahaba soils and commonly are near Boykin and Ruston soils. Boykin and Ruston soils are on ridgetops. Boykin soils have sandy surface and subsurface layers more than 20 inches thick. Ruston soils have a bisequum in the profile. Cahaba soils are on stream terraces and have sola less than 60 inches thick.

Typical pedon of Smithdale fine sandy loam, 5 to 12 percent slopes; 2.9 miles east of Cullen, 3,200 feet north and 4,000 feet east of the southwest corner of sec. 28, T. 23 N., R. 10 W.

A—0 to 6 inches; dark brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable; many coarse and fine roots; strongly acid; clear smooth boundary.

A/B—6 to 9 inches; dark brown (10YR 4/3) fine sandy loam (A) and yellowish red (5YR 5/6) fine sandy loam (Bt); weak fine subangular blocky structure; very friable; common medium and fine roots; few medium tubular pores; very strongly acid; gradual wavy boundary.

Bt1—9 to 23 inches; red (2.5YR 4/6) sandy clay loam; weak coarse prismatic structure parting to moderate medium subangular blocky; friable; few fine and medium roots; common fine tubular pores; common distinct discontinuous clay films on surfaces of peds; very strongly acid; gradual wavy boundary.

Bt2—23 to 39 inches; red (2.5YR 4/8) sandy clay loam; few fine prominent pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; friable; common distinct discontinuous clay films on surfaces of peds; very strongly acid; gradual wavy boundary.

Bt3—39 to 52 inches; red (2.5YR 5/8) sandy loam; weak medium subangular blocky structure; friable; few fine roots; distinct patchy clay films on surfaces of peds; few pockets of pale brown (10YR 6/3) sand grains; very strongly acid; gradual wavy boundary.

Bt4—52 to 80 inches; red (2.5YR 5/6) sandy loam; weak medium subangular blocky structure; very friable; common pockets of light yellowish brown (10YR 6/4) sand; sand grains bridged and coated with clay and oxides; very strongly acid.

The solum is more than 60 inches thick. Reaction is very strongly acid or strongly acid, except surface layers that have been limed. In at least one subhorizon within 30 inches of the soil surface, the level of aluminum saturation is 50 percent or more of the effective cation-exchange capacity.

The A horizon has hue of 7.5YR or 10YR, value of 4, and chroma of 2 or 3. Thickness ranges from 2 to 10 inches.

The E horizon, where present, has hue of 10YR, value of 5 or 6, and chroma of 2 to 4. Texture is fine sandy loam, sandy loam, loamy fine sand, or loamy sand.

The A/B horizon has hue of 7.5YR, 10YR, or 5YR, value of 4 or 5, and chroma of 4 to 8. The range in texture is the same as for the 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 or loam in the upper part. Texture is sandy loam or loam in the lower part. Pockets of pale brown to brownish yellow sand grains range from few to many in the lower part of the Bt horizon.

Wrightsville Series

The Wrightsville series consists of poorly drained, very slowly permeable soils that formed in silty and clayey sediment of late Pleistocene age. These soils are on uplands. Slopes are less than 1 percent. Soils of the Wrightsville series are fine, mixed, thermic Typic Glossaqualfs.

Wrightsville soils commonly are near Forbing, Gore, and Kolin soils. Forbing and Gore soils are on side slopes and ridgetops and have a reddish, clayey subsoil. Kolin soils are in higher positions than the Wrightsville soils and are fine-silty.

Typical pedon of Wrightsville silt loam; 3.5 miles southwest of Springhill, 1,950 feet north and 3,600 feet east of the southwest corner of sec. 17, T. 23 N., R. 11 W.

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

Eg1—3 to 11 inches; light brownish gray (10YR 6/2) silt loam; common medium faint dark brown (10YR 4/3) mottles; weak medium subangular blocky structure; friable; common fine and medium roots; common medium and fine pores; very strongly acid; clear wavy boundary.

Eg2—11 to 17 inches; light brownish gray (10YR 6/2) silt loam; many medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; common fine and medium roots; common medium and fine pores; very strongly acid; clear wavy boundary.

Bt/E—17 to 26 inches; light brownish gray (10YR 6/2) silty clay loam (Bt); 20 percent tongues of light gray (10YR 6/1) silt loam (E) 1/2 inch to 2 inches wide and extend through the horizon; common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; common fine and medium roots; common fine pores; common faint discontinuous clay films on surfaces of peds; very strongly acid; abrupt wavy boundary.

Btg1—26 to 36 inches; light brownish gray (10YR 6/2) silty clay; many medium distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm; common distinct discontinuous clay films on surfaces of peds; very strongly acid; gradual wavy boundary.

Btg2—36 to 60 inches; light brownish gray (2.5Y 6/2) silty clay; many medium prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; firm; common distinct discontinuous clay films on surfaces of peds; extremely acid; gradual wavy boundary.

2C—60 to 88 inches; dark red (2.5YR 3/6) clay; few fine prominent light gray (10YR 6/1) mottles; massive; firm, sticky, and plastic; common black organic stains; mildly alkaline.

The solum is 40 to 70 inches or more thick. In at least one subhorizon within 30 inches of the soil surface, the level of aluminum saturation is 20 to 50 percent of the effective cation-exchange capacity.

The A horizon has value of 3 to 5. Reaction ranges from extremely acid to strongly acid. Thickness ranges from 2 to 5 inches.

The Eg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. Texture is silt or silt loam. Thickness ranges from 13 to 24 inches. Reaction ranges from extremely acid to strongly acid.

The Bt/E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. Texture is silty clay loam or silty clay in the Bt parts and silt or silt loam in the E parts.

The Btg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. Mottles in shades of brown and yellow range from few to many. Texture is silty clay loam, silty clay, or clay. Reaction ranges from extremely acid to strongly acid.

The 2C horizon has hue of 5YR or 2.5YR, value of 3 to 6, and chroma of 4 to 6. Texture is clay or silty clay. Reaction ranges from neutral to moderately alkaline.

Formation of the Soils

Dr. Scott F. Burns, Department of Geosciences, Louisiana Tech University, helped prepare this section.

In this section, the factors of soil formation and the processes of soil formation are described and related to the soils in the survey area.

Factors of Soil Formation

Soil is formed at the earth's surface as a result of the interaction of five major factors: climate, parent material, living organisms, relief, and time *(14)*. These factors influence the processes of soil formation and cause differences in the physical and chemical characteristics of the soil.

Climate and living organisms are active forces that weather parent material and gradually form soil. Relief influences the effects of climate and living organisms by modifying soil temperature, surface runoff, and soil moisture conditions. Soil characteristics are also determined, in part, by the physical and chemical properties of the original parent material. Time is needed to change the parent material into soil. A relatively long period is required to produce distinct soil horizons.

The effect of any one factor can differ from place to place, but it is the interaction of all the factors that determines the characteristics of the soil. The interactions of these factors are more complex for some soils than for others. Therefore, many of the differences in soils cannot be attributed to only one factor.

In the following paragraphs, the factors of soil formation are described as they relate to the soils in the survey area.

Climate

Webster Parish has a humid, subtropical climate with relatively mild winters, hot summers, and abundant rainfall. The climate is affected by cold air moving in from the north and warm, moist air coming from the Gulf of Mexico. A detailed discussion of the climate in the parish is given in the section "General Nature of the Parish."

The climate is relatively uniform throughout the parish. Local differences in the soils are not a result of great differences in atmospheric climate. The warm, moist climate of the area favors rapid weathering and rapid soil formation. The highly weathered and leached soils in Webster Parish are mostly a result of the large amounts of water available to percolate downward through the soils over very long periods of time. Organic acids formed from the rapid decomposition of plant remains hasten the leaching process. Clay, soluble bases, and colloidal material have moved downward from the soil surface layer to the subsoil. In Webster Parish, soil formation continues almost year-round.

Ancient climates (Paleoclimates) in the parish may have differed, and some of the differences between soils formed on old landscapes may be caused partly by climatic differences over thousands of years.

Variations in soil moisture can also affect soil color. Gray colors in the Bg and Cg horizons of some poorly drained soils result from the release and reduction of iron. Mottled gray and red colors and iron and manganese concretions are in soils that formed under alternating conditions of oxidation and reduction.

Changes in soil moisture affect soils that contain large amounts of clay minerals. Large changes in volume can occur upon wetting and drying. When wet soils dry, cracks of variable width and depth form as the volume decreases. When cracked, dry soils are rewetted by rainfall, irrigation, or leaky pipes; the soil swells, and infiltration rates greatly decrease. Repeated large changes in volume can result in structural damage to the buildings, walls, and roads constructed upon the soils.

Cracks form extensively in the Eastwood, Forbing, and Gore soils during late summer and early fall when the soils are the driest. Cracks are as much as an inch wide and 20 inches deep.

Living Organisms

Plants, animals, bacteria, and fungi influence the chemical and physical properties of soils by their affect on gains in organic matter and nitrogen to the soil, gains and losses of plant nutrients, and changes in soil structure and porosity through bioturbation. As plant roots grow, they break up and rearrange soil particles; thus, they change soil porosity. Plants transfer nutrients from the subsoil to the surface layer. Micro-organisms decompose and incorporate organic matter into the soil, thereby enhancing the development of structure and increasing the infiltration rate and the available water capacity of the soil. Animals, such as earthworms and crawfish, retard soil development by mixing soil horizons. When trees are uprooted during windstorms, the soils are also churned to some extent. When plants and animals die, they form humus. Humus is a source of nutrients that can be recycled into the soil.

In Webster Parish, trees greatly affected soil formation. The native vegetation throughout the parish was forest. Generally, soils on the uplands formed under mixed hardwood-pine forest, and soils on bottom lands formed under hardwood forest.

Man is also an important factor in the future rate and directions of soil formation. Farmers and foresters have cleared the forest, cultivated the soil, added fertilizer and lime, and added insecticides and pesticides. Engineers have improved drainage, built dams and levees, and graded the soil surface. All of these activities affect soil formation. Some affects may not be evident for a long time, whereas some can be seen today. Any way you look at it, man has become the most important organism affecting soil formation.

Relief

Relief, or the slope of the landscape, influences soil-forming processes by its affect on internal soil drainage, depth and duration of a seasonal high water table, runoff, erosion and deposition, and exposure to the sun and wind. These characteristics, in turn, influence plant cover and soil temperature.

Vertical relief in the parish is about 250 feet, and slopes range from nearly level to steep (30 percent). The topography of the alluvial plains is level or nearly level. Slopes on uplands range from very gently sloping on the divides to strongly sloping and steep in highly dissected areas.

In the Tertiary uplands, the affect of slope on soil drainage can be seen in the soils. The well drained Mahan soil is on upper slopes. The lower slopes are occupied primarily by the Sacul soil, which is moderately well drained and has mottles in the subsoil.

The alluvial plains have less relief than the uplands; nevertheless, the affect that relief has on soil drainage is apparent in the soils that formed. Ouachita soils are on convex ridges and are well drained. Guyton and Iuka soils are in swales and other low positions and are poorly drained and somewhat poorly drained, respectively.

In the late Pleistocene age terrace uplands, the poorly drained Wrightsville soils are on broad flats and in depressional areas. The Forbing, Gore, and Kolin soils are more sloping, higher in elevation, and better drained than the Wrightsville soils.

Parent Material

The parent material of mineral soils is the unconsolidated material from which the soils first formed. Differences in the chemical and mineralogical make up of parent material are expressed in soil as differences in texture, soil color, permeability, and the depth and degree of leaching. Parent material has also had a major influence on the mineralogy of the soils. The characteristics, distributions, and depositional sequence of the parent material are more thoroughly discussed in the section "Landforms and Surface Geology."

The soils in the survey area formed in parent material deposited during five or more different geologic time periods. Recent or late Holocene age alluvial deposits are the parent material of the Dela, Iuka, and Ouachita soils. The Guyton soils that are on flood plains are also forming, at least partially, in recent alluvium. The alluvium in which these soils formed is sediment eroded from the surrounding highly weathered uplands and terraces.

The Bienville, Cahaba, Gurdon, and Guyton soils are on terraces adjacent and generally parallel to the streams that drain the uplands. These soils formed in old alluvium of late Pleistocene or early Holocene age. The alluvium, which is mostly from the surface horizons of surrounding soils, may be low in bases and weatherable minerals at the time of deposition. Because of this, some of the soils that formed in these pre-weathered materials may have a lower base status and fewer weatherable minerals than many of the soils that formed on older surfaces in the uplands. The Bienville soils formed in the sandiest sediment eroded from the soils in the uplands. The Cahaba soils formed in loamy sediment high in sand content. The Gurdon and Guyton soils formed in parent material having less sand and more silt. All of these soils have a B horizon that is more clayey than the surface horizon. The Gurdon soils generally are at a higher elevation than the Bienville, Cahaba, and Guyton soils and probably formed in parent material somewhat older than that of the Bienville, Cahaba, and Guyton soils. In places, economically important gravel deposits are under profiles of Bienville and Cahaba soils. Gravel mining is an active industry in the parish *(31)*.

Sediments deposited during the late Pleistocene Period are parent material for several of the soils in the uplands. Soils formed in this parent material are the Forbing, Gore, Kolin, and Wrightsville soils. The Forbing, Gore, and Kolin soils formed wholly or partially in reddish clay derived from the Permean Red Beds of Oklahoma, Texas, and New Mexico. This clay was transported and redeposited in this survey area by ancient rivers. The Kolin soils formed in brownish silty sediment over reddish clay. The Wrightsville soils are on broad flats. These soils are poorly drained and grayish throughout the profile. They formed in silty and clayey sediment. All of the soils in this survey area that formed in sediment of late Pleistocene age are classified as Alfisols and characteristically have a well developed B horizon that is more clayey than the A horizon. Typically, soil reaction and base saturation decrease as depth increases from the surface horizon to minimum values in the upper part of the B horizon. Below these minimum levels, reaction and base status typically increase as depth increases. In places, concretions of calcium carbonate are in the lower part of the profiles of the Forbing and Gore soils.

The Boykin, Malbis, Ruston, and Smithdale soils formed in sediment mainly of early Pleistocene age. All of these soils are on uplands that are remnants of ancient stream terraces. They are highly weathered and leached and are characterized by a distinct B horizon of secondary accumulations of clay. They are classified as Ultisols and characteristically have low base status and acid soil reaction throughout. Soil reaction and base status do not increase in the lower part of the profile because of the highly weathered and leached condition of the soils.

The Darley, Eastwood, Flo, Mahan, McLaurin, Ruple, and Sacul soils are on uplands and formed in sediments deposited during the Tertiary Period. The soils formed in Tertiary deposits are highly weathered and leached and characteristically have an acid soil reaction and low base status throughout. Most of these soils are Ultisols; however, the Flo soils are highly weathered Alfisols. All of the soils have a well developed B horizon that is more clayey than the A horizon.

Major differences in the soils that formed in the Tertiary deposits are associated with differences in the texture and composition of the parent material. The Darley, Eastwood, Mahan, Ruple, and Sacul soils formed in clayey deposits or stratified clayey and loamy deposits. All of these soils have a B horizon that is more than 35 percent clay in the upper part. The Flo and McLaurin soils formed in loamy or sandy deposits and make up only a small part of the Tertiary uplands. These soils have a B horizon that is less than 35 percent clay.

Several of the soils formed in Tertiary sediment contain large amounts of siderite, an iron carbonate mineral, and possibly glauconite, an iron phosphate mineral *(18)*. Weathering of the siderite and glauconite resulted in large accumulations of iron oxide in the soils that, in many areas, formed continuous ironstone layers. Although some ironstone is common in many of the upland soils, its accumulation is most pronounced in the Darley, Mahan, and Ruple soils.

Time

The length of time that parent material in Webster Parish has been exposed to the active factors of soil formation ranges from a few years or less to millions of years. The length of time of soil formation influences the kinds of soil horizons and their degree of development. Long periods of time generally are required for prominent horizons to form. Old soils generally have strongly developed profiles.

The youngest soils in Webster Parish are recent in age and are on flood plains. Intermediate in age are the soils formed on the stream terraces and uplands of Pleistocene age. The oldest soils are on the upland surfaces of Tertiary age.

The young flood plain soils are of Holocene age and are formed in alluvium that is only a few hundred to a few thousand years old. These soils are weakly developed, and genetic horizons are commonly faint. They retain many of the characteristics of the parent material in color, reaction, and texture. Recent alluvial deposits are the parent material of the Ouachita, Iuka, and Dela soils. The alluvium in which these soils formed is sediment eroded from the surrounding highly weathered uplands.

The Bienville, Cahaba, Gurdon, and Guyton soils are on terraces adjacent and generally parallel to the streams that drain the uplands. These soils formed in old alluvium of late Pleistocene or early Holocene age. The alluvium is derived from erosion of the surrounding uplands. It was deposited during a period from less than 10,000 years to possibly 30,000 years ago. The soils are more mature than the flood plain soils and exhibit horizon differentiation, leaching, and clay translocation. The Guyton soils are mapped on both stream terraces and on the present flood plains of streams. The Guyton soils on flood plains are receiving additional increments of recent alluvium from stream overflow.

On the ancient stream terraces or remnants of stream terraces to the west of Bayou Dorcheat are the Forbing, Gore, Kolin, and Wrightsville soils. In some literature, these ancient terraces are called terrace uplands to differentiate them from the younger stream terraces at lower elevations and from older surfaces on uplands. In this survey, these ancient terraces are included with the uplands. They are late Pleistocene in age. The sediment has been continuously exposed to weathering and soil-forming processes since its deposition some 30,000 to 103,000 years ago *(13, 18)*.

In the oldest soils, greater leaching, clay translocation, and horizonation are more evident than in younger soils. The oldest soil parent materials in the parish were deposited from 40 to 60 million years ago during the Tertiary Period. These upland soils have not been continuously exposed to weathering for that period of time, but in some places probably have been developing for more than a million years. These soils are typically highly weathered and leached. They are acidic and have a low base status and low natural fertility throughout. Most classify as Ultisols, but a few are highly weathered Alfisols.

Processes of Soil Formation

The processes of soil formation influence the kind and degree of development of soil horizons. The factors of soil formation, climate, living organisms, relief, parent material, and time, determine the rate and relative effectiveness of different processes.

Soil-forming processes include those that result in addition of mineral, organic, 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 weathering of these materials within the soil *(23)*. Some soil-forming processes that apply to the soils in Webster Parish are described in the following paragraphs.

The A horizon of a soil profile is the surface zone of maximum accumulation of organic matter. The E horizon is the subsurface layer of maximum leaching of dissolved and suspended material. The B horizon lies below the A or E horizon and is the zone of maximum accumulation of suspended material, such as iron and clay. Very young soils do not have a B horizon. Below the B horizon is the C horizon. This horizon is primarily affected by weathering of the soil particles and is little affected by additions, losses, and translocation of materials to the system.

Several processes have been active in the formation of soil horizons in Webster Parish. Among these processes are: (1) the accumulation of organic matter, (2) the deposition of alluvial sediments on the surface, (3) the oxidation and/or reduction of iron, (4) the leaching of bases, (5) the formation and translocation of clay, (6) the secondary accumulation of calcium carbonate, and (7) the secondary accumulation or ironstone. Typically, more than one process has been active in the formation of each soil.

With the help of living organisms, organic matter has accumulated, undergone partial decomposition, and been incorporated in all of the soils in the parish. Enough organic matter has accumulated to form an A horizon in all soils of the parish. Generally, the A horizon is thickest in soils that formed under grassland vegetation and thinnest in soils that formed under forest vegetation. Organic matter production in soil is greatest in the surface horizon. Thus, the surface layer is higher in organic matter content than the deeper horizons. Decomposed organic materials contribute to darker colors, increased water holding capacities, and increased cation-exchange capacities.

The frequent addition of alluvial sediments to the surface of soils on flood plains retards soil development. Therefore, most soils on flood plains do not have prominent horizons. Examples are the Ouachita and Dela soils, which formed in recent loamy accumulations on the natural levees of flood plains, and the Iuka soils, which formed in silty deposits in lower positions.

The oxidation of iron is apparent in moderately well drained and well drained soils of the parish. Red and brown colors of the translocated iron in the B horizon is evidence of this oxidation. The Mahan and Ruple soils are examples of well drained red soils.

The reduction and transfer of iron and manganese is evident in poorly drained and somewhat poorly drained soils such as the Guyton, Iuka, and Wrightsville soils. In these naturally wet soils, a process called gleying causes gray colors in horizons below the surface horizon.

Alternating oxidizing and reducing conditions in the soil produce red, brown, and gray mottles in the soil. Iron and manganese are translocated in the soil in the more soluble, reduced state and then segregated and locally concentrated during oxidizing states. The Gurdon, Malbis, and Sacul soils exhibit this mottling.

Loss of bases from soils occurs as water moves through the soil profiles. The water leaches the soluble bases, including free carbonates that were present initially in the parent material. The upland soils that formed on the Tertiary deposits are acid throughout, have low natural fertility, and are the most highly leached soils of the parish. The soils developed on the Pleistocene terraces are highly leached in the upper horizons, but generally are less severely leached than most soils that formed in the Tertiary uplands.

The formation, translocation, and accumulation of clay are processes that are active in the formation of most of the soils in Webster Parish. The weathering of silicate minerals, such as amphiboles and feldspars, releases silicon and aluminum which recombine with water indirectly to form secondary clay minerals, such as kaolinite, vermiculite, or smectite. As water moves downward, it carries small amounts of clay in suspension. Clay translocated from upper horizons accumulates as film on peds and in pores in B horizons. It is deposited and accumulates at depths penetrated by water 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 Bt horizons of clay accumulation. All of the soils of Webster Parish, except the youthful Iuka, Dela, and Ouachita soils, have an accumulation of pedogenic clay in the subsoil.

The secondary accumulation of calcium carbonate in the lower parts of soils is evident in a few of the Pleistocene age soils. These free carbonates were present in the original alluvium derived from the Permian Red Beds. In places, the Forbing and Gore soils have secondary accumulations of carbonates at a depth of less than 60 inches. These accumulations may result from the downward translocation of carbonates by water, the weathering of particles within the horizon, or the upward translocation of carbonates during fluctuations in the level of water tables.

The secondary accumulation of ironstone has been an important process in the formation of some soils of the parish. The ironstone accumulates as a result of weathering of minerals, such as glauconite and siderite, that contain reduced iron. These accumulations are especially pronounced in the Ruple, Mahan, and Darley soils.

Landforms and Surface Geology

Dr. Scott F. Burns, Department of Geosciences, Louisiana Tech University, helped prepare this section.

Webster Parish can be divided into three general physiographic regions—the uplands, the stream terraces, and the flood plains. Each region is characterized by soils that formed in a different age or kind of parent material.

Uplands

Soils of the uplands formed in parent material deposited during the Tertiary and Quaternary geologic epochs *(18)*. The parent material of these two ages and the soils that formed in the material are discussed in the following paragraphs.

Tertiary. The soils in the survey area that formed in Tertiary age sediment are in the eastern part of the parish, east of Bayou Dorcheat. The area corresponds to the McLaurin-Flo, Darley-Sacul-Mahan, Sacul-Mahan, and Sacul-Ruple-Darley general soil map units and the Eastwood part of the Eastwood-Malbis general soil map unit.

Tertiary age sediment is generally massive sands with interbedded clay layers. The bedding is nearly horizontal. Erosion of the sediment has resulted in a dissected plateau with strongly sloping to steep valley side slopes and relatively wide, flat bottomed valleys. The interfluves range from narrow and steeply sloping to broad and gently sloping. The degree to which the uplands are dissected might depend upon the presence or thickness of clay layers on the sides of the slopes *(11)*. Local relief ranges from 100 to 150 feet. The highest elevation in the parish is 460 feet. It is in the southeastern part of the parish along the divide between the drainage basins of Bayou Dorcheat and Black Lake Bayou.

Tertiary sediments in Webster Parish are members of the Claiborne and Wilcox Groups. The Claiborne Group was deposited during the Eocene Series, and the Wilcox Group was deposited during the Paleocene Series. The Cockfield, Cook Mountain, Sparta, and Cane River Formations of the Claiborne Group have been identified in the parish. No specific formations of the Wilcox Group are identified.

The Wilcox Group is exposed only above the Vacherie Salt Dome in the southeastern part of the parish. It consists of gray to brown lignitic sands and silty to sandy lignitic clays with many seams of lignite *(21)*. The Eastwood soil formed in sediments of the Wilcox Group.

The Cane River Formation is also exposed only above the Vacherie Salt Dome. It consists of brown silty clay *(9)*. The main soil formed in the Cane River sediment is also the Eastwood soil.

The Sparta Formation is characterized by white to light gray massive sands with some interbedded clays. In places, it has thin interbeds of lignite and lignitic sands and shales *(21)*. The Flo soil formed where the parent material is mainly sandy, and the McLaurin soil formed where the parent material is sandy and loamy.

The Cook Mountain Formation is the main parent material of the Tertiary uplands. It consists of bedded marine sediment that is mostly greenish gray sideritic and glauconitic clays in the upper part and yellowish to brownish clays and fossiliferous marl in the lower part. Ironstone concretions commonly form near the base of the formation *(21)*. The Darley, Ruple, Mahan, and Sacul soils formed in sediment of the Cook Mountain Formation. The Darley and Ruple soils contain abundant ironstone (fig. 10). The Mahan soils are mainly high on the slopes. They are well drained, red, and may contain some ironstone. The Sacul soils typically are on the lower parts of slopes. They are moderately well drained and have gray mottles in the upper part of the subsoil.

The youngest Tertiary unit is the Cockfield Formation. It outcrops only in a small area east of Minden. The Cockfield Formation consists mainly of nonmarine sediment that is brown lignitic clays, silts, and sands. Some sideritic and glauconitic sands are in the lower section. The Eastwood soil, which formed in sediment of the Cockfield Formation, differs from the Sacul soil, which formed in sediment of the Cook Mountain Formation, in having very plastic clays in its subsoil.

The differences between the soils of the Tertiary uplands are controlled by differences in the composition and texture of the parent material. The Eastwood and Sacul soils formed in sediment containing appreciable amounts of clay and small amounts of glauconite and siderite. The Darley, Ruple, and Mahan soils formed in sediment having concentrations of glauconite and siderite. Glauconite and siderite weather to form ironstone. The origin, characteristics, distribution, and potential use of ironstone in soils have been summarized by the Louisiana Geological Survey *(12)*.

Quaternary. In Webster Parish, the surface geology of the uplands of the Quaternary system consists of deposits of the Pleistocene series *(13)*. These sediments were the

Figure 10.--Fractured layers of ironstone in an area of Ruple gravelly loam, 5 to 12 percent slopes, restrict roots somewhat and limit the amount of water available to plants.

braided stream terrace deposits of ancient river systems. Early geological maps of Webster Parish divided the Pleistocene according to the different interglacial periods and sediments associated with these periods *(13)*. From oldest to youngest, these terraces are the Williana, Bentley, Montgomery, and Prairie Terraces. More recent geological literature refers to the terraces as High Terrace, Intermediate Terrace, and Prairie Terrace *(21)*. The High Terrace includes the former Williana and Upper Bentley Terraces, and the Intermediate Terrace includes the former Lower Bentley and Montgomery Terraces. In even more recent geological literature, the terrace surfaces are referred to as the Upland Complex, Intermediate Complex, and Prairie Complex *(4)*.

The High Terrace is highly dissected and less continuous than the Intermediate and Prairie Terraces. In Webster Parish, areas of the High Terrace occur only as small hills that are remnants of terraces that were once quite extensive. The High Terrace is considered to be early Pleistocene in age *(4)*. Areas of the High Terrace correspond to the Malbis-Ruston-Smithdale general soil map unit. The Malbis soil is mapped on both the High Terrace and the Intermediate Terrace.

Ruston soils are on narrow ridgetops, and Smithdale soils are on steeper side slopes. Both of these well drained soils are reddish and loamy throughout the profile. Malbis soils are at a lower elevation than Ruston soils, and they are on somewhat broader ridgetops and have less convex slopes. Malbis soils are brownish and loamy throughout the profile. Boykin soils are on ridgetops and formed in sandy sediment overlying loamy sediment.

The Intermediate Terrace is at a lower elevation than the High Terrace, and it is less dissected and has less relief. In Webster Parish, areas of the Intermediate Terrace generally are small, and except for areas of the Gurdon soil, correspond to the Gurdon-Malbis general soil map unit. Gurdon soils are in areas of a lower-lying stream terrace but are included with Malbis soils on the General Soil Map because of the close association of soils and terraces and the small scale of the map. Small remnants of the Intermediate Terrace probably are also included in areas of the Malbis-Ruston-Smithdale general soil map unit.

A recently published geology map of Louisiana indicates that areas of the Prairie Terrace *(21)* correspond to the Gurdon-Malbis general soil map unit. This apparent disagreement between maps is probably the result of differences in the scale of maps used and in the difficulty in delineating the small areas of each of the terrace remnants.

Areas of the Prairie Terrace correspond to the Kolin-Gore-Wrightsville general soil map unit. This terrace is less dissected than the older High and Intermediate Terraces. Slopes are dominantly less than 5 percent on interstream divides and less than 12 percent on valley walls and escarpments. The Prairie Terrace was deposited approximately 30,000 to 130,000 years ago *(4, 22)*. Investigations made during this survey indicate that sediments in Webster Parish may be slightly older than Prairie age and younger than Montgomery (Intermediate) age and possibly represent a separate, unnamed stratigraphic unit. This might explain why the Prairie Terrace in Webster Parish is included with the Intermediate Terrace on a recent geology map of Louisiana *(21)*.

Forbing and Gore soils are on gently sloping interstream divides and strongly sloping valley walls and escarpments. They formed mainly in reddish clays deposited by an ancient river that drained the Permian Red Beds of Oklahoma, Texas, and New Mexico. Kolin soils are on broad, very gently sloping interstream divides. They formed in loamy material overlying reddish clay. The poorly drained Wrightsville soils are on broad flats and in depressional areas. These soils are grayish throughout the profile and have a loamy surface layer and a clayey subsoil. The Forbing, Gore, Kolin, and Wrightsville soils are Alfisols and are leached less than soils of the Intermediate and High Terraces.

Flood Plains and Stream Terraces

Most of Webster parish is drained by the Bayou Dorcheat which flows from the north into Lake Bistineau at the southern end of the parish. Stream gradients are one or two feet per mile.

The modern flood plains make up about 15 percent of the parish. Soils of the flood plains correspond to the Guyton-Ouachita-Iuka general soil map unit. The age of the soils is Holocene; most of the soils are less than 5,000 years old. These soils are the youngest in the parish. They receive additional sediment annually from frequent stream overflow. Except for small areas of low ridges and swales, level topography is characteristic of the entire area. The sediments of the flood plains are dominantly materials derived from erosion of surrounding soils on uplands and terraces.

The poorly drained Guyton soils and moderately well drained Iuka soils are in level areas and in swales. The well drained Ouachita soils and moderately well drained Dela soils are on low ridges and natural levees of the streams. All of the soils on flood plains are subject to frequent flooding. The Dela, Ouachita, and Iuka soils formed in recent loamy deposits that are derived entirely from erosion of local soil materials, and the Guyton soils formed in older deposits of late Pleistocene age. In many places, the Guyton soils are buried beneath deposits that are the parent material of the Dela, Ouachita, and Iuka soils.

Small areas of Bienville, Cahaba, Gurdon, and Guyton soils are included in the Guyton-Ouachita-Iuka general soil map unit. These soils are on stream terraces that occur as narrow, discontinuous bands which flank the flood plains of some of the major streams in the parish. These terraces are mostly stream deposits of sediment from late Pleistocene age and are approximately 10,000 to 30,000 years old. They are the result of erosion from the surrounding uplands and are known as Deweyville Terraces *(13)*. The somewhat poorly drained Gurdon soils are on high stream terraces and formed in brownish loamy sediments that are somewhat older than those in which the Bienville and Cahaba soils formed. The somewhat excessively drained Bienville soils and well drained Cahaba soils are on low stream terraces. Bienville soils formed in reddish sandy sediments, and Cahaba soils formed in reddish loamy sediments. The poorly drained Guyton soils, which are also mapped on stream terraces, are on broad flats and in depressional areas. They formed in grayish, loamy sediments and are also considered to be of late Pleistocene age.

References

(1) Adams, F. 1984. Soil acidity and liming. Agron. Mono. 12, 2nd ed. Am. Soc. Agron.

(2) American Association of State Highway and Transportation Officials. 1986. Standard specifications for highway materials and methods of sampling and testing. Ed. 14, 2 vol.

(3) American Society for Testing and Materials. 1993. Standard classification of soils for engineering purposes. ASTM Stand. D 2487.

(4) Autin, W.J., S.F. Burns, B.J. Miller, R.J. Saucier, and J.T. Snead. 1989. Quaternary geology of the Lower Mississippi Valley. R.B. Morrison, editor, Quaternary Nonglacial Geology: Conterminous U.S., Geology of North America, Chap. 13, DNAG, Geological Society of America, vol. K-2.

(5) Black, C.A. 1968. Soil-plant relationships, 792 pp., illus.

(6) Briscoe, C.B., and M.D. Ferrill. 1958. Height growth of American sycamore in southeastern Louisiana. La. State Univ. Agr. Exp. Sta. Res. Rel., LSU Forest. Note 19.

(7) Broadfoot, Walter M. 1960. Field guide for evaluating cherrybark oak sites. U.S. Dep. Agric., Forest Serv., South. Forest Exp. Stn. Occas. Pap. 190, 8 pp., illus.

(8) Broadfoot, Walter M. 1960. Field guide for evaluating cottonwood sites. U.S. Dep. Agric., Forest Serv., South. Forest Exp. Stn. Occas. Pap. 178, 6 pp., illus.

(9) Broadfoot, Walter M. 1963. Guide for evaluating water oak sites. U.S. Dep. Agric., Forest Serv., South. Forest Exp. Stn. Res. Pap. SO-1, 8 pp., illus.

(10) Broadfoot, Walter M., and R.M. Krinard. 1959. Guide for evaluating sweetgum sites. U.S. Dep. Agric., Forest Serv., South. Forest Exp. Stn. Occas. Pap. 176, 8 pp., illus.

(11) Burns, S.F. 1986. Landslide activity in northern Louisiana. Abstracts with Programs, Geological Society of America, vol. 18, no. 3, 213 pp.

(12) Durham, C.O. Jr. 1964. Iron ore of central north Louisiana. La. Dept. of Conservation. Geological Survey Bull. 41.

(13) Fisk, H.N. 1939. Depositional terrace slopes in Louisiana. Jour. Geomorphol., vol. 2, 181-200 pp., illus.

(14) Jenny, Hans. 1941. Factors of soil formation. 281 pp., illus.

(15) Khasawneh, F.E., E.C. Sample, and E.J. Kamprath, eds. 1980. The role of phosphorus in agriculture. Am. Soc. Agron.

(16) Kilmer, Victor J., S.E. Younts, and N.C. Brady, eds. 1968. The role of potassium in agriculture. Am. Soc. Agron.

(17) Louisiana Cooperative Extension Service. 1987. Summary of Agricultural and Natural Resources. 150 pp.

(18) Martin, J.L., L.W. Hough, D.L. Raggio, and A.E. Sandberg. 1954. Geology of Webster Parish. Geological Bull. 29, Louisiana Geological Survey, Baton Rouge. 252 pp.

(19) Munson, R.D., ed. 1985. Potassium in agriculture. Am. Soc. Agron.

(20) Olson, D.J. 1959. Site index curves for upland oak in the southeast. U.S. Dep. Agric. Forest Serv., Southeast. Forest Exp. Stn. Res. Note 125, 2 pp.

(21) Pope, D.E., J.I. Snead, and R.P. McCulloh. 1984. Geologic map of Louisiana. La. Geol. Surv.

(22) Saucier, R.T. 1974. Quaternary geology of the Lower Mississippi Valley. Arkansas Geol. Sur., Res. Ser. 6, Arkansas Arch. Sur., Univ. Arkansas, Fayetteville, Ark., 26 pp., illus.

(23) Simonson, Roy W. 1959. Outline of a generalized theory of soil genesis. Soil Sci. Soc. Am. Proc. 23: 152-156, illus.

(24) Stevenson, F.J. 1982. Humus chemistry.

(25) Stevenson, F.J. 1982. Nitrogen in agricultural soils. Agron. Mono. 22. Am. Soc. Agron.

(26) Thomas, C.E. and C.V. Bylin. 1980. Louisiana mid-cycle survey shows change in forest resource trends. U.S. Dep. Agric., Forest Serv., South. Forest Exp. Stn., 4 pp., illus.

(27) United States Department of Agriculture. 1993. Soil survey manual. U.S. Dep. Agric. Handb. 18.

(28) United States Department of Agriculture. 1975. Forest statistics for Louisiana parishes. Forest Serv., South. Forest Exp. Stn. Resour. Bull., pp. 50-52.

(29) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 436, 754 pp., illus.

(30) United States Department of Agriculture. 1984 (rev.). Procedures for collecting soil samples and methods of analysis for soil survey. Soil Surv. Invest. Rep. 1, 68 pp., illus.

(31) Woodward, T.P., and A.J. Gueno, Jr. 1941. The sand and gravel deposits of Louisiana: Louisiana Geological Survey, Geological Bull. 19, pp 365.

Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

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.

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.

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.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:
Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.
Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.
Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.
Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.
Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.
Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.
Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.
Erosion (geologic)—Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.
Erosion (accelerated)—Erosion much more rapid than geologic erosion, mainly as a result of the human or animal activities or of a catastrophe in nature, such as fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The movement of water into the soil is rapid.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate

1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:
Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.
Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.
Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.
Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.
Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.
Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.
Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.
Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.
Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called ""a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Seepage (in tables). The movement of water through the soil adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the ""plow layer," or the ""Ap horizon."

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying ""coarse," ""fine," or ""very fine."

Thin layer (in tables). An otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-88 at Minden, 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-----	55.3	32.9	44.1	79	11	68	4.05	1.82	5.97	6	0.5
February----	60.5	36.4	48.4	81	16	97	4.32	2.41	6.01	5	0.1
March-------	67.9	43.2	55.6	86	23	225	4.21	2.36	5.84	6	0.1
April-------	76.9	52.7	64.8	89	33	442	4.37	2.25	6.23	5	0.0
May---------	83.3	60.6	71.9	93	44	676	5.15	2.72	7.29	6	0.0
June--------	89.9	67.8	78.9	99	54	862	3.79	1.52	5.70	5	0.0
July--------	93.2	71.3	82.2	102	62	985	3.86	1.84	5.80	5	0.0
August------	93.4	70.3	81.8	103	59	984	2.80	1.22	4.14	4	0.0
September---	87.9	64.2	76.0	99	46	777	3.27	1.33	4.91	4	0.0
October-----	78.5	52.3	65.4	93	34	478	3.34	1.24	5.42	4	0.0
November----	67.3	42.5	54.9	84	21	202	4.77	2.36	6.87	5	0.0
December----	58.9	35.8	47.3	79	15	85	4.51	2.55	6.48	6	0.2
Yearly:											
Average---	76.1	52.5	64.3	---	---	---	---	---	---	---	---
Extreme---	108	0	---	104	10	---	---	---	---	---	---
Total-----	---	---	---	---	---	5,881	48.45	38.25	56.15	61	1.0

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-88 at Minden, 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. 22	Apr. 4
2 years in 10 later than--	Mar. 6	Mar. 16	Mar. 30
5 years in 10 later than--	Feb. 17	Mar. 5	Mar. 21
First freezing temperature in fall:			
1 year in 10 earlier than--	Nov. 16	Nov. 4	Oct. 28
2 years in 10 earlier than--	Nov. 24	Nov. 10	Nov. 2
5 years in 10 earlier than--	Dec. 9	Nov. 24	Nov. 11

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-88 at Minden, 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	262	235	213
8 years in 10	273	244	220
5 years in 10	294	262	233
2 years in 10	315	280	247
1 year in 10	326	290	254

TABLE 4.--SUITABILITY AND LIMITATIONS OF GENERAL SOIL MAP UNITS FOR MAJOR LAND USES

Map unit	Extent of area	Cultivated crops	Pastureland	Woodland	Urban uses	Intensive recreation areas
	Pct					
1. Guyton-Ouachita-Iuka-----	15	Poorly suited: flooding, wetness.	Poorly suited: flooding, wetness.	Moderately well suited: restricted use of equipment, seedling mortality, plant competition, soil compaction.	Poorly suited: flooding, wetness (the soils are not suited to dwellings).	Poorly suited: flooding, wetness.
2. Gurdon-Malbis------------	2	Moderately well suited: low fertility, slope, wetness, potential aluminum toxicity.	Well suited.	Well suited.	Poorly suited (Malbis soils are moderately well suited): wetness, moderate or moderately slow permeability, slope, low strength for roads and streets.	Poorly suited (Malbis soils are moderately well suited): wetness, slope.
3. Kolin-Gore-Wrightsville--	34	Moderately well suited (Gore soils are poorly suited or not suited because of slope): slope, wetness, potential aluminum toxicity.	Moderately well suited (Kolin soils are well suited): low fertility, wetness, slope.	Moderately well suited: restricted use of equipment, seedling mortality, plant competition, soil compaction.	Poorly suited: wetness, slope, very slow permeability, high shrink-swell potential, low strength for roads and streets, flooding.	Poorly suited: wetness, very slow permeability, slope, flooding.
4. Malbis-Ruston-Smithdale--	20	Moderately well suited: (Smithdale soils are poorly suited because of slope): slope, low fertility, potential aluminum toxicity.	Well suited (Smithdale soils are moderately well suited because of slope).	Well suited.	Moderately well suited: slope, moderate and moderately slow permeability, wetness, low strength for roads and streets.	Moderately well suited: slope, small stones.

TABLE 4.--SUITABILITY AND LIMITATIONS OF GENERAL SOIL MAP UNITS FOR MAJOR LAND USES--Continued

Map unit	Extent of area	Cultivated crops	Pastureland	Woodland	Urban uses	Intensive recreation areas
	Pct					
5. McLaurin-Flo-------------	3	Moderately well suited: slope, low fertility, soil droughtiness.	Moderately well suited: slope, low fertility, soil droughtiness.	Moderately well suited: poor traction, seedling mortality.	Moderately well suited: slope, seepage, soil droughtiness, cutbanks cave easily.	Moderately well suited: sandy surface layer, soil droughtiness, slope.
6. Gore-Forbing------------	2	Not suited (gently sloping Gore and Forbing soils are poorly suited): slope, low fertility, poor tilth, potential aluminum toxicity.	Moderately well suited: slope, low fertility.	Moderately well suited: restricted use of equipment, seedling mortality, soil compaction.	Poorly suited: clayey subsoil, very slow permeability, slope, high and very high shrink-swell potential, low strength for roads and streets.	Poorly suited: very slow permeability, slope.
7. Darley-Sacul-Mahan-------	16	Not suited (gently sloping soils are moderately well or poorly suited): slope, low or medium fertility, potential aluminum toxicity.	Moderately well suited (gently sloping soils are well suited): slope, low or medium fertility.	Well suited (steeply sloping Darley soils are moderately suited).	Moderately well suited (steeply sloping Darley soils are poorly suited): slope, ironstone layers, moderate to slow permeability, high shrink-swell potential, low strength for roads and streets, wetness.	Moderately well suited (steeply sloping Darley soils are poorly suited): slope, small stones, slow permeability.

TABLE 4.--SUITABILITY AND LIMITATIONS OF GENERAL SOIL MAP UNITS FOR MAJOR LAND USES--Continued

Map unit	Extent of area	Cultivated crops	Pastureland	Woodland	Urban uses	Intensive recreation areas
	Pct					
8. Sacul-Mahan	6	Not suited (gently sloping soils are poorly suited or moderately well suited): slope, low or medium fertility, potential aluminum toxicity.	Moderately well suited (gently sloping soils are well suited): slope, low or medium fertility.	Well suited.	Poorly suited: slope, moderate and slow permeability, high shrink-swell potential, clayey subsoil, low strength for roads and streets, wetness.	Moderately well suited: slope, slow permeability, small stones.
9. Eastwood-Malbis	1	Poorly suited (strongly sloping Eastwood soils are not suited and gently sloping Malbis soils are moderately well suited): slope, low fertility.	Well suited (strongly sloping Eastwood soils are moderately well suited).	Moderately well suited: restricted use of equipment, soil compaction, erosion hazard.	Poorly suited (Malbis soils are moderately well suited): slope, moderately slow and very slow permeability, very high shrink-swell potential, wetness, low strength for roads and streets.	Poorly suited (Malbis soils are moderately well suited or well suited): Slope, very slow permeability.
10. Sacul-Ruple-Darley	1	Not suited (gently sloping soils are poorly suited or moderately well suited): slope, low or medium fertility, soil droughtiness, potential aluminum toxicity.	Moderately well suited (gently sloping soils are well suited): slope, low or medium fertility.	Well suited (steeply sloping Darley soils are moderately well suited).	Poorly suited (gently sloping and strongly sloping Darley and Ruple soils are moderately well suited): slope, wetness, ironstone layers, moderately slow and slow permeability, high shrink-swell potential, low strength for roads and streets.	Moderately well suited: slope, small stones, moderately slow and slow permeability.

TABLE 5.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
Bn	Bienville loamy fine sand, 1 to 5 percent slopes	1,100	0.3
By	Boykin loamy fine sand, 1 to 5 percent slopes	1,400	0.4
Ca	Cahaba fine sandy loam, 1 to 3 percent slopes	4,200	1.1
Da	Darley gravelly loamy fine sand, 1 to 5 percent slopes	14,900	3.8
DE	Darley gravelly loamy fine sand, 5 to 12 percent slopes	19,700	5.0
DR	Darley gravelly loamy fine sand, 12 to 30 percent slopes	4,400	1.1
Ea	Eastwood very fine sandy loam, 1 to 5 percent slopes	900	0.2
EO	Eastwood very fine sandy loam, 5 to 12 percent slopes	900	0.2
Fc	Flo loamy fine sand, 1 to 5 percent slopes	900	0.2
Fn	Forbing silt loam, 1 to 5 percent slopes	1,000	0.3
FO	Forbing silt loam, 5 to 12 percent slopes	3,700	0.9
Go	Gore silt loam, 1 to 5 percent slopes	17,000	4.3
GR	Gore silt loam, 5 to 12 percent slopes	29,700	7.5
Gt	Gurdon silt loam, 1 to 3 percent slopes	6,900	1.8
Gu	Guyton silt loam	2,100	0.5
GY	Guyton-Ouachita silt loams, frequently flooded	64,300	16.3
IU	Iuka-Dela association, frequently flooded	8,800	2.2
Ko	Kolin silt loam, 1 to 3 percent slopes	51,100	13.0
Mh	Mahan fine sandy loam, 1 to 5 percent slopes	4,800	1.2
MN	Mahan fine sandy loam, 5 to 12 percent slopes	2,600	0.7
Mp	Malbis fine sandy loam, 1 to 3 percent slopes	32,000	8.1
Ms	Malbis fine sandy loam, 3 to 8 percent slopes	13,800	3.5
Mt	McLaurin loamy fine sand, 1 to 3 percent slopes	5,500	1.4
MV	McLaurin loamy fine sand, 3 to 8 percent slopes	6,400	1.6
Pt	Pits	6,500	1.7
Re	Ruple gravelly loam, 1 to 5 percent slopes	800	0.2
RP	Ruple gravelly loam, 5 to 12 percent slopes	600	0.2
Rs	Ruston fine sandy loam, 1 to 3 percent slopes	13,900	3.5
Sa	Sacul fine sandy loam, 1 to 5 percent slopes	16,500	4.2
SC	Sacul fine sandy loam, 5 to 12 percent slopes	19,700	5.0
SM	Smithdale fine sandy loam, 5 to 12 percent slopes	13,600	3.5
Wr	Wrightsville silt loam	16,000	4.1
	Water	7,855	2.0
	Total	393,555	100.0

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Cotton	Soybeans	Bahiagrass	Common bermuda-grass	Improved bermuda-grass
		Bu	Lbs	Bu	AUM*	AUM*	AUM*
Bn--------------- Bienville	IIIs	70	600	25	6.5	5.5	11.0
By--------------- Boykin	IIIs	65	---	---	8.0	6.0	10.0
Ca--------------- Cahaba	IIe	85	750	30	8.0	6.0	9.5
Da--------------- Darley	IIIe	50	650	---	7	5.5	12
DE, DR----------- Darley	VIe	---	---	---	5	5.0	10
Ea--------------- Eastwood	IVe	60	550	---	6.0	4.5	9.0
EO--------------- Eastwood	VIe	---	---	---	5.5	4.5	8.5
Fc--------------- Flo	IIIs	---	---	---	6.5	5.5	9.5
Fn--------------- Forbing	IVe	---	---	20	6.0	4.5	9.0
FO--------------- Forbing	VIe	---	---	---	5.5	4.0	8.5
Go--------------- Gore	IVe	---	---	20	6.5	4.5	9.0
GR--------------- Gore	VIe	---	---	---	6.0	4.0	8.5
Gt--------------- Gurdon	IIe	85	750	30	8	7	9.5
Gu--------------- Guyton	IIIw	---	---	25	7.5	5.5	---
GY--------------- Guyton and Ouachita	Vw	---	---	20	6.0	5.3	---
IU**:							
Iuka and Dela--	Vw	---	---	20	7.0	6.0	8.0
Ko--------------- Kolin	IIe	75	---	30	7.5	5.5	12.0
Mh--------------- Mahan	IIIe	60	550	---	7.5	5.5	12.0

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Cotton	Soybeans	Bahiagrass	Common bermuda-grass	Improved bermuda-grass
		Bu	Lbs	Bu	AUM*	AUM*	AUM*
MN-------------- Mahan	VIe	---	---	---	6.5	5.0	11.0
Mp-------------- Malbis	IIe	95	750	37	8.5	5.5	12.0
Ms-------------- Malbis	IIIe	80	650	30	8.0	5.5	11.5
Mt-------------- McLaurin	IIe	75	600	25	8.0	5.5	11.0
MV-------------- McLaurin	IIIe	70	---	25	7.0	5.0	10.0
Pt**. Pits							
Re-------------- Ruple	IIIe	55	700	---	7	5.0	10
RP-------------- Ruple	VIe	---	---	---	6	4.5	9
Rs-------------- Ruston	IIe	90	650	30	9.5	5.5	12.0
Sa-------------- Sacul	IVe	60	---	---	7.5	5.5	11.0
SC-------------- Sacul	VIe	---	---	---	6.5	5.5	9.5
SM-------------- Smithdale	IVe	55	400	20	8.0	5.0	10.0
Wr-------------- Wrightsville	IIIw	---	---	25	7.5	5.5	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
Bn-------------- Bienville	10S	Slight	Severe	Moderate	Slight	Loblolly pine-------	96	10	Loblolly pine.
						Longleaf pine-------	88	8	
						Shortleaf pine------	75	8	
By-------------- Boykin	10S	Slight	Slight	Moderate	Moderate	Loblolly pine-------	92	10	Loblolly pine, shortleaf pine.
						Shortleaf pine------	76	8	
						Longleaf pine-------	---	---	
Ca-------------- Cahaba	9A	Slight	Slight	Slight	Moderate	Loblolly pine-------	87	9	Loblolly pine, sweetgum, water oak, southern red oak.
						Shortleaf pine------	70	8	
						Yellow poplar-------	---	---	
						Sweetgum------------	90	7	
						Southern red oak----	---	---	
						Water oak-----------	---	---	
Da, DE---------- Darley	8F	Slight	Slight	Slight	Moderate	Loblolly pine-------	85	8	Loblolly pine.
						Shortleaf pine------	75	8	
						Hickory-------------	---	---	
						Southern red oak----	---	---	
						White oak-----------	---	---	
						Sweetgum------------	---	---	
DR-------------- Darley	8R	Moderate	Moderate	Slight	Moderate	Loblolly pine-------	85	8	Loblolly pine.
						Shortleaf pine------	75	8	
						Hickory-------------	---	---	
						Southern red oak----	---	---	
						White oak-----------	---	---	
						Sweetgum------------	---	---	
Ea-------------- Eastwood	10C	Slight	Moderate	Slight	Slight	Loblolly pine-------	93	10	Loblolly pine.
						Shortleaf pine------	---	---	
						Sweetgum------------	---	---	
						Southern red oak----	---	---	
						Hickory-------------	---	---	
EO-------------- Eastwood	9C	Moderate	Moderate	Slight	Slight	Loblolly pine-------	86	9	Loblolly pine.
						Shortleaf pine------	77	9	
						Sweetgum------------	---	---	
						Southern red oak----	---	---	
						Hickory-------------	---	---	
Fc-------------- Flo	8S	Slight	Severe	Moderate	Moderate	Shortleaf pine------	72	8	Loblolly pine, shortleaf pine.
						Loblolly pine-------	---	7	
Fn, FO---------- Forbing	6C	Slight	Moderate	Moderate	Moderate	Loblolly pine-------	70	6	Loblolly pine.
						Shortleaf pine------	60	6	
Go-------------- Gore	7C	Slight	Moderate	Moderate	Slight	Loblolly pine-------	76	7	Loblolly pine.
						Shortleaf pine------	---	---	
GR-------------- Gore	8C	Moderate	Moderate	Moderate	Slight	Loblolly pine-------	78	8	Loblolly pine.
						Longleaf pine-------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
Gt---------------- Gurdon	9W	Slight	Moderate	Slight	Severe	Loblolly pine------- Sweetgum------------ Shortleaf pine------ Shumard oak--------- Willow oak----------	90 90 75 --- ---	9 7 8 --- ---	Loblolly pine, cherrybark oak, sweetgum, willow oak.
Gu---------------- Guyton	9W	Slight	Severe	Moderate	Severe	Loblolly pine------- Sweetgum------------ Green ash----------- Southern red oak---- Water oak-----------	90 --- --- --- ---	9 --- --- --- ---	Loblolly pine, sweetgum, willow oak.
GY**: Guyton----------	8W	Slight	Severe	Severe	Severe	Loblolly pine------- Sweetgum------------ Green ash----------- Nuttall oak--------- Eastern cottonwood--	80 --- --- --- ---	8 --- --- --- ---	Loblolly pine, sweetgum, willow oak.
Ouachita--------	11W	Slight	Slight	Moderate	Severe	Loblolly pine------- Sweetgum------------ Eastern cottonwood-- Cherrybark oak------	100 100 100 100	11 10 9 10	Loblolly pine, cherrybark oak, water oak, shortleaf pine.
IU**: Iuka------------	9W	Slight	Moderate	Moderate	Severe	Loblolly pine------- Sweetgum------------ Eastern cottonwood-- Water oak-----------	100 100 105 100	9 10 10 7	Loblolly pine, willow oak, water oak.
Dela------------	4A	Slight	Slight	Slight	Severe	Southern red oak---- Sweetgum------------ Eastern cottonwood-- Shortleaf pine------ Green ash----------- Hickory-------------	80 90 100 80 --- ---	4 7 9 9 --- ---	Loblolly pine, shortleaf pine, southern red oak.
Ko---------------- Kolin	8W	Slight	Moderate	Slight	Severe	Loblolly pine------- Shortleaf pine------	80 ---	8 ---	Loblolly pine.
Mh, MN----------- Mahan	9A	Slight	Slight	Slight	Slight	Loblolly pine------- Shortleaf pine------ Hickory------------- Southern red oak---- Sweetgum------------ White oak-----------	90 --- --- --- --- ---	9 --- --- --- --- ---	Loblolly pine.
Mp, Ms----------- Malbis	9A	Slight	Slight	Slight	Moderate	Loblolly pine------- Longleaf pine-------	90 80	9 7	Loblolly pine.
Mt, MV----------- McLaurin	8A	Slight	Moderate	Slight	Slight	Loblolly pine------- Shortleaf pine------	83 70	8 8	Loblolly pine.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi- nation symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Plant competi- tion	Common trees	Site index	Produc- tivity class*	
Re, RP: Ruple	10A	Slight	Slight	Slight	Slight	Loblolly pine	92	10	Loblolly pine.
						Shortleaf pine	80	9	
						Hickory	---	---	
						Southern red oak	---	---	
						Sweetgum	---	---	
						White oak	---	---	
Rs: Ruston	8A	Slight	Slight	Slight	Slight	Loblolly pine	84	8	Loblolly pine.
						Shortleaf pine	75	8	
Sa, SC: Sacul	8C	Slight	Moderate	Slight	Moderate	Loblolly pine	84	8	Loblolly pine.
						Shortleaf pine	74	8	
SM: Smithdale	8A	Slight	Slight	Slight	Slight	Loblolly pine	80	8	Loblolly pine.
						Shortleaf pine	69	8	
Wr: Wrightsville	4W	Slight	Severe	Severe	Severe	Water oak	70	4	Loblolly pine, sweetgum, water oak, willow oak, Nuttall oak.
						Sweetgum	70	4	

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Bn-------------------- Bienville	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
By-------------------- Boykin	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Slight.
Ca-------------------- Cahaba	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
Da-------------------- Darley	Severe: small stones.	Severe: small stones.	Severe: small stones.	Slight----------	Severe: small stones.
DE-------------------- Darley	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight----------	Severe: small stones.
DR-------------------- Darley	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.	Severe: slope, small stones.
Ea-------------------- Eastwood	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight----------	Slight.
EO-------------------- Eastwood	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: slope.
Fc-------------------- Flo	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
Fn-------------------- Forbing	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight----------	Slight.
FO-------------------- Forbing	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: slope.
Go-------------------- Gore	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight----------	Slight.
GR-------------------- Gore	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: slope.
Gt-------------------- Gurdon	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Gu-------------------- Guyton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
GY*:					
Guyton----------------	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
GY*:					
Ouachita	Severe: flooding.	Moderate: flooding, percs slowly.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
IU*:					
Iuka	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
Dela	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
Ko Kolin	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight	Moderate: wetness.
Mh Mahan	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
MN Mahan	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Mp, Ms Malbis	Slight	Slight	Moderate: slope.	Slight	Slight.
Mt, MV McLaurin	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
Pt*. Pits					
Re Ruple	Severe: small stones.	Severe: small stones.	Severe: small stones.	Slight	Severe: small stones.
RP Ruple	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight	Severe: small stones.
Rs Ruston	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
Sa Sacul	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
SC Sacul	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
SM Smithdale	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Wr Wrightsville	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Bn: Bienville	Fair	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
By: Boykin	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Ca: Cahaba	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Da: Darley	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
DE, DR: Darley	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Ea: Eastwood	Fair	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EO: Eastwood	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Fc: Flo	Poor	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Fn, FO: Forbing	Fair	Good	Good	Fair	Fair	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
Go: Gore	Fair	Good	Good	Fair	Fair	Good	Poor	Poor	Good	Fair	Poor.
GR: Gore	Poor	Fair	Good	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Gt: Gurdon	Fair	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Gu: Guyton	Fair	Fair	Fair	Fair	Fair	Good	Good	Good	Fair	Fair	Good.
GY*:											
Guyton	Poor	Fair	Fair	Fair	Fair	Poor	Good	Good	Poor	Fair	Good.
Ouachita	Poor	Fair	Fair	Good	Poor	Fair	Good	Fair	Fair	Good	Fair.
IU*:											
Iuka	Poor	Fair	Fair	Good	Good	Good	Poor	Poor	Fair	Good	Poor.
Dela	Poor	Fair	Fair	Good	Good	Good	Poor	Poor	Fair	Good	Poor.
Ko: Kolin	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Mh: Mahan	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	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
MN----------------- Mahan	Poor	Good	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Mp----------------- Malbis	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Ms----------------- Malbis	Fair	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Mt----------------- McLaurin	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MV----------------- McLaurin	Fair	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Pt*. Pits											
Re----------------- Ruple	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
RP----------------- Ruple	Poor	Good	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rs----------------- Ruston	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Sa----------------- Sacul	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
SC----------------- Sacul	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
SM----------------- Smithdale	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Wr----------------- Wrightsville	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Bn: Bienville	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: droughty.
By: Boykin	Slight	Slight	Slight	Slight	Slight.
Ca: Cahaba	Severe: cutbanks cave.	Slight	Slight	Slight	Slight.
Da: Darley	Moderate: cemented pan, too clayey.	Slight	Slight	Slight	Severe: small stones.
DE: Darley	Moderate: slope, cemented pan, too clayey.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: small stones.
DR: Darley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
Ea: Eastwood	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
EO: Eastwood	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: slope.
Fc: Flo	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: droughty.
Fn: Forbing	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
FO: Forbing	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.
Go: Gore	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
GR: Gore	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.
Gt: Gurdon	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Gu: Guyton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
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.
IU*:					
Iuka	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.
Dela	Moderate: flooding, wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Ko Kolin	Severe: wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
Mh Mahan	Moderate: too clayey.	Slight	Slight	Moderate: low strength.	Slight.
MN Mahan	Moderate: slope, too clayey.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
Mp Malbis	Moderate: wetness.	Slight	Slight	Slight	Slight.
Ms Malbis	Moderate: wetness.	Slight	Moderate: slope.	Slight	Slight.
Mt McLaurin	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: droughty.
MV McLaurin	Severe: cutbanks cave.	Slight	Moderate: slope.	Slight	Moderate: droughty.
Pt*. Pits					
Re Ruple	Moderate: cemented pan, too clayey.	Slight	Slight	Slight	Severe: small stones.
RP Ruple	Moderate: slope, cemented pan, too clayey.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: small stones.
Rs Ruston	Slight	Slight	Slight	Moderate: low strength.	Slight.
Sa Sacul	Moderate: too clayey, wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
SC----------------- Sacul	Moderate: too clayey, slope, wetness.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.
SM----------------- Smithdale	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
Wr----------------- Wrightsville	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness.	Severe: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Bn------------------ Bienville	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness.	Severe: seepage.	Fair: too sandy.
By------------------ Boykin	Slight-----------	Moderate: seepage, slope.	Slight-----------	Slight-----------	Good.
Ca------------------ Cahaba	Slight-----------	Severe: seepage.	Severe: seepage.	Slight-----------	Fair: thin layer.
Da------------------ Darley	Severe: percs slowly, cemented pan.	Severe: cemented pan, seepage.	Moderate: cemented pan, too clayey.	Severe: cemented pan.	Poor: cemented pan, small stones.
DE------------------ Darley	Severe: percs slowly, cemented pan.	Severe: slope, seepage, cemented pan.	Moderate: slope, cemented pan, too clayey.	Severe: cemented pan.	Poor: cemented pan, small stones.
DR------------------ Darley	Severe: slope, percs slowly, cemented pan.	Severe: slope, seepage, cemented pan.	Severe: slope.	Severe: slope, cemented pan.	Poor: cemented pan, small stones, slope.
Ea------------------ Eastwood	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight-----------	Poor: too clayey, hard to pack.
EO------------------ Eastwood	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
Fc------------------ Flo	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too sandy.
Fn------------------ Forbing	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight-----------	Poor: too clayey, hard to pack.
FO------------------ Forbing	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
Go------------------ Gore	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight-----------	Poor: too clayey, hard to pack.
GR------------------ Gore	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
Gt------------------ Gurdon	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Gu------------------ Guyton	Severe: wetness, percs slowly.	Slight-----------	Severe: wetness.	Severe: wetness.	Poor: wetness.
GY*:					
Guyton--------------	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Ouachita------------	Severe: flooding, percs slowly.	Severe: flooding.	Severe: flooding, seepage.	Severe: flooding.	Fair: too clayey.
IU*:					
Iuka----------------	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
Dela----------------	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Fair: wetness.
Ko------------------ Kolin	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
Mh------------------ Mahan	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight-----------	Fair: too clayey, hard to pack.
MN------------------ Mahan	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: slope, too clayey, hard to pack.
Mp, Ms-------------- Malbis	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Moderate: wetness.	Moderate: wetness.	Fair: wetness.
Mt, MV-------------- McLaurin	Slight-----------	Severe: seepage.	Slight-----------	Severe: seepage.	Good.
Pt*. Pits					
Re------------------ Ruple	Severe: percs slowly, cemented pan.	Severe: cemented pan.	Moderate: cemented pan, too clayey.	Severe: cemented pan.	Poor: cemented pan, small stones.
RP------------------ Ruple	Severe: percs slowly, cemented pan.	Severe: slope, cemented pan.	Moderate: slope, cemented pan, too clayey.	Severe: cemented pan.	Poor: cemented pan, small stones.
Rs------------------ Ruston	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Sa: Sacul	Severe: percs slowly, wetness.	Severe: wetness.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
SC: Sacul	Severe: percs slowly, wetness.	Severe: slope, wetness.	Severe: too clayey.	Moderate: slope, wetness.	Poor: too clayey, hard to pack.
SM: Smithdale	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey, slope.
Wr: Wrightsville	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Bn: Bienville	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
By: Boykin	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
Ca: Cahaba	Good	Probable	Improbable: too sandy.	Fair: too clayey.
Da, DE: Darley	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, too clayey, area reclaim.
DR: Darley	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, too clayey, area reclaim.
Ea, EO: Eastwood	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Fc: Flo	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
Fn, FO: Forbing	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Go, GR: Gore	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Gt: Gurdon	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Gu: Guyton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
GY*:				
Guyton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Ouachita	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
IU*:				
Iuka	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Dela	Good	Improbable: excess fines.	Improbable: excess fines.	Good.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Ko: Kolin	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
Mh, MN: Mahan	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Mp, Ms: Malbis	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Mt, MV: McLaurin	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Pt*. Pits				
Re, RP: Ruple	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, too clayey.
Rs: Ruston	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Sa, SC: Sacul	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
SM: Smithdale	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
Wr: Wrightsville	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Bn: Bienville	Severe: seepage.	Severe: piping, seepage.	Deep to water	Droughty, fast intake, slope.	Soil blowing	Droughty.
By: Boykin	Moderate: seepage.	Moderate: piping.	Deep to water	Slope, fast intake, soil blowing.	Soil blowing	Favorable.
Ca: Cahaba	Severe: seepage.	Moderate: thin layer, piping.	Deep to water	Favorable	Favorable	Favorable.
Da: Darley	Moderate: slope, cemented pan, seepage.	Moderate: thin layer.	Deep to water	Slope, fast intake, droughty.	Cemented pan	Cemented pan, droughty.
DE, DR: Darley	Severe: slope.	Moderate: thin layer.	Deep to water	Slope, fast intake, droughty.	Slope, cemented pan.	Slope, cemented pan, droughty.
Ea: Eastwood	Slight	Severe: hard to pack.	Deep to water	Slope, percs slowly, erodes easily.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
EO: Eastwood	Slight	Severe: hard to pack.	Deep to water	Slope, percs slowly, erodes easily.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
Fc: Flo	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, fast intake, droughty.	Soil blowing	Droughty.
Fn: Forbing	Moderate: slope.	Severe: hard to pack.	Deep to water	Percs slowly, slope, erodes easily.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
FO: Forbing	Severe: slope.	Severe: hard to pack.	Deep to water	Percs slowly, slope, erodes easily.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
Go: Gore	Moderate: slope.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, slope, erodes easily.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
GR: Gore	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, slope, erodes easily.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
Gt: Gurdon	Moderate: seepage.	Severe: piping, wetness.	Favorable	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
Gu Guyton	Moderate: seepage.	Severe: piping, wetness.	Percs slowly	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
GY*: Guyton	Moderate: seepage.	Severe: piping, wetness.	Percs slowly, flooding.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Ouachita	Slight	Severe: piping.	Deep to water	Erodes easily, flooding.	Erodes easily	Erodes easily.
IU*: Iuka	Moderate: seepage.	Severe: piping, wetness.	Flooding	Wetness, flooding.	Wetness	Wetness.
Dela	Severe: seepage.	Severe: piping.	Deep to water	Flooding	Favorable	Favorable.
Ko Kolin	Slight	Moderate: hard to pack, wetness.	Percs slowly	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Erodes easily, percs slowly.
Mh Mahan	Moderate: slope, seepage.	Moderate: hard to pack, thin layer, piping.	Deep to water	Slope	Favorable	Favorable.
MN Mahan	Severe: slope.	Moderate: hard to pack, thin layer, piping.	Deep to water	Slope	Slope	Slope.
Mp Malbis	Moderate: seepage.	Severe: piping.	Deep to water	Favorable	Favorable	Favorable.
Ms Malbis	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope	Favorable	Favorable.
Mt McLaurin	Severe: seepage.	Severe: piping.	Deep to water	Droughty	Favorable	Droughty.
MV McLaurin	Severe: seepage.	Severe: piping.	Deep to water	Slope, droughty.	Favorable	Droughty.
Pt*. Pits						
Re Ruple	Moderate: seepage, cemented pan, slope.	Moderate: piping.	Deep to water	Slope, droughty.	Cemented pan	Cemented pan, droughty.
RP Ruple	Severe: slope.	Moderate: piping.	Deep to water	Slope, droughty.	Slope, cemented pan.	Slope, cemented pan, droughty.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Rs---------------- Ruston	Moderate: seepage.	Severe: thin layer.	Deep to water	Favorable------	Favorable------	Favorable.
Sa---------------- Sacul	Slight---------	Severe: hard to pack.	Deep to water	Slope, percs slowly, wetness.	Percs slowly, wetness.	Percs slowly.
SC---------------- Sacul	Slight---------	Severe: hard to pack.	Deep to water	Slope, percs slowly, wetness.	Slope, percs slowly, wetness.	Slope, percs slowly.
SM---------------- Smithdale	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope----------	Slope----------	Slope.
Wr---------------- Wrightsville	Slight---------	Severe: wetness.	Percs slowly---	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, percs slowly.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
Bn-------------- Bienville	0-48	Loamy fine sand	SM	A-2-4, A-4	0	100	100	90-100	15-50	<25	NP-3
	48-75	Loamy fine sand, fine sandy loam, fine sand.	SM, ML	A-2-4, A-4	0	100	100	90-100	20-55	<25	NP-3
By-------------- Boykin	0-4	Loamy fine sand	SM	A-2-4, A-4	0	97-100	95-100	75-98	17-45	<25	NP-4
	4-22	Loamy fine sand	SM	A-2-4, A-4	0	97-100	95-100	70-98	17-45	<25	NP-4
	22-83	Fine sandy loam, sandy clay loam.	SC, CL	A-4, A-6, A-7-6	0	95-100	95-100	80-98	36-55	22-45	8-30
Ca-------------- Cahaba	0-10	Fine sandy loam	SM	A-4, A-2-4	0	95-100	95-100	65-90	30-45	---	NP
	10-37	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
	37-65	Sand, loamy sand, sandy loam.	SM, SP-SM	A-2-4	0	95-100	90-100	60-85	10-35	---	NP
Da, DE, DR------- Darley	0-10	Gravelly loamy fine sand.	SM, SM-SC, GM, GM-GC	A-1-B, A-2-4	0-5	55-80	40-70	35-65	10-30	<15	NP-5
	10-32	Clay, clay loam.	GC, SC, CL, MH	A-7-6, A-2-7	0-5	65-90	55-85	45-80	30-60	40-60	16-30
	32-44	Clay, gravelly clay, gravelly sandy clay.	GC, SC, CL, MH	A-7-6, A-2-7	3-15	40-70	35-60	30-60	25-55	40-60	16-30
	44-65	Sandy loam, fine sandy loam, sandy clay loam.	SM-SC, CL-ML, CL, SC	A-2-4, A-4, A-6, A-2-6	0-2	80-95	75-90	70-85	30-55	16-35	5-20
Ea, EO----------- Eastwood	0-6	Very fine sandy loam.	CL, SM-SC, CL-ML, ML	A-4, A-6	0	98-100	98-100	95-100	40-89	20-37	3-20
	6-25	Clay, silty clay	CH, CL	A-7-6	0	100	95-100	90-100	70-98	40-75	25-48
	25-52	Clay loam, silty clay loam, loam.	CL, CH	A-6, A-7-6	0	100	95-100	90-100	55-99	35-65	15-45
	52-75	Stratified fine sandy loam to shaly silty clay loam.	CL, SC, CL-ML, SM-SC	A-6, A-4, A-7-6	0	95-100	95-100	90-100	40-98	25-68	5-44
Fc--------------- Flo	0-25	Loamy fine sand	SM, SP-SM	A-2, A-3	0	98-100	95-100	85-100	5-35	<25	NP-3
	25-85	Loamy fine sand, fine sand.	SM	A-2, A-4	0	98-100	95-100	90-100	15-45	<25	NP-3
FO, Fn----------- Forbing	0-3	Silt loam--------	ML, CL-ML, CL	A-4	0	100	100	100	70-90	<30	NP-10
	3-17	Clay-------------	CH	A-7-6	0	100	100	95-100	85-100	51-76	26-50
	17-62	Clay-------------	CH	A-7-6	0	95-100	95-100	95-100	85-100	51-76	26-50
	62-85	Clay, silty clay	CH, CL	A-7-6	0	95-100	95-100	95-100	85-100	45-76	22-49
GR, Go----------- Gore	0-7	Silt loam--------	ML, CL-ML	A-4	0	100	100	95-100	60-90	<27	NP-7
	7-62	Clay, silty clay, silty clay loam.	CH	A-7-6	0	100	100	95-100	85-100	53-65	28-40
	62-85	Clay, silty clay.	CH	A-7-6	0	100	100	95-100	85-100	51-83	25-53

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	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	
Gt---------------- Gurdon	0-9	Silt loam--------	ML, CL-ML	A-4	0	100	95-100	90-100	70-90	<18	NP-5
	9-30	Silt loam, very fine sandy loam, loam.	ML, CL-ML, CL	A-4	0	100	95-100	90-100	75-90	<20	NP-10
	30-68	Silt loam, loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	100	95-100	90-100	75-90	18-30	5-15
Gu---------------- Guyton	0-21	Silt loam--------	ML, CL-ML	A-4	0	100	100	95-100	65-90	<27	NP-7
	21-30	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
	30-75	Silt loam, silty clay loam, clay loam.	CL, CL-ML, ML	A-6, A-4	0	100	100	95-100	50-95	<40	NP-18
GY*:											
Guyton----------	0-22	Silt loam--------	ML, CL-ML	A-4	0	100	100	95-100	65-90	<27	NP-7
	22-45	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
	45-65	Silt loam, silty clay loam, clay loam.	CL, CL-ML, ML	A-6, A-4	0	100	100	95-100	50-95	<40	NP-18
Ouachita--------	0-6	Silt loam--------	ML, CL-ML, CL	A-4	0	100	100	85-95	55-85	<30	2-10
	6-18	Silt loam, loam, very fine sandy loam.	ML, CL-ML, CL	A-4	0	100	100	85-95	55-85	<30	2-10
	18-69	Silt loam, loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	100	100	85-95	55-90	25-40	5-15
	69-81	Fine sandy loam, silt loam, loamy fine sand.	SM, ML, CL-ML, SM-SC	A-4, A-2	0	100	100	70-95	30-90	15-25	NP-7
IU*:											
Iuka------------	0-5	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
	5-60	Fine sandy loam, loam, silt loam.	SM, SM-SC, ML, CL-ML	A-4	0	95-100	85-100	65-100	36-75	<30	NP-7
Dela------------	0-12	Fine sandy loam	ML, CL, SM, SC	A-4	0	100	98-100	94-100	36-60	<30	NP-10
	12-65	Fine sandy loam, sandy loam, loam.	ML, CL, SM, SC	A-4	0	100	98-100	94-100	36-70	<30	NP-10
Ko---------------- Kolin	0-7	Silt loam--------	ML, CL-ML	A-4	0	100	100	85-100	60-85	<27	NP-7
	7-31	Silty clay loam, silt loam.	CL	A-6, A-7-6	0	100	100	95-100	85-97	30-46	11-22
	31-85	Clay, silty clay	CH	A-7-6	0	100	100	90-100	75-95	50-63	25-35
Mh, MN----------- Mahan	0-11	Fine sandy loam	SM, SM-SC, ML, SC	A-2-4, A-4	0-1	90-100	85-100	65-80	30-55	<25	NP-8
	11-43	Sandy clay loam, sandy clay, clay.	CL, MH, ML, CH	A-7-6, A-6, A-7-5	0-2	90-100	85-95	80-90	50-85	36-55	12-22
	43-75	Sandy loam, fine sandy loam, sandy clay loam.	SC, SM-SC, CL, CL-ML	A-4, A-6	0-2	90-100	85-95	65-85	35-55	16-35	4-18

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	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	
Mp, Ms----------- Malbis	0-7	Fine sandy loam	SM, ML	A-4	0	100	97-100	91-97	40-62	<30	NP-5
	7-23	Loam, sandy clay loam, clay loam.	CL-ML, CL	A-4, A-6	0	99-100	95-100	80-100	55-70	21-35	5-11
	23-55	Sandy clay loam, clay loam, loam.	ML, CL	A-4, A-6, A-7	0	98-100	96-100	90-100	56-80	29-49	4-15
	55-81	Sandy clay loam, clay loam.	ML, CL	A-4, A-5, A-6, A-7	0	98-100	96-100	90-100	56-80	30-49	4-15
Mt, MV----------- McLaurin	0-9	Loamy fine sand	SM	A-2	0	90-100	90-100	50-75	15-30	<20	NP-4
	9-60	Sandy loam, fine sandy loam, loam.	SM, SC, SM-SC	A-4	0	90-100	90-100	85-95	36-45	<30	NP-10
	60-72	Loamy fine sand, loamy sand, sandy loam.	SM	A-2, A-4	0	90-100	90-100	50-85	15-45	<20	NP-4
	72-90	Sandy loam, sandy clay loam, loam.	SC, ML, CL, SM	A-4, A-6	0	90-100	90-100	70-80	36-55	30-40	6-15
Pt*. Pits											
Re, RP----------- Ruple	0-6	Gravelly loam----	SM, SM-SC, GM-GC, GM	A-1-B, A-2-4	0-5	55-80	40-70	35-65	10-30	<30	NP-10
	6-28	Gravelly clay, gravelly sandy clay, clay.	GC, SM, MH, CL	A-7-5, A-7-6, A-6, A-2-6	1-10	45-75	40-65	30-60	25-55	33-60	11-27
	28-63	Stratified clay to sandy clay loam.	CL, GC, SC	A-6, A-7-6, A-2-6, A-2-7	3-15	40-70	35-60	30-60	25-55	30-50	11-27
Rs--------------- Ruston	0-5	Fine sandy loam	SM, ML	A-4, A-2-4	0	85-100	78-100	65-100	30-75	<20	NP-3
	5-38	Sandy clay loam, loam, clay loam.	SC, CL	A-6	0	85-100	78-100	70-100	36-75	30-40	11-20
	38-54	Fine sandy loam, sandy loam, sandy clay loam.	SM, ML, CL-ML, SM-SC	A-4, A-2-4	0	85-100	78-100	65-100	30-75	<27	NP-7
	54-85	Sandy clay loam, clay loam, sandy loam.	SC, CL	A-6	0	85-100	78-100	70-100	36-75	30-42	11-20
Sa, SC----------- Sacul	0-3	Fine sandy loam	SM, SM-SC	A-4, A-2	0	75-100	75-100	45-85	25-50	<25	NP-7
	3-12	Very fine sandy loam, fine sandy loam, loamy fine sand.	SM, ML, SM-SC, CL-ML	A-2, A-4	0	75-100	75-100	40-95	12-75	<30	NP-10
	12-51	Clay, silty clay, clay loam.	CH, CL, SC	A-7	0	85-100	85-100	70-100	40-95	45-70	20-40
	51-69	Clay loam, loam, sandy clay loam.	CL, SC	A-6, A-7, A-4	0	85-100	85-100	65-100	30-95	25-48	8-25
SM--------------- Smithdale	0-9	Fine sandy loam	SM, SM-SC	A-4, A-2	0	100	85-100	60-95	28-49	<20	NP-5
	9-39	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
	39-80	Loam, sandy loam	SM, ML, CL, SC	A-4	0	100	85-100	65-95	36-70	<30	NP-10

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Wr---------------- Wrightsville	0-17	Silt loam--------	ML, CL-ML, CL	A-4	0	100	95-100	90-100	70-100	<30	3-10
	17-60	Silty clay, clay, silty clay loam.	CH, CL	A-7, A-6	0	100	100	95-100	75-95	40-60	15-25
	60-88	Silty clay, clay.	CL, CH	A-7	0	100	100	95-100	75-95	40-60	15-25

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Bn---------------- Bienville	0-48	5-15	1.35-1.60	2.0-6.0	0.08-0.11	4.5-6.5	Low----------	0.20	5	.3-2
	48-75	5-20	1.35-1.80	2.0-6.0	0.08-0.13	4.5-6.0	Low----------	0.20		
By---------------- Boykin	0-4	3-10	1.40-1.60	6.0-20	0.07-0.11	4.5-6.5	Low----------	0.20	5	<1
	4-22	3-10	1.40-1.60	6.0-20	0.07-0.11	4.5-6.5	Low----------	0.20		
	22-83	18-30	1.45-1.70	0.6-2.0	0.13-0.17	4.5-6.0	Low----------	0.28		
Ca---------------- Cahaba	0-10	7-17	1.35-1.60	2.0-6.0	0.10-0.14	4.5-6.0	Low----------	0.24	5	.5-2
	10-37	18-35	1.35-1.60	0.6-2.0	0.12-0.20	4.5-6.0	Low----------	0.28		
	37-65	4-20	1.40-1.70	2.0-20	0.05-0.10	4.5-6.0	Low----------	0.24		
Da, DE, DR-------- Darley	0-10	2-15	1.35-1.70	6.0-20	0.07-0.11	4.5-6.5	Low----------	0.15	3	.5-4
	10-32	35-60	1.20-1.40	0.6-2.0	0.10-0.20	3.6-5.5	Low----------	0.24		
	32-44	35-60	1.20-1.40	0.2-0.6	0.10-0.20	4.5-5.5	Low----------	0.24		
	44-65	15-35	1.35-1.70	0.2-0.6	0.11-0.17	3.6-5.5	Low----------	0.28		
Ea, EO------------ Eastwood	0-6	3-18	1.20-1.60	0.6-2.0	0.13-0.20	4.5-6.5	Low----------	0.55	4	.5-1
	6-25	40-65	1.20-1.45	<0.06	0.12-0.18	3.6-5.5	Very high----	0.32		
	25-52	25-40	1.20-1.50	0.06-0.2	0.12-0.20	3.6-6.5	High---------	0.32		
	52-75	15-35	1.35-1.65	0.06-0.2	0.10-0.15	4.5-7.3	Moderate-----	0.37		
Fc---------------- Flo	0-25	1-6	1.35-1.60	6.0-20	0.05-0.09	4.5-6.0	Low----------	0.17	5	<1
	25-85	5-12	1.35-1.70	6.0-20	0.07-0.14	4.5-6.0	Low----------	0.17		
FO, Fn------------ Forbing	0-3	12-27	1.40-1.60	0.6-2.0	0.21-0.23	5.1-6.5	Low----------	0.49	5	.5-2
	3-17	60-85	1.20-1.60	<0.06	0.18-0.20	5.6-7.3	Very high----	0.32		
	17-62	60-85	1.20-1.60	<0.06	0.16-0.20	6.1-8.4	Very high----	0.32		
	62-85	50-85	1.20-1.60	<0.06	0.16-0.20	7.4-8.4	Very high----	0.32		
GR, Go------------ Gore	0-7	5-15	1.35-1.60	0.6-2.0	0.18-0.22	4.5-6.0	Low----------	0.49	5	.5-4
	7-62	27-60	1.20-1.65	<0.06	0.08-0.14	3.6-9.4	High---------	0.32		
	62-85	40-80	1.20-1.65	<0.06	0.08-0.14	3.6-8.4	High---------	0.32		
Gt---------------- Gurdon	0-9	5-15	1.25-1.60	0.6-2.0	0.13-0.24	3.6-6.0	Low----------	0.49	5	1-3
	9-30	10-18	1.25-1.55	0.6-2.0	0.13-0.24	3.6-6.0	Low----------	0.49		
	30-68	15-35	1.25-1.60	0.6-2.0	0.13-0.24	3.6-6.0	Low----------	0.49		
Gu---------------- Guyton	0-21	7-25	1.35-1.65	0.6-2.0	0.20-0.23	3.6-6.0	Low----------	0.43	5	.5-4
	21-30	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-6.0	Low----------	0.37		
	30-75	20-35	1.35-1.70	0.06-2.0	0.15-0.22	3.6-6.0	Low----------	0.37		
GY*:										
Guyton-----------	0-22	7-25	1.35-1.65	0.6-2.0	0.20-0.23	3.6-6.0	Low----------	0.43	5	.5-4
	22-45	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-6.0	Low----------	0.37		
	45-65	20-35	1.35-1.70	0.06-2.0	0.15-0.22	3.6-6.0	Low----------	0.37		
Ouachita---------	0-6	8-25	1.35-1.60	0.6-2.0	0.15-0.22	4.5-5.5	Low----------	0.37	5	1-3
	6-18	8-25	1.35-1.60	0.6-2.0	0.15-0.22	4.5-5.5	Low----------	0.37		
	18-69	18-35	1.35-1.60	0.2-0.6	0.15-0.22	4.5-5.5	Low----------	0.32		
	69-81	8-25	1.35-1.65	0.6-6.0	0.07-0.22	4.5-5.5	Low----------	0.24		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
IU*:										
Iuka	0-5	6-15	1.30-1.60	2.0-6.0	0.10-0.15	4.5-5.5	Low	0.24	5	.5-2
	5-60	8-18	1.30-1.60	0.6-2.0	0.10-0.20	4.5-5.5	Low	0.28		
Dela	0-12	5-18	1.30-1.60	2.0-6.0	0.10-0.15	5.1-6.5	Low	0.20	5	.5-2
	12-65	5-18	1.50-1.70	2.0-6.0	0.10-0.20	4.5-6.5	Low	0.32		
Ko Kolin	0-7	10-27	1.35-1.65	0.6-2.0	0.18-0.22	5.1-6.5	Low	0.49	5	.5-4
	7-31	20-35	1.35-1.65	0.2-0.6	0.18-0.22	4.5-7.8	Moderate	0.37		
	31-85	40-55	1.20-1.65	<0.06	0.15-0.18	4.5-8.4	High	0.32		
Mh, Mn Mahan	0-11	2-15	1.35-1.70	2.0-6.0	0.10-0.15	5.1-6.0	Low	0.28	5	.5-4
	11-43	35-60	1.30-1.70	0.6-2.0	0.12-0.18	4.5-6.0	Low	0.32		
	43-75	10-35	1.35-1.70	0.6-2.0	0.10-0.17	4.5-6.0	Low	0.28		
Mp, Ms Malbis	0-7	10-25	1.30-1.60	0.6-2.0	0.10-0.15	4.5-6.0	Low	0.24	5	.5-1
	7-23	18-33	1.30-1.70	0.6-2.0	0.12-0.20	4.5-5.5	Low	0.28		
	23-55	20-35	1.40-1.60	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.28		
	55-81	20-35	1.45-1.70	0.2-0.6	0.06-0.12	4.5-5.5	Low	0.28		
Mt, Mv McLaurin	0-9	1-5	1.30-1.70	6.0-20	0.05-0.10	4.5-5.5	Very low	0.17	5	.5-2
	9-60	10-18	1.40-1.60	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.20		
	60-72	5-15	1.30-1.70	2.0-6.0	0.05-0.10	4.5-5.5	Very low	0.20		
	72-90	5-27	1.40-1.60	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.20		
Pt*. Pits										
Re, RP Ruple	0-6	5-25	1.25-1.65	2.0-6.0	0.07-0.17	5.6-7.3	Low	0.17	3	1-6
	6-28	40-80	1.15-1.40	0.6-2.0	0.10-0.20	5.1-6.5	Low	0.24		
	28-63	30-80	1.10-1.40	0.2-0.6	0.07-0.17	4.5-6.5	Low	0.24		
Rs Ruston	0-5	5-20	1.30-1.70	0.6-2.0	0.09-0.16	4.5-6.5	Low	0.28	5	.5-3
	5-38	18-35	1.40-1.70	0.6-2.0	0.12-0.17	4.5-6.0	Low	0.28		
	38-54	10-20	1.30-1.70	0.6-2.0	0.12-0.15	4.5-6.0	Low	0.32		
	54-85	15-38	1.40-1.70	0.6-2.0	0.12-0.17	4.5-6.0	Low	0.28		
Sa, SC Sacul	0-3	5-20	1.30-1.50	0.6-2.0	0.09-0.12	4.5-5.5	Low	0.28	5	1-3
	3-12	2-25	1.40-1.60	0.6-2.0	0.07-0.17	4.5-5.5	Low	0.28		
	12-51	35-60	1.25-1.40	0.06-0.2	0.15-0.18	4.5-5.5	High	0.32		
	51-69	15-40	1.30-1.45	0.2-0.6	0.14-0.18	4.5-5.5	Low	0.28		
SM Smithdale	0-9	2-15	1.40-1.50	2.0-6.0	0.14-0.16	4.5-5.5	Low	0.28	5	.5-2
	9-39	18-33	1.40-1.55	0.6-2.0	0.15-0.17	4.5-5.5	Low	0.24		
	39-80	12-27	1.40-1.55	2.0-6.0	0.14-0.16	4.5-5.5	Low	0.28		
Wr Wrightsville	0-17	10-25	1.25-1.50	0.2-0.6	0.16-0.24	3.6-5.5	Low	0.43	5	.5-3
	17-60	35-55	1.20-1.45	<0.06	0.14-0.22	3.6-6.0	High	0.37		
	60-88	40-55	1.20-1.45	<0.06	0.14-0.22	6.6-8.4	High	0.37		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
Bn----------------- Bienville	A	None---------	---	---	4.0-6.0	Apparent	Dec-Apr	Low------	High.
By----------------- Boykin	B	None---------	---	---	>6.0	---	---	Moderate	High.
Ca----------------- Cahaba	B	None---------	---	---	>6.0	---	---	Moderate	Moderate.
Da, DE, DR-------- Darley	C	None---------	---	---	>6.0	---	---	High-----	High.
Ea, EO------------ Eastwood	D	None---------	---	---	>6.0	---	---	High-----	High.
Fc----------------- Flo	A	None---------	---	---	>6.0	---	---	Low------	Moderate.
Fn, FO------------ Forbing	D	None---------	---	---	>6.0	---	---	High-----	Low.
Go, GR------------ Gore	D	None---------	---	---	>6.0	---	---	High-----	Low.
Gt----------------- Gurdon	C	None---------	---	---	1.0-2.0	Apparent	Nov-Apr	High-----	High.
Gu----------------- Guyton	D	None---------	---	---	0-1.5	Perched	Dec-May	High-----	High.
GY*:									
Guyton-----------	D	Frequent----	Very brief to long.	Jan-Dec	0-1.5	Perched	Dec-May	High-----	High.
Ouachita---------	C	Frequent----	Very brief to long.	Jan-Dec	>6.0	---	---	Moderate	Moderate.
IU*:									
Iuka-------------	C	Frequent----	Very brief	Dec-Apr	1.0-3.0	Apparent	Dec-Apr	Moderate	High.
Dela-------------	B	Frequent----	Very brief	Dec-Apr	3.0-5.0	Apparent	Dec-Apr	Moderate	Moderate.
Ko----------------- Kolin	C	None---------	---	---	1.5-3.0	Perched	Dec-Apr	High-----	Moderate.
Mh, MN------------ Mahan	C	None---------	---	---	>6.0	---	---	High-----	High.
Mp, Ms------------ Malbis	B	None---------	---	---	2.5-4.0	Perched	Dec-Mar	Moderate	Moderate.
Mt, MV------------ McLaurin	B	None---------	---	---	>6.0	---	---	Low------	Moderate.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
Pt*. Pits									
Re, RP------------ Ruple	C	None--------	---	---	>6.0	---	---	High-----	High.
Rs---------------- Ruston	B	None--------	---	---	>6.0	---	---	Moderate	Moderate.
Sa, SC------------ Sacul	C	None--------	---	---	2.0-4.0	Perched	Dec-Apr	High-----	High.
SM---------------- Smithdale	B	None--------	---	---	>6.0	---	---	Low------	Moderate.
Wr---------------- Wrightsville	D	Rare--------	---	---	0.5-1.5	Perched	Dec-Apr	High-----	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--FERTILITY TEST DATA FOR SELECTED SOILS

(Analyses by the Soil Fertility Laboratory, Louisiana Agricultural Experiment Station. Dashes indicate data is not available.)

Soil name and sample number	Horizon	Depth	Organic matter content	pH 1:1 H_2O	Extractable phosphorus	Exchangeable cations: Ca	Mg	K	Na	Al	H	Total acidity	Cation-exchange capacity (sum)	Cation-exchange capacity (effective)	Base saturation (sum)	Saturation: Sum of cation-exchange capacity Na	Saturation: Effective cation-exchange capacity Al	Ca/Mg
		In	Pct		Ppm	Milliequivalents/100 grams of soil									Pct	Pct	Pct	
Bienville loamy fine sand:[1] (S88LA-119-006)	Ap	0-6	0.36	5.1	103	0.9	0.1	0.1	0.0	0.0	0.4	1.2	2.3	1.5	47.8	0.0	0.0	9.0
	E	6-28	0.01	6.0	39	1.0	0.2	0.0	0.0	0.0	0.0	0.0	1.2	1.2	100.0	0.0	0.0	5.0
	B/E	28-48	0.01	6.1	55	1.7	0.3	0.1	0.0	0.0	0.0	0.0	2.1	2.1	100.0	0.0	0.0	5.7
	Bt	48-75	0.01	5.8	47	1.3	0.1	0.1	0.0	0.0	0.4	0.6	2.1	1.9	71.4	0.0	0.0	13.0
Darley gravelly loamy fine sand:[1,2] (S88LA-119-014)	A1	0-5	1.00	5.1	28	1.0	0.3	0.1	0.0	0.0	0.2	4.8	6.2	1.6	22.6	0.0	0.0	3.3
	E	5-10	0.42	5.3	21	0.4	0.1	0.1	0.0	0.0	0.3	4.1	4.7	0.9	12.8	0.0	0.0	4.0
	Bt1	10-18	0.45	4.6	39	1.0	1.5	0.1	0.0	2.5	0.7	10.8	13.4	5.8	19.4	0.0	43.1	0.7
	Bt2	18-32	0.16	4.4	24	0.4	0.7	0.1	0.1	2.7	0.6	7.8	9.1	4.6	14.3	1.1	58.7	0.6
	Bt/Bsm	32-44	0.30	5.0	27	0.3	0.2	0.1	0.0	2.5	0.5	7.9	8.5	3.6	7.1	0.0	69.4	1.5
	BC	44-65	0.09	4.4	25	0.2	0.2	0.1	0.0	1.6	0.4	10.2	10.7	2.5	4.7	0.0	64.0	1.0
Dela fine sandy loam:[1,3] (S88LA-119-008)	Ap	0-5	1.18	5.6	27	5.9	0.6	0.2	0.0	0.0	0.2	6.6	13.3	6.9	50.4	0.0	0.0	9.8
	A1	5-12	0.63	5.9	20	4.6	1.0	0.1	0.0	0.0	0.4	5.4	11.1	6.1	51.4	0.0	0.0	4.6
	C1	12-24	0.19	5.9	17	3.9	0.4	0.1	0.0	0.0	0.6	4.8	9.2	5.0	47.8	0.0	0.0	9.8
	C2	24-42	0.01	5.3	21	3.4	0.6	0.1	0.0	0.4	0.6	5.4	9.5	5.1	43.2	0.0	7.8	5.7
	C3	42-65	0.01	4.8	13	1.1	0.5	0.1	0.0	3.4	0.6	8.4	10.1	5.7	16.8	0.0	59.6	2.2
Flo loamy fine sand:[1,4] (S88LA-119-011)	A	0-11	0.54	5.1	64	0.4	0.1	0.0	0.0	0.2	0.6	3.6	4.1	1.3	12.2	0.0	15.4	4.0
	E	11-25	0.11	6.1	52	0.6	0.2	0.0	0.0	0.0	0.2	2.3	3.1	1.0	25.8	0.0	0.0	3.0
	Bw	25-45	0.11	5.7	30	0.3	0.1	0.0	0.0	0.0	0.4	1.3	1.7	0.8	23.5	0.0	0.0	3.0
	Bt	45-61	0.16	5.4	30	0.4	0.1	0.0	0.0	0.0	0.2	1.0	1.5	0.7	33.3	0.0	0.0	4.0
	E & B	61-85	0.01	5.4	30	0.4	0.1	0.0	0.0	0.0	0.3	1.2	1.7	0.8	29.5	0.0	0.0	4.0
Gore silt loam:[1,5] (S88LA-119-004)	Ap	0-2	1.09	6.0	14	3.8	0.4	0.1	0.0	0.0	0.0	2.4	6.7	4.3	64.2	0.0	0.0	9.5
	B/E	2-7	0.54	5.0	9	2.6	0.7	0.2	0.0	1.1	0.3	4.2	7.7	4.9	45.5	0.0	22.4	3.7
	Bt1	7-15	0.11	4.8	21	6.0	2.4	0.3	0.1	6.7	0.3	12.0	20.8	15.8	42.3	0.5	42.4	2.5
	Bt2	15-25	0.03	4.8	21	5.8	2.9	0.3	0.1	8.3	0.5	14.4	23.5	17.9	38.7	0.4	46.4	2.0
	Bt3	25-38	0.01	4.9	21	4.6	3.1	0.4	0.2	8.1	0.9	14.4	22.7	17.3	36.6	0.9	46.8	1.5
	BC	38-62	0.01	4.4	39	8.5	6.4	0.6	0.6	10.4	0.6	16.8	32.9	27.1	48.9	1.8	38.4	1.3
	C	62-85	0.01	4.4	34	8.0	5.8	0.5	0.5	4.9	0.5	9.6	24.4	20.2	60.7	2.0	24.3	1.4

See footnotes at end of table.

TABLE 17.--FERTILITY TEST DATA FOR SELECTED SOILS--Continued

(Analyses by the Soil Fertility Laboratory, Louisiana Agricultural Experiment Station. Dashes indicate data is not available.)

Soil name and sample number	Horizon	Depth	Organic matter content	pH 1:1 H_2O	Extractable phosphorus	Exchangeable cations: Ca	Mg	K	Na	Al	H	Total acidity	Cation-exchange capacity (sum)	Cation-exchange capacity (effective)	Base saturation (sum)	Saturation: Sum of cation-exchange capacity Na	Effective cation-exchange capacity Al	Ca/Mg
		In	Pct		Ppm	----------Milliequivalents/100 grams of soil----------									Pct	Pct	Pct	
Guyton fine sandy loam:[1] (S88LA-119-013)	A	0-5	1.44	4.3	39	1.9	0.7	0.1	0.1	2.2	0.4	9.9	12.7	5.4	22.0	0.8	40.7	2.7
	Eg1	5-14	0.92	4.2	35	1.1	0.5	0.1	0.1	2.5	0.9	7.5	9.3	5.2	19.4	1.1	48.1	2.2
	Eg2	14-22	0.58	4.2	34	1.2	0.7	0.1	0.1	3.6	0.4	7.7	9.8	6.1	21.4	1.0	59.0	1.7
	B/E	22-45	0.36	4.1	42	4.9	2.4	0.2	0.5	4.3	0.7	9.8	17.8	13.0	44.9	2.8	33.1	2.0
	Btg	45-65	0.14	3.6	58	13.8	2.2	0.2	0.8	1.3	0.5	9.0	26.0	18.8	65.4	3.1	6.9	6.3
Iuka fine sandy loam:[1,6] (S88LA-119-007)	Ap	0-5	1.83	5.2	32	6.7	0.9	0.3	0.0	0.7	0.3	10.8	18.7	8.9	42.2	0.0	7.9	7.4
	A1	5-8	0.66	5.2	18	3.4	0.4	0.1	0.0	0.2	0.6	6.0	9.9	4.7	39.4	0.0	4.3	8.5
	C1	8-24	0.29	5.2	15	3.0	0.4	0.1	0.0	0.4	0.4	4.8	8.3	4.3	42.2	0.0	9.3	7.5
	Cg1	24-39	0.01	4.6	15	2.8	0.7	0.1	0.1	1.6	0.8	6.0	9.7	6.1	38.1	1.0	26.2	4.0
	Cg2	39-60	0.01	4.7	20	3.4	1.1	0.2	0.1	3.1	0.7	9.0	13.8	8.6	34.8	0.7	36.0	3.1
Mahan fine sandy loam:[1,7] (S88LA-119-015)	Ap	0-7	1.47	4.8	30	1.2	0.3	0.1	0.0	0.0	0.6	6.5	8.1	2.2	19.8	0.0	0.0	4.0
	E	7-11	0.55	5.1	22	0.9	0.2	0.1	0.0	0.0	0.3	4.9	6.1	1.5	19.7	0.0	0.0	4.5
	Bt1	11-23	0.53	5.1	46	1.0	2.7	0.1	0.0	0.0	0.4	7.8	11.6	4.2	32.8	0.0	0.0	0.4
	Bt2	23-35	0.24	5.2	39	0.7	2.1	0.1	0.0	0.0	0.8	6.6	9.5	3.7	30.5	0.0	0.0	0.3
	Bt3	35-43	0.13	4.8	28	0.8	1.3	0.1	0.0	5.4	0.6	7.1	9.3	8.2	23.7	0.0	65.9	0.6
Ouachita silt loam:[1,8] (S88LA-119-009)	A1	0-6	2.21	5.3	33	8.7	0.9	0.3	0.2	0.7	1.1	15.6	25.6	11.9	39.3	0.8	5.9	9.7
	E	6-18	0.30	4.7	35	3.3	0.4	0.1	0.1	3.6	1.0	12.6	16.5	8.5	23.6	0.6	42.4	8.3
	Bw1	18-30	0.05	4.6	27	1.3	0.4	0.1	0.1	7.2	1.2	14.4	16.3	10.3	11.7	0.6	69.9	3.2
	Bw2	30-41	0.01	4.5	22	1.0	0.4	0.2	0.1	7.4	1.4	15.6	17.3	10.5	9.8	0.6	70.5	2.5
	Bw3	41-69	0.01	4.6	18	0.9	0.3	0.3	0.1	6.8	0.8	12.6	14.2	9.2	11.3	0.7	73.9	3.0
	C	69-81	0.01	4.7	18	0.4	0.1	0.1	0.1	3.6	0.4	6.6	7.3	4.7	9.6	1.4	76.6	4.0
Ruston fine sandy loam:[1] (S88LA-119-002)	Ap	0-5	0.76	5.2	32	0.7	0.1	0.2	0.0	0.7	0.1	1.2	2.2	1.8	45.5	0.0	38.9	7.0
	Bt1	5-16	0.01	5.1	16	3.0	1.0	0.3	0.0	1.4	0.4	5.4	9.7	6.1	44.3	0.0	23.0	3.0
	Bt2	16-38	0.01	4.8	14	1.2	1.4	0.3	0.1	3.2	0.4	9.0	12.0	6.6	25.0	0.8	48.5	0.9
	B/E	38-54	0.01	5.0	12	0.3	1.0	0.2	0.1	3.6	0.4	7.2	8.8	5.6	18.2	1.1	64.3	0.3
	B't	54-77	0.01	4.9	11	0.2	1.0	0.3	0.1	4.5	0.5	6.0	7.6	6.6	21.1	1.3	68.2	0.2
	C	77-85	0.01	4.8	9	0.1	0.6	0.2	0.0	4.5	0.0	4.8	5.7	5.4	15.8	0.0	83.3	0.2

See footnotes at end of table.

TABLE 17.--FERTILITY TEST DATA FOR SELECTED SOILS--Continued

(Analyses by the Soil Fertility Laboratory, Louisiana Agricultural Experiment Station. Dashes indicate data is not available)

Soil name and sample number	Horizon	Depth	Organic matter content	pH 1:1 H_2O	Extractable phosphorus	Exchangeable cations: Ca	Mg	K	Na	Al	H	Total acidity	Cation-exchange capacity (sum)	Cation-exchange capacity (effective)	Base saturation (sum)	Saturation: Sum of cation-exchange capacity Na	Saturation: Effective cation-exchange capacity Al	Ca/Mg
		In	Pct		Ppm	Milliequivalents/100 grams of soil									Pct	Pct	Pct	
Smithdale fine sandy loam:[1]	A	0-6	0.89	5.1	34	0.8	0.1	0.1	0.0	0.2	0.3	3.0	4.0	1.5	25.0	0.0	13.3	8.0
(S88LA-119-016)	A/B	6-9	0.39	5.0	22	0.7	0.2	0.0	0.0	0.4	0.4	2.4	3.3	1.7	27.3	0.0	23.5	3.5
	Bt1	9-23	0.08	4.6	32	0.6	0.8	0.2	0.0	5.6	0.4	7.2	8.8	7.6	18.2	0.0	73.7	0.8
	Bt2	23-29	0.05	4.7	30	0.5	0.6	0.1	0.0	3.6	0.8	6.5	7.7	5.6	15.6	0.0	64.3	0.8
	Bt3	29-52	0.01	4.6	25	0.2	0.3	0.1	0.0	3.6	0.6	8.2	8.8	4.8	6.8	0.0	75.0	0.7
	Bt4	52-80	0.01	4.7	24	0.1	0.2	0.1	0.0	3.1	0.5	9.4	9.8	4.0	4.1	0.0	77.5	0.5
Wrightsville silt loam:[1]	A1	0-3	1.57	4.7	22	4.1	1.0	0.3	0.1	2.9	0.9	9.6	15.1	9.3	36.4	0.7	31.2	4.1
(S88LA-119-003)	Eg1	3-11	0.69	4.8	24	7.1	1.7	0.3	0.2	5.4	0.4	12.0	21.3	15.1	43.7	0.9	35.8	4.2
	Eg2	11-17	0.34	4.7	25	6.2	1.7	0.3	0.2	7.0	1.0	12.0	20.4	16.4	41.2	1.0	42.7	3.6
	B/E	17-26	0.12	4.8	22	7.8	2.5	0.6	0.5	8.3	0.7	9.6	21.0	20.4	54.3	2.4	40.7	3.1
	Btg1	26-36	0.01	4.7	28	10.4	3.5	0.4	0.9	6.8	0.8	13.2	28.4	22.8	53.5	3.2	29.8	3.0
	Btg2	36-60	0.01	4.4	34	13.6	4.5	0.5	1.4	4.9	0.5	4.8	24.8	25.4	80.6	5.6	19.3	3.0
	2C	60-88	0.01	7.8	113	25.7	6.2	0.4	2.7	0.0	0.0	1.2	36.2	35.0	96.7	7.5	0.0	4.1
SND:[9]																		
(S88LA-119-005)	Ap	0-6	0.40	5.6	11	1.6	0.2	0.5	0.0	0.0	0.4	1.2	3.5	2.7	65.7	0.0	0.0	8.0
	A/B	6-13	0.04	5.3	22	2.4	0.2	0.2	0.6	0.0	0.6	1.2	4.6	4.0	73.9	13.0	0.0	12.0
	Bt1	13-28	0.01	5.6	11	4.4	0.4	0.2	0.6	0.0	0.4	2.4	8.0	6.0	70.0	7.5	0.0	11.0
	Bt2	28-37	0.01	5.7	16	4.1	0.6	0.1	0.0	0.0	0.6	1.8	6.6	5.4	72.7	0.0	0.0	6.8
	BC	37-49	0.01	6.0	18	1.5	0.3	0.1	0.0	0.0	0.0	0.6	2.5	1.9	76.0	0.0	0.0	5.0
	C	49-66	0.01	5.9	8	0.8	0.2	0.1	0.0	0.4	0.4	0.6	1.7	1.9	64.7	0.0	21.1	4.0

[1] Pedon is the typical pedon of the series in the survey area.

[2] Pedon is closely similar to the Darley series, but the reaction of the Bt2 and BC horizons is 0.1 pH unit lower than allowed in the series range. This difference is within the normal error of observation.

[3] Pedon is closely similar to the Dela series, but the reaction of the C3 horizon is 0.3 pH unit lower than defined for the series. This difference is within the normal error of observation.

[4] Pedon is closely similar to the Flo series, but the reaction of the E horizon is 0.1 pH unit higher than allowed in the series range, and the base saturation at a depth of 72 inches below the surface of the soil is slightly less than 35 percent.

[5] Pedon is closely similar to the Gore series, but the reaction of the BC and C horizons is 0.1 pH unit lower than allowed in the series range. This difference is within the normal error of observation.

[6] Pedon is closely similar to the Iuka series, but the organic matter content in the A horizon is slightly higher than allowed in the series range. This difference is within the normal error of observation.

[7] Pedon is closely similar to the Mahan series, but the reaction of the Ap horizon is 0.3 pH unit lower than allowed in the series range. This difference is within the normal error of observation.

[8] Pedon is closely similar to the Ouachita series, but the organic matter content in the A horizon is slightly higher than allowed in the series range. This difference is within the normal error of observation.

[9] SND- Series not determined. This pedon classifies as fine-loamy, siliceous, thermic Typic Hapludalfs. It is mapped as a similar soil in map unit Ca, Cahaba fine sandy loam, 1 to 3 percent slopes.

TABLE 18.--PHYSICAL TEST DATA FOR SELECTED SOILS

(The symbol < means less than. Dashes indicate that analyses were not made)

Soil name and sample number	Horizon	Depth	Particle-size distribution: Sand: Very coarse (2-1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.10 mm)	Very fine (0.10-0.05 mm)	Total (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Water content: 1/3 bar	15 bar	Water retention	Bulk density: Air-dry	Oven-dry	Field moisture	COLE
		In	Pct								Pct (wt)			g/cm^3	g/cm^3	g/cm^3	
Gurdon silt loam:*[1] (S87LA-119-003)	Ap	0-9	0.2	0.2	0.7	12.0	17.3	30.4	65.1	4.5	25.6	3.9	21.7	1.47	1.47	1.44	---
	Bt1	9-18	0.3	0.1	0.1	9.4	17.8	27.7	58.5	13.8	25.0	6.4	18.6	1.55	1.55	1.49	---
	Bt2	18-30	0.2	0.1	0.1	9.3	17.2	26.9	58.5	14.6	25.7	6.9	18.8	1.69	1.70	1.60	---
	Bt3	30-45	0.4	0.1	0.1	7.8	14.9	23.3	58.9	17.8	27.6	8.1	19.5	1.65	1.67	1.58	---
	Btg1	45-58	0.1	0.1	0.1	9.4	17.9	27.6	57.0	15.4	26.5	7.6	18.9	1.81	1.81	1.73	---
	Btg2	58-68	0.0	0.1	0.3	8.1	15.2	23.7	50.4	25.9	31.7	12.8	18.9	1.86	1.88	1.75	---
Kolin silt loam:*[1,2] (S87LA-119-006)	A1	0-3	0.9	0.5	0.6	5.8	20.6	28.4	58.8	12.8	26.1	10.2	15.9	1.50	1.50	1.45	---
	E	3-7	0.4	0.6	0.6	5.7	21.2	28.5	58.3	13.2	33.1	19.2	14.9	1.68	1.68	1.63	---
	Bt1	7-14	0.3	0.3	0.2	3.7	14.1	18.6	49.0	32.4	35.6	20.1	15.5	1.75	1.75	1.58	---
	Bt2	14-23	0.3	0.3	0.2	3.0	16.3	20.1	49.3	30.6	35.9	20.1	15.8	1.77	1.76	1.59	---
	B/E	23-31	0.4	0.3	0.3	3.2	14.3	18.5	48.0	33.5	35.9	20.8	15.1	1.85	1.89	1.55	---
	B't1	31-48	0.1	0.1	0.2	3.1	14.2	17.7	37.9	44.4	36.9	22.2	14.7	1.90	1.94	1.56	---
	B't2	48-78	0.1	0.2	0.2	2.8	12.4	15.7	40.8	43.5	37.5	22.6	14.9	1.97	1.99	1.63	---
	B't3	78-85	0.0	0.1	0.1	1.1	4.9	6.2	55.3	38.5	36.0	20.8	15.2	1.82	1.83	1.67	---
Malbis fine sandy loam:*[1,3] (S87LA-119-007)	Ap	0-7	0.3	0.7	2.9	17.8	40.8	62.5	34.7	2.8	10.9	3.0	7.9	---	---	---	---
	B/E	7-13	0.1	0.6	1.8	11.8	27.9	42.2	43.9	13.9	18.1	6.1	12.0	1.65	1.66	1.62	---
	Bt1	13-19	0.4	0.5	1.3	8.5	21.5	32.2	37.7	30.1	27.1	12.0	15.1	1.58	1.63	1.52	---
	Bt2	19-23	0.4	0.5	0.8	8.5	21.8	32.0	38.8	29.2	27.0	11.5	15.5	1.65	1.66	1.58	---
	Btv1	23-39	0.4	0.5	1.2	8.2	20.7	31.0	34.8	34.2	28.7	14.3	14.4	1.69	1.73	1.65	---
	Btv2	39-55	0.3	0.3	0.8	6.6	19.0	27.0	32.9	40.1	30.3	16.3	14.0	1.74	1.75	1.66	---
	Bt5	55-70	0.1	0.1	0.6	5.2	21.8	27.8	33.5	38.7	30.4	16.2	14.2	1.71	1.74	1.65	---
	Bt6	70-81	0.0	0.1	0.2	5.5	37.7	43.5	26.0	30.5	27.0	12.5	14.5	1.75	1.80	1.69	---
McLaurin loamy fine sand:*[1,4] (S87LA-119-004)	Ap	0-4	0.1	0.5	9.8	68.8	5.5	84.7	13.7	1.6	6.6	3.0	3.6	1.64	1.65	1.62	---
	E	4-9	0.1	0.2	8.5	69.1	6.2	84.1	13.1	2.8	6.3	3.0	3.9	1.83	1.84	1.62	---
	BE	9-18	0.0	0.1	7.6	60.4	5.4	73.5	18.7	7.8	10.7	3.6	7.1	1.99	2.01	1.50	---
	Bt1	18-30	0.0	0.1	6.6	54.8	6.0	67.5	19.2	13.3	15.3	5.7	9.6	2.02	2.07	1.56	---
	Bt2	30-46	0.0	0.2	6.9	55.1	5.7	67.9	17.9	14.2	15.9	6.5	9.4	1.99	2.03	1.58	---
	Bt3	46-60	0.0	0.1	7.4	63.6	5.5	76.6	14.0	9.4	11.7	4.1	7.6	1.85	1.98	1.67	---
	B/E	60-72	0.0	0.1	8.4	66.2	5.2	79.9	13.0	7.1	7.7	3.0	4.7	1.97	1.98	1.78	---
	B't	72-90	0.0	0.0	5.6	68.7	9.8	84.1	11.4	4.5	7.2	2.7	5.0	---	---	---	---

See footnotes at end of table.

TABLE 18.--PHYSICAL TEST DATA FOR SELECTED SOILS--Continued

(The symbol < means less than. Dashes indicate that analyses were not made)

Soil name and sample number	Horizon	Depth	Particle-size distribution: Sand: Very coarse (2-1 mm)	Sand: Coarse (1-0.5 mm)	Sand: Medium (0.5-0.25 mm)	Sand: Fine (0.25-0.10 mm)	Sand: Very fine (0.10-0.05 mm)	Sand: Total (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Water content: 1/3 bar	Water content: 15 bar	Water retention	Bulk density: Air-dry	Bulk density: Oven-dry	Bulk density: Field moisture	COLE
		In	Pct								Pct (wt)			g/cm3	g/cm3	g/cm3	
Ruple gravelly loam:**[5]																	
(S82LA-119-001)	Ap	0-6	9.8	5.1	7.0	11.5	5.9	39.3	36.3	24.4	34.6	14.8	0.18	---	1.36	1.27	0.017
	Bt1	6-14	5.9	3.2	4.1	8.7	4.7	26.6	28.3	45.1	28.5	18.6	0.11	---	1.46	1.36	0.018
	Bt2	14-23	3.7	2.4	2.7	4.5	3.1	16.4	16.7	66.9	40.2	26.6	0.12	---	1.40	1.26	0.024
	Bt3	23-28	0.8	0.9	1.4	3.0	3.0	9.1	14.6	76.3	41.9	31.3	0.12	---	1.35	1.17	0.046
	Bsm/Bt1	28-42	8.5	4.5	2.4	3.0	2.7	21.1	16.0	62.9	43.1	31.1	0.13	---	1.23	1.17	0.015
	Bsm/Bt2	42-63	12.6	5.7	3.9	4.8	4.1	31.1	17.9	51.0	47.0	27.8	0.17	---	1.14	1.08	0.015
Ruston fine sandy loam:**[6]																	
(S87LA-119-008)	Ap	0-7	---	0.3	2.0	19.4	45.3	67.0	32.7	0.3	10.1	2.8	0.10	---	1.44	1.42	0.005
	E	7-14	---	0.2	1.5	18.5	40.3	60.5	37.2	2.3	11.2	1.7	0.16	---	1.67	1.67	---
	B/E	14-21	---	0.2	1.2	15.1	34.5	51.0	35.0	14.0	13.3	5.8	0.12	---	1.70	1.65	0.010
	Bt1	21-29	0.2	0.1	1.1	13.5	31.4	46.3	31.3	22.4	15.3	9.2	0.11	---	1.76	1.72	0.008
	Bt2	29-38	0.2	0.2	1.2	14.6	32.7	48.9	30.8	20.3	15.9	8.6	0.13	---	1.75	1.72	0.006
	B/E'	38-51	---	0.1	1.4	17.4	32.5	51.4	31.6	17.0	15.6	6.8	0.15	---	1.73	1.70	0.006
	B't1	51-64	---	0.1	1.4	20.1	32.6	54.2	29.2	16.6	12.3	7.2	0.09	---	1.79	1.77	0.004
	B't2	64-76	---	0.1	1.5	22.2	31.7	55.5	26.4	18.1	14.7	7.3	0.13	---	1.77	1.72	0.010
	B't3	76-88	0.1	0.1	1.6	22.5	34.3	58.6	26.0	15.4	14.2	6.5	0.13	---	1.74	1.71	0.006
Sacul fine sandy loam:*[1]																	
(S87LA-119-001)	A1	0-3	2.5	1.3	1.4	14.3	42.6	19.5	34.7	3.2	12.6	3.7	8.90	1.42	1.43	1.38	0.010
	E	3-12	2.1	0.6	0.6	13.9	37.3	17.2	42.1	3.4	12.4	2.7	9.70	1.58	1.65	1.57	0.020
	Bt1	12-22	0.5	0.2	0.2	4.0	13.9	4.9	26.3	54.9	40.3	22.6	17.70	1.68	1.68	1.34	0.080
	Bt2	22-36	0.6	0.3	0.1	2.1	10.9	3.1	36.7	49.3	34.4	21.0	13.40	1.65	1.66	1.47	0.040
	Bt3	36-51	3.1	0.5	0.2	4.7	18.7	8.5	31.9	40.9	32.9	17.9	15.00	1.72	1.74	1.57	0.030
	BC	51-69	0.9	0.5	0.3	36.7	27.1	38.4	11.6	22.9	21.8	10.1	11.70	1.72	1.74	1.55	0.000

See footnotes at end of table.

TABLE 18.--PHYSICAL TEST DATA FOR SELECTED SOILS--Continued

(The symbol < means less than. Dashes indicate that analyses were not made)

Soil name and sample number	Horizon	Depth	Particle-size distribution: Sand: Very coarse (2-1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.10 mm)	Very fine (0.10-0.05 mm)	Total (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Water content: 1/3 bar	15 bar	Water retention	Bulk density: Air-dry	Oven-dry	Field moisture	COLE
		In	Pct								Pct (wt)			g/cm^3	g/cm^3	g/cm^3	
SND:*[7]																	
(S87LA-119-005)	Ap	0-3	0.3	0.9	1.5	6.1	16.7	25.5	59.0	15.5	22.3	6.8	15.5	---	---	---	---
	Bt1	3-10	0.2	0.2	0.2	1.1	5.7	7.4	42.0	50.6	21.2	6.6	14.6	---	---	---	---
	Bt2	10-17	0.0	0.1	0.1	0.9	5.0	6.1	43.5	50.4	29.5	14.5	15.0	1.47	1.57	1.42	---
	Bt3	17-28	0.2	0.2	0.1	0.8	4.2	5.5	45.0	49.5	31.2	14.5	16.7	1.60	1.62	1.57	---
	Btku1	28-40	0.5	0.2	0.1	0.4	2.3	3.5	42.1	54.4	32.7	15.6	17.1	1.73	1.75	1.68	---
	Btku2	40-62	0.0	0.0	0.0	0.1	0.4	0.5	42.1	57.4	36.7	20.4	16.3	1.54	1.56	1.51	---
	BC	62-86	1.1	0.6	0.2	0.4	1.9	4.2	44.2	51.6	36.7	20.5	16.2	1.64	1.67	1.52	---
	B't	86-92	2.1	0.6	0.2	0.3	1.7	4.9	41.6	53.5	34.8	19.8	15.0	1.58	1.67	1.51	---

* Analyses by the Soil Characterization Laboratory, Agronomy Department, Louisiana Agricultural Experiment Station, Louisiana State University Agricultural Center.

**Analyses by the National Soil Survey Laboratory, Natural Resources Conservation Service.

[1] Pedon is the typical pedon for the series in the survey area.

[2] Pedon is closely similar to the Kolin series, but the organic matter content of the A horizon is slightly higher than the defined range for the series. This difference is within the normal error of observation.

[3] Pedon is closely similar to the Malbis series, but the clay content of the A horizon is slightly lower than allowed in the series range. This difference is within the normal error of observation.

[4] Pedon is closely similar to the McLaurin series, but the percent silt is slightly lower than the defined range for the series. This difference is within the normal error of observation.

[5] Pedon is the typical pedon for the official series description.

[6] Pedon is closely similar to the Ruston series, but the clay content of the A and E horizons is slilghtly lower than allowed in the series range. Also, it has more very fine sand in the B't horizons than allowed in the series range. Base saturation at the critical depth is slightly higher than allowed for the series. These differences are within the normal error of observation.

[7] SND- Series not designated. Pedon classifies as a clayey, montmorillonitic, thermic Typic Paleudult. It is mapped as an inclusion in map unit FO, Forbing silt loam, 5 to 12 percent slopes.

TABLE 19.--CHEMICAL TEST DATA FOR SELECTED SOILS

(Dashes indicate analyses not made. The symbol < means less than. TR indicates trace amounts of element)

Soil name and sample number	Horizon	Depth	Extractable cations: Ca	Mg	K	Na	Extractable acidity	Cation-exchange capacity (NH4OAc)	Base saturation (NH4OAc)	Organic carbon	pH 1:1 H_2O	pH 1:1 KCl	pH 1:2 $CaCl_2$	Extractable iron	Extractable aluminum	Extractable hydrogen	Available phosphorus: Bray 1	Bray 2
		In	Meq/100g				Pct	Pct		Pct				Pct	Meq/100g		Ppm	
Gurdon silt loam:*[1] (S87LA-119-003)	AP	0-9	3.0	0.5	0.1	0.2	6.6	3.3	115.2	0.84	5.0	3.9	4.7	0.1	0.2	0.4	49	73
	Bt1	9-18	2.3	0.7	0.1	0.2	7.8	3.7	89.2	0.15	4.7	3.5	4.4	0.1	1.6	0.4	<5	9
	Bt2	18-30	1.8	0.5	0.1	0.1	7.8	4.3	58.1	0.12	4.6	3.7	4.3	0.2	2.5	0.8	<5	<5
	Bt3	30-45	1.4	0.8	0.1	0.2	8.4	4.9	51.0	0.24	4.5	3.6	4.2	0.2	3.8	0.4	<5	<5
	Btg1	45-58	0.9	0.5	0.1	0.1	7.8	5.0	32.0	0.24	4.7	3.5	4.5	0.2	3.6	0.6	<5	<5
	Btg2	58-68	1.0	1.1	0.1	0.1	13.5	10.5	21.9	0.15	4.7	3.4	4.4	0.2	6.5	0.5	<5	<5
Kolin silt loam:*[1,2] (S87LA-119-006)	A1	0-3	0.8	0.6	0.1	0.3	6.0	6.1	29.5	1.60	5.7	4.9	5.2	0.2	0.0	0.2	45	56
	E	3-7	1.2	0.8	0.1	0.1	12.2	11.0	20.0	0.20	4.8	3.5	4.1	0.9	6.7	0.3	<5	<5
	Bt1	7-14	2.1	1.2	0.1	0.1	12.3	12.0	29.2	0.10	4.5	3.5	4.3	1.0	4.0	0.0	<5	<5
	Bt2	14-23	2.6	0.6	0.1	0.1	10.2	12.7	26.8	0.10	5.0	3.9	4.8	1.0	1.0	0.0	<5	<5
	B/E	23-31	12.3	10.3	0.1	0.1	3.6	23.3	97.9	0.20	7.6	6.6	7.1	1.3	---	---	<5	120
	B′t1	31-48	23.3	13.3	0.2	0.6	3.6	22.3	167.7	0.20	8.1	7.1	7.6	2.0	---	---	8	156
	B′t2	48-78	22.3	12.2	0.1	0.8	4.2	22.0	160.9	0.09	8.1	7.1	7.7	2.2	---	---	10	156
	B′t3	78-85	12.2	8.4	0.1	0.1	4.8	22.4	92.9	0.09	8.0	6.9	7.6	2.0	---	---	<5	160
Malbis fine sandy loam:*[1,3] (S87LA-119-007)	AP	0-7	0.1	0.4	0.1	0.0	7.2	3.8	15.8	0.70	4.5	4.0	4.1	0.4	0.4	0.6	110	120
	B/E	7-13	1.8	0.6	0.1	0.0	6.6	4.2	59.5	0.30	4.8	3.8	4.5	0.9	0.7	0.5	8	14
	Bt1	13-19	3.7	1.9	0.1	0.0	7.2	6.5	87.7	0.20	5.0	4.9	4.7	2.0	0.7	0.5	<5	<5
	Bt2	19-23	0.9	2.2	0.1	0.0	9.6	6.0	53.3	0.09	4.9	3.8	4.4	2.1	1.8	0.4	<5	<5
	Btv1	23-39	0.1	2.8	0.0	0.1	9.6	6.3	47.6	0.09	4.8	3.9	4.4	2.0	2.7	0.3	<5	<5
	Btv2	39-55	0.1	2.2	0.0	0.0	10.2	5.3	43.4	0.09	4.8	3.8	4.5	2.6	4.5	0.3	<5	<5
	Bt5	55-70	0.1	1.8	0.0	0.1	9.6	8.0	25.0	0.09	4.7	3.6	4.4	2.4	4.0	0.6	<5	<5
	Bt6	70-81	0.1	1.3	0.0	0.0	9.0	7.7	18.2	0.09	4.7	3.6	4.3	3.0	5.0	0.6	<5	<5
McLaurin loamy fine sand:*[1,4] (S87LA-119-004)	A	0-4	0.1	0.1	0.1	0.2	2.7	3.1	16.1	0.66	5.5	4.6	4.9	0.1	0.0	0.2	<5	7
	E	4-9	0.1	0.1	0.1	0.2	3.6	3.0	16.7	0.30	5.5	4.6	4.9	0.2	0.0	0.2	<5	6
	BE	9-18	0.1	0.1	0.2	2.5	3.0	18.1	16.0	0.30	5.4	4.4	4.9	0.5	0.0	0.2	<5	9
	Bt1	18-30	0.2	0.1	0.2	0.7	3.6	15.3	7.8	0.30	5.4	4.3	4.8	1.0	0.0	0.2	<5	<5
	Bt2	30-46	0.2	0.2	0.2	0.6	2.4	9.5	12.6	0.18	5.2	4.1	4.5	1.1	0.2	0.2	<5	7
	Bt3	46-60	0.1	0.1	0.2	0.1	1.5	7.1	7.0	0.01	5.2	4.3	4.5	1.2	0.2	0.2	<5	8
	B/E	60-72	0.1	0.1	0.1	0.2	6.0	8.0	6.3	0.01	5.3	4.2	4.2	1.3	0.0	0.2	<5	9
	B′t	72-90	0.1	0.1	0.0	0.0	3.0	1.4	14.3	0.01	5.2	4.1	4.1	1.3	0.2	0.2	<5	13

See footnotes at end of table.

TABLE 19.--CHEMICAL TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Extractable cations: Ca	Extractable cations: Mg	Extractable cations: K	Extractable cations: Na	Extractable acidity	Cation-exchange capacity NH$_4$OAc	Base saturation NH$_4$OAc	Organic carbon	pH 1:1 H_2O	pH 1:1 KCl	pH 1:2 $CaCl_2$	Extractable iron	Extractable aluminum	Extractable hydrogen	Available phosphorus: Bray 1	Available phosphorus: Bray 2
		In	Meq/100g				Pct	Pct		Pct				Pct	Meq/100g		Ppm	
Ruple gravelly loam:**[5] (S82LA-119-001)	AP	0-6	11.4	1.8	0.5	TR	10.1	18.7	73.0	2.88	6.1	5.5	6.1	10.5	0.6	---	---	---
	Bt1	6-14	5.6	1.5	0.3	0.1	8.6	12.0	62.0	0.62	6.2	5.4	5.9	17.6	1.1	---	---	---
	Bt2	14-23	6.4	2.9	0.3	0.1	10.2	14.6	66.0	0.46	6.1	5.6	5.9	17.2	1.2	---	---	---
	Bt3	23-28	7.1	4.1	0.3	0.1	9.7	16.6	70.0	0.33	6.1	5.6	5.8	18.5	1.4	---	---	---
	Bsm/Bt1	28-42	5.0	2.7	0.1	0.1	11.9	16.9	47.0	0.20	5.6	5.0	5.1	20.8	1.6	---	---	---
	Bsm/Bt2	42-60	2.9	1.8	0.1	0.1	12.5	13.4	37.0	0.18	5.5	5.0	5.3	18.1	1.4	---	---	---
Ruston fine sandy loam:**[6] (S87LA-119-008)	AP	0-7	2.5	0.6	---	0.1	2.6	3.5	91.0	1.24	5.6	---	5.0	0.2	0.1	---	---	---
	E	7-14	0.6	0.2	---	0.1	1.4	1.4	64.0	0.23	5.4	---	4.6	0.3	0.1	---	---	---
	B/E	14-21	2.2	0.5	TR	0.1	3.5	4.3	65.0	0.23	5.3	---	4.4	1.0	0.1	---	---	---
	Bt1	21-29	2.9	1.8	0.1	0.2	4.0	6.8	74.0	0.12	5.4	---	4.7	1.5	0.2	---	---	---
	Bt2	29-38	1.4	1.7	TR	0.1	4.4	6.0	53.0	0.12	5.1	---	4.3	1.5	0.2	---	---	---
	B/E'	38-51	0.6	1.1	---	0.1	3.2	4.5	40.0	0.07	5.0	---	4.2	1.2	0.2	---	---	---
	B't1	51-64	0.7	1.1	TR	0.2	5.1	4.7	43.0	0.04	4.9	---	4.2	1.2	0.2	---	---	---
	B't2	64-76	0.5	1.3	TR	0.1	4.0	4.8	40.0	0.09	4.9	---	4.2	1.2	0.1	---	---	---
	B't3	76-88	0.3	1.2	TR	0.2	3.7	4.3	40.0	0.04	4.9	---	4.1	1.0	0.1	---	---	---
Sacul fine sandy loam:*[1] (S87LA-119-001)	A1	0-3	0.3	0.3	0.0	0.0	7.2	5.4	11.1	1.11	4.6	3.7	3.6	0.3	1.4	0.2	<5	9
	E	3-12	0.4	0.2	0.0	0.0	2.4	3.0	20.0	0.21	5.0	3.9	4.0	0.4	0.5	0.1	<5	<5
	Bt1	12-22	1.0	4.8	0.2	0.1	19.2	16.3	37.4	0.30	4.7	3.7	3.5	2.0	9.4	0.0	<5	<5
	Bt2	22-36	0.5	3.8	0.1	0.5	22.2	19.0	25.8	0.12	4.7	3.6	3.5	2.4	14.4	0.2	<5	<5
	Bt3	36-51	0.7	3.0	0.3	1.2	19.8	18.8	27.7	0.12	4.6	3.5	3.6	2.5	13.9	0.1	<5	<5
	BC	51-69	0.4	1.2	0.1	0.4	12.0	10.0	21.0	0.18	4.5	3.4	3.7	2.9	8.5	0.1	<5	<5

See footnotes at end of table.

TABLE 19.--CHEMICAL TEST DATA FOR SELECTED SOILS--Continued

Soil name and sample number	Horizon	Depth	Extractable cations: Ca	Mg	K	Na	Extractable acidity	Cation-exchange capacity	Base saturation	Organic carbon	pH 1:1 H_2O	pH 1:1 KCl	pH 1:2 $CaCl_2$	Extractable iron	Extractable aluminum	Extractable hydrogen	Available phosphorus: Bray 1	Bray 2
								NH$_4$OAc	NH$_4$OAc									
		In	Meq/100g	Meq/100g	Meq/100g	Meq/100g	Pct	Pct	Pct	Pct				Pct	Meq/100g	Meq/100g	Ppm	Ppm
SND:*[7]																		
(S87LA-119-005)	AP	0-3	0.6	0.5	0.1	0.1	6.0	8.9	14.6	0.60	4.8	3.9	4.4	0.2	1.3	0.7	<5	<5
	Bt1	3-10	0.4	1.1	0.1	1.0	7.2	10.5	24.8	0.30	4.6	3.7	4.2	0.5	2.9	0.3	<5	<5
	Bt2	10-17	0.6	1.6	0.2	1.4	12.0	18.5	20.5	0.10	4.7	3.6	4.1	0.5	6.5	0.3	<5	<5
	Bt3	17-28	0.8	1.8	0.2	2.6	12.6	21.1	25.6	0.09	4.8	3.6	4.4	0.6	6.3	0.7	<5	<5
	Btku1	28-40	2.6	2.2	0.2	2.4	13.2	19.2	38.5	0.09	4.8	3.7	4.5	0.6	7.2	0.8	<5	<5
	Btku2	40-62	2.1	2.3	0.1	1.4	13.8	18.0	32.8	0.09	4.7	3.6	4.1	0.8	7.7	0.7	<5	<5
	BC	62-86	2.1	2.2	0.1	3.0	13.8	13.2	56.1	0.09	4.7	3.5	3.9	0.9	7.7	0.7	<5	<5
	B't	86-92	2.0	2.1	0.2	3.0	7.2	12.0	60.8	0.09	4.9	3.8	4.2	1.4	2.9	0.3	<5	<5

* Analyses by the Soil Characterization Laboratory, Agronomy Department, Louisiana Agricultural Experiment Station, Louisiana State University Agricultural Center.

**Analyses by the National Soil Survey Laboratory, Natural Resources Conservation Service.

[1] Pedon is the typical pedon for the series in the survey area.

[2] Pedon is closely similar to the Kolin series, but the organic matter content of the A horizon is slightly higher than the defined range for the series. This difference is within the normal error of observation.

[3] Pedon is closely similar to the Malbis series, but the clay content of the A horizon is slightly lower than allowed in the series range. This difference is within the normal error of observation.

[4] Pedon is closely similar to the McLaurin series, but the percent silt is slightly lower than the defined range for the series. This difference is within the normal error of observation.

[5] Pedon is the typical pedon for the official series description.

[6] Pedon is closely similar to the Ruston series, but the clay content of the A and E horizons is slightly lower than allowed in the series range. Also, it has more very fine sand in the B't horizons than allowed in the series range. These differences are within the normal error of observation.

[7] SND- Series not designated. Pedon classifies as a clayey, montmorillonitic, thermic Typic Paleudults. It is mapped as an inclusion in map unit FO, Forbing silt loam, 5 to 12 percent slopes.

TABLE 20.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Bienville	Sandy, siliceous, thermic Psammentic Paleudalfs
Boykin	Loamy, siliceous, thermic Arenic Paleudults
Cahaba	Fine-loamy, siliceous, thermic Typic Hapludults
Darley	Clayey, kaolinitic, thermic Typic Hapludults
Dela	Coarse-loamy, siliceous, nonacid, thermic Typic Udifluvents
Eastwood	Fine, montmorillonitic, thermic Vertic Hapludalfs
Flo	Sandy, siliceous, thermic Psammentic Paleudalfs
Forbing	Very-fine, montmorillonitic, thermic Vertic Paleudalfs
Gore	Fine, mixed, thermic Vertic Paleudalfs
Gurdon	Coarse-silty, siliceous, thermic Aquic Paleudults
Guyton	Fine-silty, siliceous, thermic Typic Glossaqualfs
Iuka	Coarse-loamy, siliceous, acid, thermic Aquic Udifluvents
Kolin	Fine-silty, siliceous, thermic Glossaquic Paleudalfs
Mahan	Clayey, kaolinitic, thermic Typic Hapludults
Malbis	Fine-loamy, siliceous, thermic Plinthic Paleudults
McLaurin	Coarse-loamy, siliceous, thermic Typic Paleudults
Ouachita	Fine-silty, siliceous, thermic Fluventic Dystrochrepts
Ruple	Clayey, oxidic, thermic Typic Rhodudults
Ruston	Fine-loamy, siliceous, thermic Typic Paleudults
Sacul	Clayey, mixed, thermic Aquic Hapludults
Smithdale	Fine-loamy, siliceous, thermic Typic Hapludults
Wrightsville	Fine, mixed, thermic Typic Glossaqualfs

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