SOIL SURVEY OF

Lawrence County, Mississippi

United States Department of Agriculture
Soil Conservation Service

In cooperation with
Mississippi Agricultural and Forestry
Experiment Station

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all who need the information, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in the period 1965–71. Soil names and descriptions were approved in 1972. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1971. This survey was made cooperatively by the Soil Conservation Service and the Mississippi Agricultural and Forestry Experiment Station. It is part of the technical assistance furnished to the Lawrence County Soil Conservation District.

Soil maps in this survey may be copied without permission, but any enlargement of these maps could cause misunderstanding of the detail of mapping and result in erroneous interpretations. Enlarged maps do not show small areas of contrasting soils that could have been shown at a larger mapping scale.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms, ranches, and woodlands; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All the soils of Lawrence County are shown on the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the "Index to Map Sheets."

On each sheet of the detailed map, soil areas are outlined and identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise it is outside, and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information. This guide lists all the soils of the county in alphabetic order by map symbol and gives the capability classification of each. It also shows the page where each soil is described and the page for the woodland group in which the soil has been placed.

Individual colored maps showing the relative suitability or degree of limitation of soils for many purposes can be developed by using the soil map and the information in the text. Transparent material can be laid over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those that have a moderate limitation can be colored yellow, and those that have a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the discussions of the mapping units.

Foresters and others can refer to the section "Woodland" where the soils of the county are grouped according to their suitability for trees.

Game managers and others can find information about soils and wildlife in the section "Wildlife."

Ranchers and others can find, under "Woodland," groupings of the soils according to their suitability for forage production, and also the names of many of the plants that grow on each site.

Engineers and builders can find, under "Engineering Uses of the Soils," tables that contain test data, estimates of soil properties, and information about soil features that affect engineering practices.

Community planners and others can read about soil properties that affect the choice of sites for dwellings and recreation areas in the section "Land Use Planning."

Scientists and others can read about how the soils formed and how they are classified in the section "Formation and Classification of the Soils."

Newcomers in Lawrence County may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the information about the county given in the section "General Nature of the County."

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SOIL SURVEY OF LAWRENCE COUNTY, MISSISSIPPI

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UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH THE MISSISSIPPI AGRICULTURAL AND FORESTRY EXPERIMENT STATION

LAWRENCE COUNTY is in the southwestern part of Mississippi (fig. 1). It has a land area of 277,120 acres, or 433 square miles. The county is 28 miles from north to south and 16 miles from east to west. The county is bordered on the north by Copiah and Simpson counties, on the east by Jefferson Davis County, on the south by Walthall and Marion Counties, and on the west by Lincoln County.

Beef cattle, timber, and row crops are the chief sources of agricultural income in Lawrence County. Dairying is a secondary source. Oil and other industry produce a large amount of income. The largest industrial installations in the county are a garment plant, a veneermill, a large papermill, and several sawmills. Many employees of industrial plants are also part-time farmers.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soils are in Lawrence County, where they are located, and how they can be used. The soil scientists went into the county knowing they were likely to find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes; the size and speed of streams; the kinds of native plants or crops; the kinds of rock; and various facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The *soil series* and the *soil phase* are the categories of classification most used in a local survey.

Soils that have profiles almost alike make up a soil series. Except for a different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Smithdale and Wanilla, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Lawrence County adjoins Lincoln and Walthall Counties, in Mississippi, for which soil surveys have been published. The soils on the soil map in the Lawrence

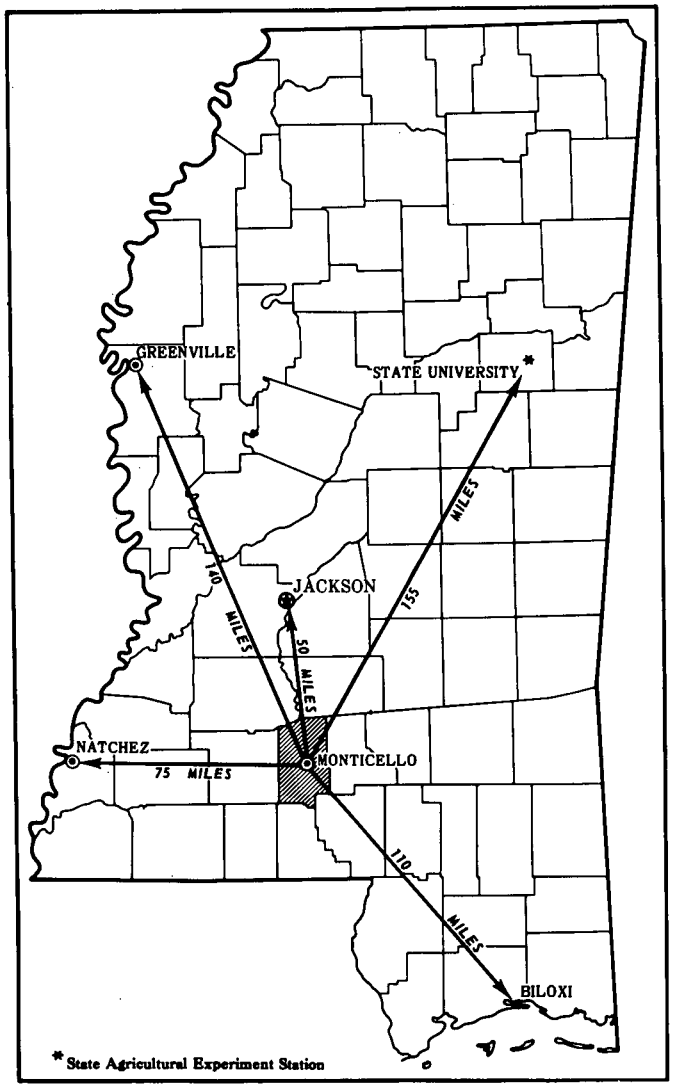

Figure 1.—Location of Lawrence County, in Mississippi.

County survey do not always join those on the soil map in the Lincoln County survey, which was published in 1963, and in the Walthall County survey, which was published in 1960, because series concepts have changed and mapping techniques have improved.

Soils of one series can differ in texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Ruston sandy loam, 2 to 5 percent slopes, is one of three phases within the Ruston series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The general soil map in the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series. Two such kinds of mapping units are shown on the soil map of Lawrence County: soil associations and undifferentiated groups.

A soil association is made up of adjacent soils that occur as areas large enough to be shown individually on the soil map but are shown as one unit because the time and effort of delineating them separately cannot be justified. There is a considerable degree of uniformity in pattern and relative extent of the dominant soils, but the soils may differ greatly from one another. The name of an association consists of the names of the dominant soils, joined by a hyphen. Cadeville-Freestone association is an example.

An undifferentiated group is made up of two or more soils that could be delineated individually but are shown as one unit because, for the purpose of the survey, there is little value in separating them. The pattern and proportion of soils are not uniform. An area shown on the map may be made up of only one of the dominant soils, or of two or more. The name of an undifferentiated group consists of the names of the dominant soils, joined by "and." Cadeville and Falkner soils, 4 to 8 percent slopes, is an example.

While a soil survey is in progress, samples of soils are taken, as needed, for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soil in other places are assembled. Data on yields of crops under defined management practices are assembled from farm records and from field or plot experiments on the same kinds of soil. Yields under defined management practices are then estimated for all the soils.

But only part of a soil survey is done when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in such a way as to be useful to different groups of users, among them farmers, foresters, and engineers.

On the basis of yield and practice tables and other data, the soil scientists set up trial groups. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others, and then adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Lawrence County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of land use. Such a map is a useful general guide in managing a watershed, a wooded tract, or a wildlife area; or in planning engineering works, recreational facilities, and community developments. It is not a suitable map for planning the management of a farm or field, or for selecting the exact location of a road, building, or similar structure, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect their management.

The six soil associations in Lawrence County are discussed in the following pages.

1. Smithdale-Lucy association

Well-drained, steep, loamy and sandy soils; on uplands

This association consists of soils on narrow ridgetops that are less than one-eighth mile wide and steep side slopes that are broken by numerous short drainageways. The stream valleys are generally less than one-eighth mile wide. This association is in the south-central part of the county. The major soils of this association formed in thick beds of loamy, acid material. This association makes up about 8 percent of the county. It is about 51 percent Smithdale soils and 37 percent Lucy soils. The remaining 12 percent is made up of Providence and Ruston soils on the broader ridgetops and Jena and Velda soils on the narrow flood plains.

Smithdale soils have a surface layer of dark grayish-brown sandy loam about 5 inches thick. The next layer, extending to a depth of 10 inches, is yellowish-red sandy loam. The next layer, extending to a depth of 40 inches, is yellowish-red sandy clay loam. The under

lying material, extending to a depth of 80 inches, is yellowish-red sandy loam.

Lucy soils have a surface layer of brown loamy sand about 4 inches thick. The subsurface layer, extending to a depth of 26 inches, is light yellowish-brown loamy sand. The next layer, extending to a depth of 36 inches, is yellowish-red sandy loam. The underlying material, extending to a depth of 72 inches, is red loam.

A commercial timber company owns and uses most of the land in this association, but a few small farms are scattered throughout. Most farmers derive a large part of their income from off-the-farm employment. One church-related recreational and training camp is in this association.

Most of this association is in pine on the slopes and ridgetops and hardwoods on the narrow flood plains. It is better suited to woodland and pasture than to other uses. Row crops should be grown on the few gently sloping soils of the ridgetops. Only the soils on the ridgetops are fairly well suited to residential and commercial development. The large wooded areas are suited to some recreational uses and are well suited to woodland wildlife habitat.

2. Guyton-Cahaba-Rosella association

Poorly drained and well-drained, nearly level, loamy soils that have a high content of silt in some places; on stream terraces and on uplands

This association consists of soils on terraces of the Pearl River. The terraces are 1 to 3 miles wide. The major soils of this association formed in loamy sediment on broad flats and nearly level terraces.

This association makes up about 19 percent of the county. It is about 26 percent Guyton soils, 23 percent Cahaba soils, and 15 percent Rosella soils. The remaining 36 percent is made up of Falkner, Paden, and Wanilla soils on broad flats; Alaga soils on sandy terraces; and Jena and Nugent soils near stream channels.

Guyton soils have a surface layer of grayish-brown silt loam about 2 inches thick. The subsurface layer, extending to a depth of 18 inches, is gray silt loam that has brownish mottles. The next layer, extending to a depth of 37 inches, is gray silt loam that has brownish mottles. The underlying material, extending to a depth of 65 inches, is gray silty clay loam that has brownish mottles.

Cahaba soils have a surface layer of dark-brown sandy loam about 10 inches thick. The next layer is 33 inches thick. In the upper 23 inches it is mainly red and yellowish-red sandy clay loam, and in the lower 10 inches it is yellowish-red sandy loam. The underlying material is 77 inches thick. In the upper 29 inches it is brownish loamy sand or sand, and in the lower 48 inches it is very pale brown sand.

Rosella soils have a surface layer of gray silt loam about 3 inches thick. The subsurface layer, extending to a depth of 12 inches, is light brownish-gray silt loam that has brownish mottles. The next layer, extending to a depth of 65 inches, is gray silt loam that has brownish mottles.

Farms in this association average about 160 acres in size, but there are several farms of 1,000 acres or more. Many farmers derive most of their income from off-the-farm employment. The town of Monticello is within this association, and one large wood-using plant is within the association.

Most of this association is used for row crops or pasture, and about 20 percent is in woodland. The wooded areas consist of poor stands of hardwoods and loblolly pine. This association is suited to most cultivated crops, to general farming and pasture, and to pine and hardwoods. Cahaba soils are suited to use as building or park sites or other nonfarm uses. Guyton and Rosella soils are not suited for most nonfarm uses because the soils are wet, have slow to very slow permeability, and have a seasonally high water table. The large wooded areas are suited to woodland wildlife habitat.

3. Jena-Rosebloom-Velda association

Well-drained and poorly drained, nearly level, loamy soils that have a high content of silt in some places; on flood plains

This association consists of soils on relatively wide flood plains broken by old meandering stream channels and oxbow lakes. It is along Pearl and Fair Rivers, and Bahala, Bear, Silver, and Whitesand Creeks.

This association makes up about 12 percent of the county. It is about 58 percent Jena soils, 11 percent Rosebloom soils, and 10 percent Velda soils. The remaining 21 percent is made up of Alaga, Arkabutla, Cahaba, Nugent, and Wanilla soils.

Jena soils have a surface layer of dark-brown fine sandy loam about 3 inches thick. The next layer is yellowish-brown fine sandy loam to a depth of 45 inches. The underlying material, extending to a depth of 72 inches, is yellowish-brown loamy fine sand.

Rosebloom soils have a surface layer of grayish-brown silt loam about 5 inches thick. The next layer, extending to a depth of 60 inches, is gray silty clay loam mottled with yellowish brown and strong brown.

Velda soils have a surface layer of dark yellowish-brown silt loam about 7 inches thick. The next layer is 36 inches thick. In the upper 9 inches it is dark yellowish-brown silt loam, and in the lower 27 inches it is yellowish-brown silt loam mottled with brown. Below this is dark-brown silt loam mottled with pale brown and 30 inches thick.

Part of this association is owned by commercial companies and private individuals and is used for the production of timber. Farms or parts of farms make up the rest. Many privately owned hunting and fishing camps are within the association.

Most of this association is in hardwoods, and about 20 percent is used for row crops and pasture. It is better suited to woodland and pasture than to other uses. Row crops should be grown only on well-drained soils in higher areas that are less frequently flooded. Because of the hazard of flooding, this association generally is not suited to use as building or park sites or similar uses. Jena and Velda soils on the higher places near streams are suited to recreational use. All of this association is suited to wildlife habitat and to fishing, and Rosebloom soils are well suited to wetland wildlife habitat.

4. Providence-Smithdale-Ruston association

Moderately well drained and well drained, gently slop-

ing to moderately sloping, loamy soils that have a fragipan and a high content of silt in some places; on uplands

This association consists of gently sloping soils on ridgetops that are ⅛ to ¼ mile wide and moderate to steep soils on side slopes that are broken by many short drainageways. The stream valleys are generally less than ⅛ mile wide. The association is in the northeastern corner, along the southeastern side, and in the central part of the southwestern section of the county. The major soils of this association formed in thick beds of loamy materials.

This association makes up about 32 percent of the county. It is about 44 percent Providence soils, 30 percent Smithdale soils, and 20 percent Ruston soils. The remaining 6 percent is made up of Paden and Saffell soils on uplands and Arkabutla and Jena soils in stream valleys.

Providence soils have a surface layer of dark-gray silt loam about 4 inches thick. The subsurface layer, extending to a depth of 9 inches, is light yellowish-brown and strong-brown silt loam. The next layer, extending to a depth of 32 inches, is mainly yellowish-red silty clay loam, but the lower few inches is more silty and has light yellowish-brown mottles. The next layer, extending to a depth of 58 inches, is a fragipan of yellowish-red to red loam that has pale-brown mottles. Below this, extending to a depth of 74 inches, is red sandy clay loam that has pale-brown mottles.

Smithdale soils have a surface layer of dark grayish-brown sandy loam about 5 inches thick. The next layer is 75 inches thick. In the upper 5 inches it is yellowish-red sandy loam, in the next 30 inches it is yellowish-red sandy clay loam, and in the lower 40 inches it is yellowish-red sandy loam.

Ruston soils have a surface layer of dark-brown sandy loam about 3 inches thick. The subsurface layer, extending to a depth of 6 inches, is brown sandy loam. The subsoil extends to a depth of 80 inches. In the upper 16 inches, it is yellowish-red clay loam and sandy clay loam, in the next 30 inches it is yellowish-red sandy loam that has brownish and reddish mottles, and in the lower 33 inches it is red sandy clay loam.

Farms in this association are about 100 acres in size. Most farmers derive a large part of their income from off-the-farm employment. The towns of New Hebron, Oakvale, and Silver Creek are within this association.

About 65 percent of this association is used for row crops or pasture. Wooded areas consist of pine on the slopes and hardwoods along the narrow valleys. The association generally is better suited to general farming and cattle than to other kinds of farming, but the Smithdale soils are better suited to pine timber. It is suited to most crops and pasture plants. Except for the steep soils, the soils in this association are fairly well suited to use as building or park sites and other nonfarm uses. On moderately sloping to steep soils, the slope is a limitation to nonfarm uses. The large wooded areas are suited to woodland wildlife habitat.

5. Cadeville-Falkner-Freestone association

Moderately well drained and somewhat poorly drained, moderately sloping to steep, loamy soils that have a clayey to loamy subsoil; on uplands

This association consists of moderate slopes on narrow ridgetops and strongly sloping to steep side slopes that are broken by short drainageways. The valleys are generally less than one-tenth mile wide. The association is in the north-central and northwestern part of the county. The major soils of this association formed in beds of clayey and loamy material.

This association makes up about 21 percent of the county. It is about 42 percent Cadeville soils, 9 percent Falkner soils, and 8 percent Freestone soils. The remaining 41 percent is made up of Paden, Providence, Saffell, and Smithdale soils.

Cadeville soils have a surface layer of silt loam about 5 inches thick. In the upper 3 inches it is very dark grayish brown, and in the lower 2 inches it is light yellowish brown. The next layer, extending to a depth of 12 inches, is red clay. The next layer, extending to a depth of 48 inches, is mottled light olive-gray and yellowish-red clay loam. Below this, extending to a depth of 72 inches, is gray clay loam that has brownish mottles.

Falkner soils have a surface layer of brown silt loam about 3 inches thick. The next layer, extending to a depth of 6 inches, is light yellowish-brown silt loam. The next layer, extending to a depth of 22 inches, is yellowish-brown silt loam that has a few light brownish-gray mottles in the lower 6 inches. The next layer, extending to a depth of 42 inches, is mottled strong-brown, light brownish-gray, and brown silty clay loam. Below this, extending to a depth of 80 inches, is mottled light brownish-gray, yellowish-brown, and yellowish-red clay and clay loam.

Freestone soils have a surface layer of dark grayish-brown sandy loam about 5 inches thick. The subsurface layer, extending to a depth of 9 inches, is brownish-yellow sandy loam. The next layer, extending to a depth of 23 inches, is strong-brown sandy clay loam that has light brownish-gray mottles. The next layer, extending to a depth of 43 inches, is mottled strong-brown, light brownish-gray, and reddish-yellow clay. The next layer, extending to a depth of 57 inches, is strong-brown clay that has light-gray and red mottles. Below this, extending to a depth of 72 inches, is mottled light-gray, brownish-yellow, and yellowish-red clay.

A large part of this association is owned by commercial timber companies, but there are a few farms scattered throughout. Farms average about 80 acres in size. Most farmers derive a large part of their income from off-farm employment. One large hunting camp is within the association.

Most of this association is in pine on the slopes and narrow ridgetops and hardwoods in the narrow valleys. This association is better suited to woodland than to other uses. Row crops and pasture should be grown only on the narrow ridgetops. The association is not suited to use as general building sites, park sites, or other nonfarm uses because of the clayey subsoil and the slope. The large wooded areas are suited to woodland wildlife habitat.

6. Providence-Paden association

Moderately well drained, nearly level to gently sloping, loamy soils that have a fragipan and a high content of silt; on uplands

This association consists of nearly level to gentle slopes on wide ridgetops and moderately sloping and steep side slopes broken by numerous short drainageways. The valleys are less than one-tenth mile wide. This association is in the southwestern part of the county. The major soils in this association formed in beds of loamy material.

This association makes up about 8 percent of the county. It is about 45 percent Providence soils and 38 percent Paden soils. The remaining 17 percent is made up of Smithdale, Falkner, Guyton, and Ruston soils on uplands and Arkabutla and Jena soils in valleys.

Providence soils have a surface layer of dark-gray silt loam about 4 inches thick. The subsurface layer, extending to a depth of 9 inches, is light yellowish-brown and strong-brown silt loam. The next layer, extending to a depth of 32 inches, is mainly yellowish-red silty clay loam, but the lower few inches is more silty and has light yellowish-brown mottles. The next layer is a fragipan, extending to a depth of 58 inches, of yellowish-red to red loam that has pale-brown mottles. Below this, extending to a depth of 74 inches, is red sandy clay loam that has pale-brown mottles.

Paden soils have a surface layer of dark grayish-brown silt loam about 3 inches thick. The subsurface layer, extending to a depth of 6 inches, is light yellowish-brown silt loam. The next layer, extending to a depth of 23 inches, is mainly yellowish-brown silt loam that has strong-brown mottles, but the lower few inches is mottled yellowish brown, strong brown, and light brownish gray. Below this is a fragipan that is 62 inches thick. In the upper 25 inches it is mottled yellowish-brown, light brownish-gray, and strong-brown silt loam. In the lower 36 inches it is loam mottled in shades of brown, gray, and red.

Farms in this association are about 160 acres in size. Most farmers derive a large part of their income from off-farm employment. The small town of Jayess is within this association.

About 60 percent of this association is used for row crops and pasture. Wooded areas consist of stands of pine on the slopes and ridgetops and of hardwood along the valleys. This association is suited to crops and pasture. It is fairly well suited to general building sites, park sites, or other nonfarm uses. The large wooded areas are suited to woodland wildlife habitat.

Descriptions of the Soils

This section describes the soil series and mapping units in Lawrence County. Each soil series is described in detail, and then, briefly, the mapping units in that series are described. Unless it is specifically mentioned otherwise, it is to be assumed that what is stated about the soil series holds true for the mapping units in that series. Thus, to get full information about any one mapping unit, it is necessary to read both the description of the mapping unit and the description of the series to which it belongs.

An important part of the description of each soil series is the soil profile, that is, the sequence of layers from the surface downward to underlying material. The profile of each series is described twice. The first description is brief and in terms familiar to a layman. The second is much more detailed and is for those who need to make thorough and precise studies of soils. The profile described is representative of mapping units in a series. If the profile of a given mapping unit is different from the one described for the series, the differences are apparent in the name of the mapping unit, or the differences are stated in describing the mapping unit. The description of each mapping unit contains suggestions on how the soil can be managed. Color terms are for moist soil unless otherwise stated.

Preceding the name of each mapping unit is a symbol. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of each description of a mapping unit is the capability unit and the woodland suitability group in which the mapping unit has been placed. The page where each capability unit or other interpretative group is described is listed in the "Guide to Mapping Units" at the back of this survey.

The acreage and proportionate extent of each mapping unit are shown in table 1. Many of the terms used in describing soils can be found in the Glossary, and more detailed information about the terminology and

TABLE 1.—*Approximate acreage and proportionate extent of the soils*

Soil	Area	Extent
	Acres	*Percent*
Alaga loamy sand, 0 to 5 percent slopes	2,495	0.9
Arkabutla soils, frequently flooded	1,315	.5
Cadeville-Freestone association, hilly	32,065	11.6
Cadeville and Falkner soils, 4 to 8 percent slopes	3,830	1.3
Cadeville and Falkner soils, 8 to 12 percent slopes	5,980	2.1
Cahaba sandy loam, 0 to 2 percent slopes	11,230	4.0
Cahaba sandy loam, 2 to 5 percent slopes	1,240	.4
Falkner silt loam, 0 to 3 percent slopes	2,945	1.0
Guyton silt loam	14,015	5.1
Jena fine sandy loam	4,795	1.7
Jena soils, frequently flooded	25,250	9.1
Nugent soils, frequently flooded	1,400	.5
Paden silt loam, 0 to 2 percent slopes	14,960	5.4
Providence silt loam, 0 to 2 percent slopes	1,100	.4
Providence silt loam, 2 to 5 percent slopes	38,345	13.8
Providence silt loam, 5 to 8 percent slopes	11,905	4.3
Rosebloom silt loam, frequently flooded	4,040	1.5
Rosella silt loam	8,060	2.9
Ruston sandy loam, 2 to 5 percent slopes	9,190	3.3
Ruston sandy loam, 5 to 8 percent slopes	5,415	2.0
Ruston sandy loam, 8 to 12 percent slopes	5,435	2.0
Saffell gravelly sandy loam, 2 to 5 percent slopes	460	.2
Saffell gravelly sandy loam, 12 to 17 percent slopes	2,605	1.0
Smithdale sandy loam, 15 to 30 percent slopes	29,920	10.8
Smithdale sandy loam, 15 to 30 percent slopes, severely eroded	1,845	.7
Smithdale-Lucy association, hilly	28,740	10.4
Velda silt loam	3,360	1.2
Wanilla silt loam	5,180	1.9
Total	277,120	100.0

methods of soil mapping can be obtained from the Soil Survey Manual (*12*).[1]

Alaga Series

The Alaga series consists of well-drained to somewhat excessively drained soils that formed in thick beds of sandy alluvium. Slope is 0 to 5 percent.

In a representative profile the surface layer is dark-brown loamy sand about 5 inches thick. The underlying material, to a depth of 80 inches, is yellowish-brown loamy sand in the upper 31 inches; brownish-yellow loamy sand that has pale-brown mottles below this; and yellowish-brown fine sand that has very pale brown mottles in the lower 20 inches.

Representative profile of Alaga loamy sand, 0 to 5 percent slopes, about 1½ miles east of Pearl River and 100 yards north of U.S. Highway 84, NW¼NW¼ sec. 24, T. 7 N., R. 21 W.

Ap—0 to 5 inches, dark-brown (10YR 4/3) loamy sand; single grained; very friable; many fine roots; strongly acid; clear, smooth boundary.

C1—5 to 36 inches, yellowish-brown (10YR 5/4) loamy sand; single grained; very friable; few fine roots; thin coatings on grains of sand; strongly acid; clear, smooth boundary.

C2—36 to 60 inches, brownish-yellow (10YR 6/6) loamy sand; single grained; very friable; few fine roots; few, medium, faint, pale-brown (10YR 6/3) mottles; coatings on grains of sand; strongly acid; clear, wavy boundary.

C3—60 to 80 inches, yellowish-brown (10YR 5/4) fine sand; single grained; very friable; few, fine, soft concretions surrounded by very pale brown (10YR 7/3) soil material; coatings on about 50 percent of grains of sand; very strongly acid.

The A horizon is dark grayish-brown, dark-brown, or grayish-brown loamy sand or loamy fine sand. The C horizon is light yellowish-brown, brownish-yellow, or yellowish-brown loamy sand, loamy fine sand, or fine sand. It may be stratified with sand or fine sand. In places the lower part of the C horizon has mottles in shades of brown. Some profiles contain soft concretions. The content of silt and clay between depths of 10 and 40 inches is 10 to 25 percent. The profile is medium acid to very strongly acid, except in a surface layer that has been limed.

Alaga soils are near Cahaba and Nugent soils. They do not have so red or so fine textured a B horizon as Cahaba soils. They do not have a stratified C horizon which is typical of Nugent soils.

AlB—Alaga loamy sand, 0 to 5 percent slopes. This soil is on stream terraces. It is well drained to somewhat excessively drained. Included in mapping are small areas of Cahaba and Nugent soils.

The soil is very strongly acid to medium acid. Permeability is rapid, and roots and air penetrate the soil easily. The available water capacity is low. Runoff is slow.

About 90 percent of this soil is used for forest, and the rest is used mostly for pasture. Early-maturing truck crops are suitable row crops. All crops and pasture plants respond to applications of fertilizer and lime. Because the soil is droughty, frequent, light applications of fertilizer are needed. The soil is easy to till and can be cultivated throughout a wide range of moisture content without crusting or packing. Erosion is not a hazard, and crops can be grown continuously. Capability unit IIIs–1; woodland suitability group 3s2.

Arkabutla Series

The Arkabutla series consists of somewhat poorly drained soils that formed in loamy alluvium that is high in content of silt. Slope is 0 to 2 percent.

In a representative profile the surface layer is about 5 inches of dark-brown silty clay loam. The next layer is about 12 inches of silty clay loam mottled in shades of gray and brown. The next layer is 16 inches of light brownish-gray silt loam mottled with yellowish brown and reddish brown. The next layer, to a depth of 70 inches, is gray silty clay loam that has few to common yellowish-brown mottles in the lower part.

Representative profile of Arkabutla soils, frequently flooded, SW¼ SW¼ sec. 22, T. 9 N., R. 21 W., in a wooded area.

A1—0 to 5 inches, dark-brown (10YR 4/3) silty clay loam; weak, medium, granular structure; friable; many fine roots; very strongly acid; abrupt, smooth boundary.

B21—5 to 17 inches, mottled light brownish-gray (10YR 6/2), grayish-brown (10YR 5/2), and dark grayish-brown (10YR 4/2) silty clay loam; weak, medium, subangular blocky structure; friable; common fine and medium roots; few reddish-brown (5YR 4/3) organic stains; few fragments of charcoal; very strongly acid; abrupt, smooth boundary.

B22g—17 to 33 inches, light brownish-gray (10YR 6/2) silt loam; common, medium, distinct, yellowish-brown (10YR 5/8) mottles and common, medium, prominent, reddish-brown (5YR 4/3) mottles; weak and moderate, medium, subangular blocky structure; friable; common medium and fine roots; few pockets that contain bedding planes in the lower part; firm; few fragments of charcoal; very strongly acid; clear, smooth boundary.

B23g—33 to 70 inches, gray (10YR 6/1) silty clay loam; few, fine, distinct, dark yellowish-brown mottles; weak, medium, subangular blocky structure; firm; common medium and fine roots; few fragments of charcoal; very strongly acid; clear, smooth boundary.

B24g—70 to 80 inches, gray (10YR 6/1) silty clay loam; common, medium, distinct, yellowish-brown (10YR 5/8) mottles; weak, medium, subangular blocky structure; firm; few fine roots; few black and brown concretions; few fragments of charcoal; very strongly acid.

The A horizon is dark-brown or dark grayish-brown silt loam, silty clay loam, or loam. The B21 horizon is mottled in shades of gray and brown or has a brown matrix that has many mottles in shades of gray. It is silt loam or silty clay loam. The Bg horizon is light brownish-gray or gray silt loam or silty clay loam that has few to common mottles of brown or yellow. The content of clay is 20 to 32 percent between depths of 10 and 40 inches. The profile is very strongly acid or strongly acid.

Arkabutla soils are near Jena, Rosebloom, and Velda soils. They have a more clayey and grayer B2 horizon than Jena and Velda soils. They are better drained than Rosebloom soils.

Ar—Arkabutla soils, frequently flooded. These soils are on flood plains of streams and are somewhat poorly drained. Slopes are 0 to 2 percent.

Included in mapping are small areas of Jena, Rosebloom, and Velda soils.

These soils are very strongly acid or strongly acid. Permeability is moderate, and the available water capacity is high. Depth to the seasonal high water table is about 15 inches. Runoff is slow. These soils flood frequently during spring and winter. Most areas receive runoff from higher areas.

[1] Italic numbers in parentheses refer to Literature Cited, p. 47.

About 95 percent of the acreage is used for woodland, and the rest is used for pasture. Pasture plants and hardwood and pine trees are suited to these soils. These soils are easy to till but crust and pack if they are cultivated. Surface drainage, proper tillage, and adequate fertilization are needed. Crops are not generally grown because of the hazard of flooding. If the flooding is controlled, good yields of commonly grown crops can be expected. Capability unit IVw–1; woodland suitability group 1w9.

Cadeville Series

The Cadeville series consists of moderately well drained soils that formed in clayey sediment. Slope is 4 to 30 percent or more.

In a representative profile the surface layer is 5 inches thick. It is very dark grayish-brown silt loam over light yellowish-brown silt loam. The subsoil, to a depth of 72 inches, is red clay in the upper 7 inches, mottled light olive-gray and yellowish-red clay loam below this, and gray clay loam mottled in shades of brown in the lower 24 inches.

Representative profile of Cadeville silt loam, in an area of Cadeville-Freestone association, hilly, SW¼ SW¼ sec. 1, T. 8 N., R. 21 W., in a large wooded area.

A1—0 to 3 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, medium, granular structure; friable; many fine roots; very strongly acid; abrupt, smooth boundary.

A2—3 to 5 inches, light yellowish-brown (10YR 6/4) silt loam; weak, medium, granular structure; friable; many fine roots; very strongly acid; abrupt, smooth boundary.

B21t—5 to 12 inches, red (2.5YR 4/6) clay; moderate, medium and fine, blocky structure; firm, plastic; common fine roots; shiny faces on peds; very strongly acid; clear, smooth boundary.

B22t—12 to 48 inches, mottled light olive-gray (5Y 6/2) and yellowish-red (5YR 4/8) clay loam; moderate, medium and fine, subangular blocky structure; firm, plastic, and sticky; few fine roots; shiny faces on peds; very strongly acid; gradual, smooth boundary.

B23t—48 to 60 inches, gray (5Y 6/1) clay loam; many, medium, prominent, yellowish-brown (10 YR 5/8) and strong-brown (7.5YR 5/8) mottles; moderate, medium, subangular blocky structure; firm, plastic, and sticky; shiny faces on peds; very strongly acid; gradual, smooth boundary.

B24t—60 to 72 inches, gray (5Y 6/1) clay loam; common, medium, prominent, yellowish-brown (10YR 5/8) mottles; moderate, medium, subangular blocky structure; firm, plastic, and sticky; very strongly acid.

The A horizon is silt loam, fine sandy loam, or loam. The A1 horizon is dark grayish brown, dark brown, grayish brown, dark gray, very dark grayish brown, or very dark gray. The A2 and Ap horizons are light yellowish brown, brown, light brownish gray, grayish brown, or yellowish brown. The B21t horizon is red or yellowish-red silty clay or clay. It has few to many mottles that have chroma of 2 or less, or it is mottled in shades of brown, gray, red, and yellow. The content of clay averages 35 to 60 percent in the upper 20 inches of the Bt horizon. The matrix of the B22t horizon is gray. The horizon has few to many mottles in shades of brown, red, and yellow or of brown, gray, red, and yellow. The B23t and B24t horizons are gray and have few to many mottles in shades of brown. The soil material is silty clay loam or clay loam. Some profiles have a C horizon of grayish silt loam within 60 inches of the surface. The profile is very strongly acid or strongly acid.

In Lawrence County, Cadeville soils have a base saturation of 35 to 50 percent at 50 inches below the upper boundary of the B2t horizon. This saturation is a few percentage points below the range defined for the series, but this difference does not alter use and management of the soils.

Cadeville soils are near Falkner and Freestone soils. They are finer textured in the upper part of the B2t horizon than Falkner and Freestone soils.

CFE—Cadeville-Freestone association, hilly. This association is on uplands. It consists of moderately well drained Cadeville silt loam and moderately well drained to somewhat poorly drained Freestone sandy loam. Slopes are 20 to 30 percent. The areas of this association generally are larger and more inclusive than areas of most mapping units in the county. The mapping has been controlled well enough for the intended use of the survey.

The Cadeville soil makes up about 63 percent of this association, and the Freestone soil about 15 percent. Included in mapping are a few areas of Falkner, Providence, and Saffell soils. The pattern and extent of Cadeville and Freestone soils are fairly uniform throughout the association. Each area of the association contains these soils and generally one or more of the less extensive soils.

The Cadeville soil in this association has the profile described as representative of the series. It is mostly on the middle and lower side slopes. It is very strongly acid or strongly acid. Permeability is very slow, and the available water capacity is high. Runoff is rapid, and the hazard of erosion is severe.

The Freestone soil in this association has the profile described as representative of the series. It is mostly on ridgetops and under side slopes. It is strongly acid. Permeability is slow, and the available water capacity is medium. Runoff is rapid, and the hazard of erosion is severe.

This association is used for woodland. Because of the steepness of slopes and the severe hazard of erosion, the soils are better suited to pine and other adapted trees than to cultivated crops. Capability unit VIIe–1; Cadeville soil in woodland suitability group 3c2, Freestone soil in woodland suitability group 2w8.

CgC—Cadeville and Falkner soils, 4 to 8 percent slopes. This undifferentiated group of soils is on uplands. It consists of moderately well drained Cadeville soils and somewhat poorly drained Falkner soils. The pattern and extent of Cadeville and Falkner soils are not uniform. Most areas contain both Cadeville and Falkner soils, but some areas are mainly Cadeville silt loam.

Cadeville soils make up about 55 percent of this mapping unit, and Falkner soils about 30 percent. Less extensive soils, including Providence and Paden soils, make up the rest.

Cadeville soils have a surface layer of dark grayish-brown silt loam about 3 inches thick over about 4 inches of light yellowish-brown silt loam. Below this is yellowish-red clay about 7 inches thick. The next layer is 18 inches of mottled yellowish-red, yellowish-brown, and light brownish-gray clay; 12 inches of light brownish-gray clay; 14 inches of light brownish-gray silty clay loam; and, to a depth of 92 inches light brownish-gray silt loam.

The Cadeville soils are very strongly acid or strongly acid. Permeability is very slow, and the available water

capacity is high. Runoff is medium, and the hazard of erosion is moderate.

Falkner soils have a surface layer of dark grayish-brown silt loam about 5 inches thick. The next layer is 22 inches of light yellowish-brown or yellowish-brown silt loam and 10 inches of light brownish-gray clay. Below this is silty clay loam, to a depth of 65 inches, that is light brownish-gray in the upper part and gray in the lower part.

The Falkner soils are strongly acid or very strongly acid. Permeability is slow, and the available water capacity is high. Runoff is medium, and the hazard of erosion is moderate.

About 50 percent of this mapping unit is used for pasture, and the rest is woodland. Because of the hazard of erosion, permeability, and general wetness, these soils are better suited to pasture and to trees, such as pine, than to cultivated crops. Capability unit IVe–1; Cadeville soils in woodland suitability group 3c2, Falkner soils in woodland suitability group 2w8.

CgD—Cadeville and Falkner soils, 8 to 12 percent slopes. This undifferentiated group of soils is on uplands. It consists of moderately well drained Cadeville soils and somewhat poorly drained Falkner soils. The pattern and extent of Cadeville and Falkner soils are not uniform. Most areas contain both Cadeville and Falkner soils, but some areas are mainly Cadeville soils.

Cadeville soils make up about 50 percent of this mapping unit, and Falkner soils about 22 percent. Included in mapping are a few areas of Providence silt loam.

Cadeville soils have a surface layer of dark grayish-brown silt loam about 4 inches thick over about 3 inches of light yellowish-brown silt loam. Below this is yellowish-red clay mottled with light brownish-gray 13 inches thick. The next layer is 20 inches of silty clay loam mottled with gray, yellow, and brown and, to a depth of 72 inches, light brownish-gray clay loam.

The Cadeville soils are very strongly acid to strongly acid. Permeability is very slow, and the available water capacity is high. Runoff is rapid, and the hazard of erosion is moderately severe.

Falkner soils have a surface layer of dark-grayish brown silt loam about 3 inches thick over about 3 inches of light yellowish-brown silt loam. The next layer is 26 inches thick and is yellowish-brown silt loam that has few to many mottles of strong brown and light brownish gray. Below this is 8 inches of light brownish-gray silty clay loam mottled with strong brown and yellowish-brown and, to a depth of 66 inches, mottled gray and yellowish-red silty clay.

The Falkner soils are very strongly acid or strongly acid. Permeability is slow, and the available water capacity is high. Runoff is rapid, and the hazard of erosion is moderately severe. A water table is perched at 15 to 30 inches below the surface for brief periods during winter and spring.

The soils of this mapping unit are mainly used for woodland, and because of the strong slopes and the moderately severe hazard of erosion, they are better suited to permanent vegetation than to cultivated crops. Capability unit VIe–1; Cadeville soils in woodland suitability group 3c2, Falkner soils in woodland suitability group 2w8.

Cahaba Series

The Cahaba series consists of well-drained soils on stream terraces. The soils formed in loamy and sandy alluvium (fig. 2). Slope is 0 to 5 percent.

In a representative profile the surface layer is dark-brown sandy loam 10 inches thick. The subsoil is 33 inches thick. In the upper 23 inches it is red to yellowish-red sandy clay loam, and in the lower 10 inches it is yellowish-red sandy loam. The underlying material, to a depth of 120 inches, is strong-brown loamy sand in the upper 9 inches, and light yellowish-brown to very pale brown sand in the lower 68 inches.

Representative profile of Cahaba sandy loam, 0 to 2 percent slopes, NE¼ NE¼ sec. 20, T. 6 N., R. 20 W., south of private road one-eighth mile east of river road.

Ap—0 to 6 inches, dark-brown (7.5YR 4/4) sandy loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; abrupt, smooth boundary.

A12—6 to 10 inches, dark-brown (7.5YR 4/4) sandy loam; weak, fine and medium, granular structure; very friable; many fine roots; strongly acid; clear, smooth boundary.

B1—10 to 14 inches, reddish-brown (5YR 4/4) sandy loam; weak, fine, subangular blocky structure; very friable; many fine roots; grains of sand are coated and bridged with clay; strongly acid; clear, smooth boundary.

B21t—14 to 22 inches, red (2.5YR 4/6) sandy clay loam; weak and moderate, fine and medium, subangular blocky structure; friable; common fine roots; few, thin, patchy films of clay; grains of sand coated and bridged with clay; strongly acid; clear, smooth boundary.

B22t—22 to 33 inches, yellowish-red (5YR 4/6) sandy clay loam; moderate, medium, subangular blocky structure; friable; common fine roots; few, thin, patchy films of clay; grains of sand coated and bridged with clay; strongly acid; clear, smooth boundary.

B3t—33 to 43 inches, yellowish-red (5YR 4/6) sandy loam; weak, fine and medium, subangular blocky structure;

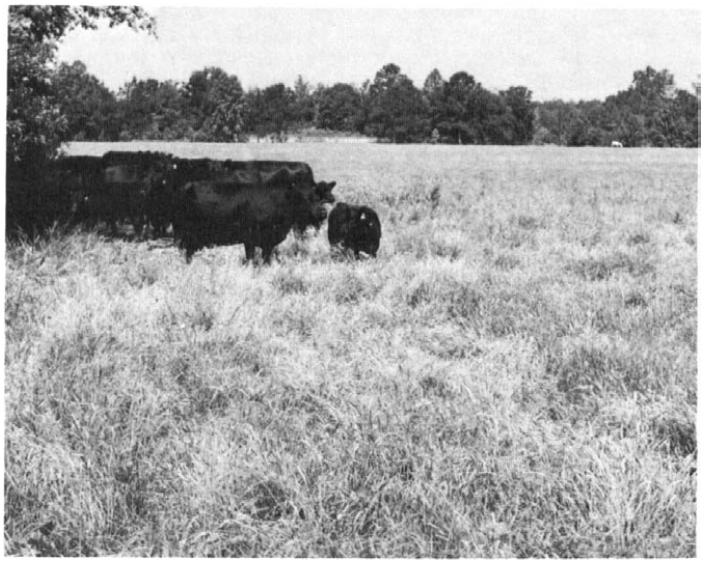

Figure 2.—Cattle grazing on bahiagrass in an area of Cahaba sandy loam, 0 to 2 percent slopes.

friable; few fine roots; grains of sand are coated and bridged with clay; strongly acid; gradual, smooth boundary.

C1—43 to 52 inches, strong-brown (7.5YR 5/6) loamy sand; single grained; very friable to loose; strongly acid; gradual, smooth boundary.

C2—52 to 72 inches, light yellowish-brown (10YR 6/4) sand; single grained; very friable to loose; strongly acid; gradual, smooth boundary.

C3—72 to 120 inches, very pale brown (10YR 7/3) sand; single grained; very friable to loose; few fine pebbles; strongly acid.

The A1 and Ap horizons are brown, dark brown, or dark yellowish brown. The A2 horizon, if any, is brown, yellowish brown, pale brown, or light yellowish brown. The Bt horizon is yellowish-red, reddish-brown, or red sandy clay loam, clay loam, loam, or sandy loam. The content of clay is 20 to 35 percent in the upper 20 inches of the Bt horizon. The C horizon is very pale brown, pale-brown, light yellowish-brown, brownish-yellow, or strong-brown loamy fine sand, fine sand, loamy sand, or sand. The profile is very strongly acid or strongly acid.

Cahaba soils are near Alaga and Lucy soils. They have a redder, finer textured B horizon than Alaga soils. They have a thinner, less sandy A horizon than Lucy soils.

ChA—Cahaba sandy loam, 0 to 2 percent slopes. This soil is on stream terraces and is well drained. It has the profile described as representative of the series. Included in mapping are small areas of Alaga soils.

This soil is very strongly acid or strongly acid. Permeability is moderate, and the available water capacity is medium. Runoff is slow, and the hazard of erosion is none to slight. Depth to the seasonal high water table is more than 60 inches.

About 90 percent of the average is cultivated or used for pasture, and the rest is in woodland. Cotton, corn, soybeans, small grains, truck crops, orchard plants, pecans, and hardwood and pine trees are suited to this soil. Erosion is not a hazard, and row crops can be grown continuously if good management practices are used. All crop and pasture plants respond to applications of fertilizer. The soil is easy to till and can be cultivated throughout a wide range of moisture content. Capability unit I–1; woodland suitability group 2o7.

ChB—Cahaba sandy loam, 2 to 5 percent slopes. This soil is on stream terraces and is well drained.

This Cahaba soil has a surface layer of brown sandy loam 12 inches thick. The next layer is yellowish-red sandy clay loam 27 inches thick. The underlying material is pale-brown and light yellowish-brown loamy sand and sand to a depth of 80 inches or more. Included in mapping are areas of Alaga soils.

The soil is very strongly acid or strongly acid. Permeability is moderate, and the available water capacity is medium. Runoff is slow, and the hazard of erosion is slight.

About 90 percent of this soil is cultivated or used for pasture, and the rest is in woodland. Cotton, corn, soybeans, small grains, truck crops, pecans, loblolly pine, cherrybark oak, and sweetgum are suited to this soil. All crop and pasture plants respond to applications of fertilizer. The hazard of erosion is slight if row crops are planted, but it is reduced by the use of contour tillage, supporting grassed waterways, strip-cropping, or parallel terraces. Capability unit IIe–1; woodland suitability group 2o7.

Falkner Series

The Falkner series consists of somewhat poorly drained soils that formed in a thin layer of silty material and the underlying clayey material. Slope is 0 to 12 percent.

In a representative profile the surface layer is silt loam about 6 inches thick. It is brown in the upper part and light yellowish brown in the lower part. The next layer extends to a depth of 80 inches. In the upper 14 inches, it is yellowish-brown silt loam that has a few light brownish-gray mottles in the lower 6 inches. Below this is mottled yellowish-brown, light brownish-gray, and brown silty clay loam. In the lower 38 inches is mottled light brownish-gray, yellowish-brown, and yellowish-red clay and clay loam.

Representative profile of Falkner silt loam, 0 to 3 percent slopes, on west side of State Highway 27 and approximately 1⅛ miles north of Wanilla intersection, SW¼ SW¼ sec. 18, T. 8 N., R. 11 E., in a wooded area.

Ap—0 to 3 inches, brown (10YR 5/3) silt loam; weak, medium, subangular blocky structure; friable; many fine roots; strongly acid; abrupt, smooth boundary.

A2—3 to 6 inches, light yellowish-brown (10 YR 6/4) silt loam; weak, fine, granular structure; friable; common fine roots; strongly acid; abrupt, smooth boundary.

B21t—6 to 16 inches, yellowish-brown (10YR 5/6) silt loam; weak and moderate, medium, subangular blocky structure; friable; few fine roots; patchy films of clay on faces of peds; very strongly acid; clear, smooth boundary.

B22t—16 to 22 inches, yellowish-brown (10YR 5/4) silt loam; few, fine, distinct, light brownish-gray mottles; moderate, medium and fine, subangular blocky structure; friable, slightly sticky; few fine roots; patchy films of clay on faces of peds; very strongly acid; clear, wavy boundary.

B23t—22 to 42 inches, mottled yellowish-brown (10YR 5/6), light brownish-gray (10YR 6/2), and brown (10YR 5/3) silty clay loam; moderate, medium, subangular blocky structure; firm, slightly sticky; films of clay on faces of peds; very strongly acid; clear, smooth boundary.

IIB24t—42 to 62 inches, coarsely mottled light brownish-gray (10YR 6/2), yellowish-brown (10YR 5/6), and yellowish-red (5YR 5/8) clay; moderate, medium and fine, subangular blocky structure; firm, sticky; few fine roots; patchy films of clay on faces of peds; very strongly acid; clear, smooth boundary.

IIB25t—62 to 80 inches, coarsely mottled light brownish-gray (10YR 6/2), yellowish-brown (10YR 5/6), and yellowish-red (5YR 4/8) clay loam; weak, medium, subangular blocky structure; firm, slightly sticky; patchy films of clay on faces of peds; very strongly acid.

The Ap horizon is brown, dark grayish brown, or grayish brown. The A2 horizon is light yellowish brown, pale brown, yellowish brown, or grayish brown. The B horizon is silt loam or silty clay loam. The B21t horizon is yellowish brown, pale brown, brownish yellow, or light yellowish brown and in places has gray mottles. The B22t and B23t horizons have a matrix color similar to that of the B21t horizon, and they have few to many gray mottles or are mottled in shades of brown, gray, red, and yellow. The IIB horizon is gray clay loam, silty clay, or clay. It has few to many mottles of brown, red, and yellow, or is mottled in shades of brown, gray, red, and yellow. The content of clay averages between 20 and 35 percent in the upper 20 inches of the B horizon. The profile is very strongly acid or strongly acid.

Falkner soils are near Cadeville, Paden, and Wanilla soils. They do not have a clayey upper part of the Bt horizon, but Cadeville soils do. They do not have the fragipan, but Paden soils do. They have a more clayey B horizon than Wanilla soils.

FaB—Falkner silt loam, 0 to 3 percent slopes. This soil is on uplands and stream terraces and is somewhat poorly drained. Included in mapping are small areas of Paden and Wanilla soils.

This soil is very strongly acid or strongly acid. Permeability is slow, and the available water capacity is high. Runoff is slow to medium. The seasonal high water table is within about 16 inches of the surface.

About 50 percent of this soil is used for row crops or pasture, and the rest is in woodland. Cotton, corn, soybeans, small grains, pasture plants, and adapted hardwoods and pine trees are suited to this soil. Surface drainage, arrangement of crop rows, proper tillage, and application of fertilizer are needed. Row crops can be grown continuously if good management practices are used. Capability unit IIIw–1; woodland suitability group 2w8.

Freestone Series

The Freestone series consists of moderately well drained to somewhat poorly drained soils that formed in a layer of loamy material and the underlying clayey material. Slope is 20 to 30 percent.

In a representative profile the surface layer is dark grayish-brown sandy loam about 5 inches thick. The subsurface layer is brownish-yellow sandy loam about 4 inches thick. The next layer, to a depth of 72 inches, is strong-brown sandy clay loam in the upper 14 inches and has a few light brownish-gray and pale-brown mottles; mottled strong-brown, pale-brown, light brownish-gray, and reddish-yellow clay in the next 20 inches; strong-brown clay that has red and light-gray mottles in the next 14 inches; and mottled light-gray, brownish-yellow, and yellow-red clay in the lower 15 inches.

Representative profile of Freestone sandy loam, in an area of Cadeville-Freestone association, hilly, 0.5 mile south of Tryus to pipeline, 100 feet northeast and 20 feet south of pipeline, SW¼SW¼ sec. 4, T. 8 N., R. 10 E.

A1—0 to 5 inches, dark grayish-brown (10YR 4/2) sandy loam; weak, medium, granular structure; friable; many fine roots; strongly acid; abrupt, smooth boundary.

A2—5 to 9 inches, brownish-yellow (10YR 6/6) sandy loam; weak, medium, subangular blocky structure; friable; many fine roots; strongly acid; abrupt, smooth boundary.

B21t—9 to 23 inches, strong-brown (7.5YR 5/6) sandy clay loam; few, fine, prominent, light brownish-gray and pale-brown mottles; moderate, medium, subangular blocky structure; firm; common fine roots; films of clay on faces of peds; common pockets and streaks of clean sand grains; strongly acid; clear, smooth boundary.

B22t—23 to 43 inches, mottled strong-brown (7.5YR 5/6), pale-brown (10YR 6/3), light brownish-gray (10YR 6/2), and reddish-yellow (5YR 6/6) clay; moderate, medium, subangular blocky structure; firm; few fine roots; films of clay on faces of peds; few pockets of clean sand grains; strongly acid; clear, smooth boundary.

B23t—43 to 57 inches, strong brown (7.5YR 5/6) clay; many, medium, prominent, red (2.5YR 4/8) and light-gray (10YR 7/1) mottles; moderate, medium, angular blocky structure; firm, slightly sticky; films of clay on faces of peds; few pockets of clean sand grains; strongly acid; clear, smooth boundary.

B24t—57 to 72 inches, mottled light-gray (10YR 7/1), brownish-yellow (10YR 6/6), and yellowish red (5YR 5/6) clay; moderate, medium, angular blocky structure; firm, patchy films of clay; slightly sticky; few pockets of clean sand grains; strongly acid.

The A horizon is fine sandy loam or sandy loam. The A1 and Ap horizons are grayish brown, dark grayish brown, brown, or pale brown. The A2 horizon is pale brown, brownish yellow, grayish brown, or light brownish gray. The B21t horizon is yellowish-brown or strong-brown clay loam, sandy clay loam, or loam. In most profiles it has few to many mottles that have chroma of 2 or less, or it is mottled in shades of brown and gray. The B22t, B23t, and B24t horizons are light brownish-gray, light-gray, or gray clay, clay loam, or silty clay loam and are prominently mottled in shades of red and yellowish brown or mottled in shades of gray, red, and yellow. Base saturation is 35 to 60 percent at 50 inches below the upper boundary of the B2t horizon.

Freestone soils are near Cadeville and Saffell soils. They have less clay in the upper 20 inches of the B2t horizon than Cadeville soils. They do not have a high content of gravel, but Saffell soils do.

Guyton Series

The Guyton series consists of poorly drained soils that formed in loamy sediment that is high in content of silt. The soils are on broad flats and in drainageways. Slope is 0 to 2 percent.

In a representative profile the surface layer is grayish-brown silt loam about 2 inches thick. The subsurface layer is gray silt loam that is mottled with yellowish-brown and is about 16 inches thick. The subsoil, to a depth of 65 inches, is gray silt loam in the upper 19 inches and has brownish mottles, and gray silty clay loam in the lower 28 inches, that has yellowish-brown mottles.

Representative profile of Guyton silt loam, ¾ mile west of Oma and north of gravel road, NW¼SW¼ sec. 25, T. 9 N., R. 10 E., in a large wooded area.

A1—0 to 2 inches, grayish-brown (10YR 5/2) silt loam; weak, fine and medium, granular structure; friable; many fine roots and root channels, some root channels filled with very dark grayish-brown (10YR 3/2) material; very strongly acid; clear, smooth boundary.

A21g—2 to 6 inches, gray (10YR 6/1) silt loam; few, fine, distinct, yellowish-brown mottles; weak, fine and medium, granular structure; friable; common fine roots and root channels; many pores and voids that appear to be uncoated; strongly acid; gradual, smooth boundary.

A22g—6 to 18 inches, gray (10YR 6/1) silt loam; common, medium and coarse, distinct, yellowish-brown (10YR 5/8) mottles; weak, fine and medium, granular structure; friable; common fine roots and root channels; many clean pores and voids; strongly acid; clear, irregular boundary.

B21tg—18 to 30 inches, gray (10YR 6/1) silt loam; many, medium, distinct, yellowish-brown (10YR 5/8) mottles; weak, fine and medium, subangular blocky structure; firm, slightly plastic; few fine roots; films of clay on faces of peds and in fine pores; few vertical tongues of silt ½ inch to 3 inches wide; strongly acid; gradual, wavy boundary.

B22tg—30 to 37 inches, gray (10YR 6/1) silt loam; many, coarse, distinct, yellowish-brown (10YR 5/8) and strong-brown (7.5YR 5/8) mottles; weak and moderate, fine and medium, subangular blocky structure; firm, slightly plastic; few fine roots; films of clay on faces of peds; few vertical tongues of silt ¼ inch to 2 inches wide; very strongly acid; gradual, wavy boundary.

B23tg—37 to 50 inches, gray (10YR 6/1) silty clay loam; few, fine, distinct, yellowish-brown mottles; moderate, medium, subangular blocky structure; firm, slightly

plastic; few fine roots and root channels; films of clay on both vertical and horizontal faces of peds; very strongly acid; gradual, smooth boundary.

B24tg—50 to 65 inches, gray (10YR 6/1) silty clay loam; common, coarse, distinct, yellowish-brown (10YR 5/6) mottles; moderate, fine and medium, subangular blocky structure; firm, plastic; few fine roots and root channels; films of clay on both vertical and horizontal faces of peds; very strongly acid.

The A horizon is 16 to 28 inches thick. The A1 or Ap horizon is dark grayish brown, grayish brown, or light brownish gray. The A2 horizon is gray, light gray, or light brownish gray. The Btg horizon is light-gray, gray, grayish-brown, or light brownish-gray silt loam or silty clay loam. Tongues of material from the A2 horizon extend into the Btg horizon. The content of clay is 18 to 35 percent in the upper 20 inches of the Btg horizon. The profile is very strongly acid or strongly acid.

In Lawrence County, the ratio of calcium to magnesium in Guyton soils is slightly higher than is defined as the range for the series. This difference does not alter the use and management of these soils.

Guyton soils are near Providence and Rosella soils. They are grayer and more poorly drained than Providence soils, and they lack a fragipan. Unlike Rosella soils, they lack a high content of sodium in the upper part of the B horizon.

Gu—Guyton silt loam. This soil is on flat terraces and in drainageways and is poorly drained. Slope is 0 to 2 percent. Included in mapping are small areas of Rosella soils.

The soil is very strongly acid or strongly acid. Permeability is very slow, and the available water capacity is high. Runoff is very slow. For several weeks late in winter and early in spring, most of the acreage is covered with water received from higher areas. Depth to a seasonal high water table is less than 15 inches.

Most of this soil is used for woodland, but a small acreage is used for pasture and row crops. Cotton, corn, soybean, pasture plants, and hardwood and pine trees are suited to this soil. The soil is easy to till, but it may crust and pack when cultivated. A system of open ditches helps to remove excess water. Row crops can be grown continuously if good management practices are used. Capability unit IIIw–2; woodland suitability group 2w9.

Jena Series

The Jena series consists of well-drained soils that formed in loamy alluvium. The soils are on flood plains of streams. Slope is 0 to 2 percent.

In a representative profile the surface layer, about 3 inches thick, is dark-brown fine sandy loam. The next layer, 42 inches thick, is yellowish-brown fine sandy loam. The underlying material, to a depth of 72 inches, is yellowish-brown loamy fine sand.

Representative profile of Jena fine sandy loam, north of Fair River and 100 feet west of gravel road, north side of bridge, SW¼SE¼ sec. 2, T. 7 N., R 10 E.

A1—0 to 3 inches, dark-brown (10YR 4/3) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; abrupt, smooth boundary.

B21—3 to 7 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; clear, smooth boundary.

B22—7 to 45 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak, medium, subangular blocky structure; very friable; common fine roots; strongly acid; clear, smooth boundary.

C—45 to 72 inches, yellowish-brown (10YR 5/4) loamy fine sand; weak, fine, granular structure and single grained; very friable to loose; few thin strata of pale-brown (10YR 6/3) loamy fine sand; few small quartz pebbles; strongly acid.

The A1 and Ap horizons are brown, dark-brown, or dark yellowish-brown sandy loam or fine sandy loam. The B2 horizon is dark yellowish-brown, yellowish-brown, or strong-brown loam, fine sandy loam, or sandy loam. The content of clay is less than 18 percent between depths of 10 and 40 inches. The C horizon is dark yellowish-brown, yellowish-brown, light yellowish-brown, pale-brown or light-gray fine sandy loam through loamy fine sand. In places the lower part contains quartz gravel. The profile is strongly acid or very strongly acid throughout except in a surface layer that has been limed.

Jena soils are near Arkabutla, Rosebloom, and Velda soils. They are not so gray as and are better drained than Arkabutla and Rosebloom soils. They have a higher content of sand and a lower content of silt than Velda soils.

Je—Jena fine sandy loam. This soil is on flood plains of streams and is well drained. This soil has the profile described as representative of the series. Slope is 0 to 2 percent. Included in mapping are small areas of Arkabutla, Rosebloom, and Velda soils.

The soil is very strongly acid or strongly acid. Permeability is moderate, and the available water capacity is medium. Runoff is slow. Depth to a seasonal high water table is more than 40 inches.

About 75 percent of the acreage is used for woodland, and the rest is used for row crops or pasture. Corn, cotton, small grains, soybeans, pasture plants, and hardwood and pine trees are suited to this soil. All crop and pasture plants respond to applications of fertilizer. The soil is easy to till and can be cultivated throughout a wide range of moisture content without crusting. Row crops can be grown continuously if good management practices are used. Capability unit I–2; woodland suitability group 1o7.

JN—Jena soils, frequently flooded. This undifferentiated group of soils is in the higher areas of the flood plains, which are ¼ mile to 2 miles wide. The soils are well drained. Oxbow lakes and old stream channels are common throughout the areas. Slope is 0 to 2 percent. The pattern and extent of Jena soils are not uniform. Some areas are mostly Jena soils, and some areas contain other soils. About 57 percent of this mapping unit is either Jena soils or closely similar soils. The other soils in this unit are similar to Jena except they are not as well drained and have more silt in the subsoil.

These soils have a surface layer of dark-brown fine sandy loam 4 inches thick. The next layer is yellowish-brown fine sandy loam 20 inches thick. Below this is pale-brown, stratified fine sandy loam and loamy sand.

Included with these soils in mapping are areas of Alaga and Velda soils at higher elevations and Arkabutla and Rosebloom soils on broad flats and in drainageways.

The Jena soils are very strongly acid or strongly acid. Permeability is moderate, and the available water capacity is medium. Runoff is slow. Depth to a seasonal high water table is more than 40 inches. Flooding occurs two or more times each year.

Most of the acreage is used for hardwood forest, but a small part is used for pasture. Minor areas of included soils are subject to flooding for long periods

each year and consequently are not suited to crops. Natural levees and other higher areas are subject to less frequent flooding for shorter periods of time and could produce crops and pasture. Adapted hardwoods and pine trees are suited to these soils. Capability unit Vw–1; woodland suitability group 1w8.

Lucy Series

The Lucy series consists of well-drained soils that formed in sandy and loamy material. Slope is 15 to 30 percent.

In a representative profile the surface layer, about 4 inches thick, is brown loamy sand. The subsurface layer, 22 inches thick, is light yellowish-brown loamy sand. The next layer, to a depth of 72 inches, is yellowish-red sandy loam in the upper 10 inches, and red loam in the lower 36 inches.

Representative profile of Lucy loamy sand, in an area of Smithdale-Lucy association, hilly, 3 miles northeast of Divide, NW¼NE¼ sec. 9, T. 5 N., R. 11 E.

A1—0 to 4 inches, brown (10YR 5/3) loamy sand; single grained; very friable; strongly acid; abrupt, smooth boundary.
A2—4 to 26 inches, light yellowish-brown (10YR 6/4) loamy sand; single grained; very friable; strongly acid; clear, smooth boundary.
B1—26 to 36 inches, yellowish-red (5YR 4/6) sandy loam; weak, medium, subangular blocky structure; grains of sand coated and bridged with clay; very friable; strongly acid; clear, smooth boundary.
B2t—36 to 72 inches, red (2.5YR 4/6) loam; moderate, medium, subangular blocky structure; grains of sand coated and bridged with clay; patchy films of clay on faces of peds; strongly acid.

The A horizon is loamy sand or loamy fine sand. The A1 horizon is brown, dark brown, or dark grayish brown. The A2 horizon is light yellowish brown, brownish yellow, yellowish brown, or strong brown. Some profiles have a yellowish-red A3 horizon. The B1 horizon is yellowish-red, red, or dark-red sandy loam, loam, or sandy clay loam. The B2t horizon is yellowish-red, red, or dark-red loam, clay loam, or sandy clay loam. The profile is very strongly acid or strongly acid.

Lucy soils are near Cahaba, Ruston, Saffell, and Smithdale soils. They have a thicker and sandier A horizon than those soils.

Nugent Series

The Nugent series consists of excessively drained soils that formed in sandy alluvium. Slope is 0 to 3 percent.

In a representative profile the surface layer is a dark grayish-brown sand about 4 inches thick. The underlying material, to a depth of 72 inches, is pale-brown sand in the upper part and stratified with thin layers of sandy loam. Below this is pale-brown gravelly sand. In the lower 29 inches it is pale-brown sand that has a few strata of loamy sand.

Representative profile of Nugent soils, frequently flooded, south of Fair River and ¼ mile east of gravel road, SE1/4SE1/4 sec. 2, T. 7 N., R. 10 E., in a wooded area.

A1—0 to 4 inches, dark grayish-brown (10YR 4/2) sand; single grained; very friable; many fine roots; strongly acid; abrupt, smooth boundary.
C1—4 to 39 inches, pale-brown (10YR 6/3) sand; single grained; loose; fine strata of sandy loam; few brown organic stains; strongly acid; clear, smooth boundary.
C2—39 to 43 inches, pale-brown (10YR 6/3) gravelly sand; single grained; loose; scattered black grains; many clean grains of sand; 20 percent quartz gravel; strongly acid.
C3—43 to 72 inches, pale-brown (10YR 6/3) sand; single grained; loose; few fine strata of loamy sand; strongly acid; clear, smooth boundary.

The A1 horizon is most commonly sand, but in some places it is loamy sand, fine sand, or sandy loam. It is dark grayish brown, grayish brown, brown, pale brown, or very pale brown. The C horizon is very pale brown, pale brown, or light yellowish-brown sand, gravelly sand, or loamy sand that has thin strata of loam, sandy loam, or silt loam. Some profiles may have thin layers that are brown, dark yellowish brown, or yellowish brown at variable depths.

Nugent soils are near Alaga soils. Unlike Alaga soils, they have fine stratification in the upper 20 inches.

Nu—Nugent soils, frequently flooded. This undifferentiated group of soils is on flood plains of streams. These soils are excessively drained. They have a surface layer that ranges from sand to sandy loam in texture. Slope is 0 to 3 percent. Included in mapping are small areas of Alaga soil and gravelly, sandy soil.

Nugent soils are very strongly acid to medium acid. Permeability is rapid, and the available water capacity is low. Runoff is slow. Flooding is frequent.

Most of the acreage has sparse vegetation, but a few areas have hardwood trees. In a few areas, gravel is near the surface in sufficient quantity to mine, and sand and gravel are mined in some of these areas. Because of the hazard of frequent flooding and because of droughtiness, these soils are best suited to trees. Suitable trees are adapted hardwood and pine trees. Capability unit Vw–2; woodland suitability group 2s8.

Paden Series

The Paden series consists of moderately well drained soils that have a fragipan (fig. 3). The soils formed in silty material and the underlying loamy sediment. They are on stream terraces or uplands. Slope is 0 to 2 percent.

In a representative profile the surface layer is dark grayish-brown silt loam about 3 inches thick. The subsurface layer is light yellowish-brown silt loam 3 inches thick. The next layer, 12 inches thick, is yellowish-brown silt loam that has strong-brown mottles. Below this, to a depth of 85 inches, is a fragipan. In the upper 5 inches it is mottled yellowish-brown, strong-brown, and light brownish-gray silt loam. In the next 25 inches it is mottled yellowish-brown, light brownish-gray, and strong-brown silt loam. In the lower 37 inches it is loam mottled in shades of brown, gray, and red.

Representative profile of Paden silt loam, 0 to 2 percent slopes, about 100 feet south of a gravel road and ¼ mile east of road intersection, NE¼ SW¼ sec. 14, T. 6 N., R. 20 W., in a wooded area.

A1—0 to 3 inches, dark grayish brown (10YR 4/2) silt loam; weak, fine, granular structure; friable; many fine roots; few fine pores; very strongly acid; abrupt, smooth boundary.
A2—3 to 6 inches, light yellowish-brown (10YR 6/4) silt loam; weak, medium, granular structure; friable; many

Figure 3.—Small grain on Paden silt loam, 0 to 2 percent slopes.

fine roots; few fine pores; very strongly acid; abrupt, smooth boundary.

B2—6 to 18 inches, yellowish-brown (10YR 5/8) silt loam; few, fine, prominent, strong-brown mottles; pockets of pale-brown (10YR 6/3), uncoated grains of sand; moderate, medium, subangular blocky structure; friable; common fine roots; few patchy films of clay; few concretions; many pores; very strongly acid; clear, wavy boundary.

B'x1&A'2—18 to 23 inches, mottled yellowish-brown (10YR 5/8) and strong-brown (7.5YR 5/8) silt loam; A'2 material is light yellowish-brown (10YR 6/4) and light brownish-gray (10YR 6/2) silt loam between peds and on faces of peds; moderate, medium, subangular blocky structure; hard, compact, and brittle; common fine roots between peds; films of clay on faces of peds; common fine pores; very strongly acid; clear, smooth boundary.

B'x2—23 to 48 inches, mottled yellowish-brown (10YR 5/8), light brownish-gray (10YR 6/2), and strong-brown (7.5YR 5/6) silt loam; weak, coarse, prismatic structure parting to moderate, medium, subangular blocky; hard, compact, and brittle; films of clay on faces of peds; common fine pores; very strongly acid; clear, smooth boundary.

IIB'x3—48 to 76 inches, mottled yellowish-brown (10YR 5/8), light brownish-gray (10YR 6/2), and red (2.5YR 4/8) loam; weak, coarse, prismatic structure parting to moderate, medium, subangular blocky; hard, compact, and brittle; films of clay on faces of peds; seams between prisms filled with gray silt loam; very strongly acid; clear, smooth boundary.

IIB'x4—76 to 85 inches, mottled yellowish-red (5YR 5/8), light brownish-gray (10YR 6/2), and light yellowish-brown (10YR 6/4) loam; weak, coarse, prismatic structure parting to moderate, medium, subangular blocky; hard, compact, and brittle; seams between prisms filled with gray silty clay loam; very strongly acid.

The A1 and Ap horizons are dark grayish brown, grayish brown, or dark brown. The A2 horizon is yellowish brown, light yellowish brown, or pale brown. The B2 horizon is yellowish-brown or strong-brown silt loam or silty clay loam. The B'x1&A'2 horizon is light brownish gray, pale brown, or light yellowish brown, or it is mottled in shades of brown, yellow, and gray. In some profiles there is an A'2 horizon. The B'x horizon is silt loam, clay loam, or silty clay loam mottled in shades of gray, brown, yellow, and red. The IIB'x horizon is loam, clay loam, sandy clay loam, or silty clay loam. It is mottled in shades of brown, gray, and red, or it has a matrix of red or yellowish red and is mottled in shades of gray, brown, and yellow. Depth to the fragipan ranges from 18 to 30 inches. At a depth between 18 inches and the upper boundary of the fragipan, the content of clay ranges from 20 to 32 percent and the content of fine sand

and coarser sand is less than 15 percent. The soil is very strongly acid or strongly acid.

In Lawrence County the Paden soils have a fragipan that is much thicker than the range defined for the series. Because there is little difference in the thickness of the root zone the use and management of these soils is not altered.

Paden soils are near Falkner, Providence, Rosella, and Wanilla soils. They have a fragipan, which Falkner, Rosella, and Wanilla soils do not have. They differ from Providence soils in that they have a base saturation of less than 35 percent at a depth of 30 inches below the upper boundary of the fragipan.

PaA—Paden silt loam, 0 to 2 percent slopes. This soil is on stream terraces and nearly level uplands and is moderately well drained. It contains a large amount of silt, and it has a fragipan. Included in mapping are small areas of Falkner, Providence, and Wanilla soils.

The soil is very strongly acid or strongly acid throughout. Permeability is moderate in the upper part of the profile and slow in the fragipan. The available water capacity is medium. Runoff is medium to slow. The soil has a perched water table above the fragipan during periods of high rainfall.

About 50 percent of the acreage is used for pasture or row crops, and the rest is in woodland. Cotton, corn, small grain, soybeans, pasture plants, and hardwood and pine trees are suited to this soil. All crop and pasture plants respond to applications of fertilizer. The soil is easy to till, but if cultivated, it tends to crust and pack. A plowpan may form in this soil. Row crops can be grown continuously if good management practices are used. Capability unit IIw–1; woodland suitability group 2o7.

Providence Series

The Providence series consists of moderately well drained soils that have a fragipan (fig. 4). These soils formed in a silty mantle and the underlying loamy sediment. Slope is 0 to 8 percent.

In a representative profile the surface layer is dark-gray silt loam 4 inches thick. Below this is light yellowish-brown and strong-brown silt loam 5 inches thick. The next layer is 23 inches thick. In the upper 18 inches it is yellowish-red silty clay loam, and in the lower 5 inches it is more silty and has light yellowish-brown mottles. Below this, to a depth of 74 inches, is a fragipan of yellowish-red to red loam, in the upper 26 inches that has pale-brown mottles and, below this red sandy clay loam that has pale-brown mottles.

Figure 4.—Coastal bermudagrass on Providence silt loam, 2 to 5 percent slopes.

Representative profile of Providence silt loam, 2 to 5 percent slopes, 50 feet north of gravel road in southeast corner of SE¼ NW¼ sec. 32, T. 7 N., R. 10 E., in a wooded area.

A1—0 to 4 inches, dark-gray (10YR 4/1) silt loam; weak, medium, granular structure; friable; many fine roots; strongly acid; abrupt, smooth boundary.

A2—4 to 6 inches, light yellowish-brown (10YR 6/4) silt loam; weak, medium, granular structure; friable; many fine roots; strongly acid; abrupt, smooth boundary.

B1—6 to 9 inches, strong-brown (7.5YR 5/6) silt loam; weak, medium, subangular blocky structure; friable; many fine roots; strongly acid; clear, smooth boundary.

B21t—9 to 27 inches, yellowish-red (5YR 4/6) silty clay loam; moderate, medium, subangular blocky structure; friable; common fine roots; films of clay on faces of peds; strongly acid; clear, smooth boundary.

B22t—27 to 32 inches, yellowish-red (5YR 5/8) silt loam; few, fine, faint, light yellowish-brown mottles; moderate, medium, subangular blocky structure; friable; common fine roots; films of clay on faces of peds; strongly acid; abrupt, wavy boundary.

IIBx1—32 to 50 inches, yellowish-red (5YR 5/6) loam; common, medium, prominent, pale-brown (10YR 6/3) mottles; weak, coarse, prismatic structure parting to moderate, medium, subangular blocky; firm, compact, and brittle; few fine roots between peds; films of clay on faces of peds; common, fine, vesicular pores; strongly acid; clear, smooth boundary.

IIBx2—50 to 58 inches, red (2.5YR 4/6) loam; many, medium, distinct, pale-brown (10YR 6/3) mottles; weak, coarse, prismatic structure parting to moderate, medium, subangular blocky; firm, compact, and brittle; patchy films of clay on faces of peds; common fine pores; few fine pebbles; strongly acid; clear, smooth boundary.

IIB23t—58 to 74 inches, red (2.5YR 5/8) sandy clay loam; many, medium, prominent, pale-brown (10YR 6/3) mottles; moderate, medium, subangular blocky structure; firm, slightly sticky; very strongly acid.

The A1 horizon is dark grayish brown, dark gray, very dark gray, very dark grayish brown, or dark brown. The Ap or A2 horizon is light yellowish brown, yellowish brown, pale brown, or brown. The B1 horizon is yellowish brown, brownish yellow, strong brown, or yellowish red. The B2t horizon is yellowish-red or yellowish-brown silty clay loam or silt loam. The upper 20 inches of the Bt horizon is 18 to 35 percent clay and less than 15 percent sand. The Bx horizon is yellowish-red, red, or yellowish-brown loam, silt loam, or sandy clay loam either mottled with gray, brown, and yellow or mottled in shades of brown, gray, red, and yellow. The IIBt horizon is sandy clay loam, sandy loam, or loam that is yellowish red, red, or yellowish brown, or is mottled in shades of red, yellow, and gray. The profile is very strongly acid to medium acid throughout, except in areas that have been limed. Depth to the fragipan ranges from 18 to 36 inches.

Providence soils are near Guyton, Paden, Ruston, and Smithdale soils. They have a fragipan, but Guyton, Ruston, and Smithdale soils do not. They have higher base saturation in the lower part of the B horizon than Paden soils.

PrA—Providence silt loam, 0 to 2 percent slopes. This soil is on flat uplands and stream terraces and is moderately well drained. Included in mapping are small areas of Paden soils.

This Providence soil has a surface layer of dark grayish-brown silt loam 5 inches thick and a subsur-

face layer of yellowish-brown silt loam 7 inches thick. The next layer is mainly yellowish-red silt loam 20 inches thick. Below this is a fragipan, 20 inches thick, of mottled brownish and grayish silt loam. Below the fragipan is yellowish-red loam to a depth of 72 inches.

Providence soils are very strongly acid to medium acid throughout, except where the surface layer has been limed. Permeability is moderate in the upper part of the profile and moderately slow in the lower part. The available water capacity is medium. Runoff is slow. A perched water table is above the fragipan during periods of heavy rainfall.

Most of the acreage is used for row crops and pasture, but a small acreage is woodland. Cotton, corn, soybeans, small grains, truck crops, pasture plants, and hardwood and pine trees are suited to this soil. Erosion is not a hazard, and row crops can be grown continuously. The soil is easily tilled, but if cultivated it tends to crust and pack. Row crops and pasture plants respond to applications of fertilizer. Capability unit IIw–2; woodland suitability group 2o7.

PrB—Providence silt loam, 2 to 5 percent slopes. This soil is on uplands. It is moderately well drained.

This soil has the profile described as representative of the series. In small areas where the surface layer and subsurface layer have been mixed by plowing, the plow layer is brown silt loam 2 to 5 inches thick. Included in mapping are small areas of Paden, Ruston, and Saffell soils.

This soil is very strongly acid to strongly acid throughout, except for a surface layer that has been limed. Permeability is moderate in the upper part of the profile and moderately slow in the fragipan. The available water capacity is medium. The hazard of erosion is slight to moderate. A perched water table is above the fragipan during periods of heavy rainfall.

About 90 percent of the acreage is used for row crops and pasture, and the rest is in woodland. Cotton, corn, pasture plants, truck crops, soybeans, small grains, and hardwood and pine trees are suited to this soil. Erosion is a slight to moderate hazard in cropped areas but can be controlled by the use of grassed waterways, stripcropping, and parallel terracing. The soil is easy to till but if cultivated it may crust and pack. Row crops and pasture plants respond to applications of fertilizer. Capability unit IIe–2; woodland suitability group 2o7.

PrC—Providence silt loam, 5 to 8 percent slopes. This soil is on uplands. It is moderately well drained.

This Providence soil has a surface layer of dark-brown silt loam 6 inches thick and a subsurface layer of light yellowish-brown silt loam 4 inches thick. The next layer is mainly yellowish-red silty clay loam 17 inches thick. Below this is a fragipan of loam, to a depth of 72 inches that is mottled in shades of brown, red, and gray. Included in mapping are small areas of Paden, Ruston, and Saffell soils.

The soil is very strongly acid to medium acid. Permeability is moderate in the upper part of the profile and moderately slow in the fragipan. The available water capacity is medium. Runoff is medium, and the hazard of erosion is moderate. A perched water table is above the fragipan during periods of heavy rainfall.

About 75 percent of the acreage is used for crops and pasture, and the rest is in woodland. Cotton, corn, soybeans, small grain, pasture plants, truck crops, and hardwood and pine trees are suited to this soil. Erosion is a moderate hazard in cropped areas but can be controlled by the use of grassed waterways, stripcropping and parallel terracing. The soil is easy to till, but if cultivated, it may crust and pack. A plowplan may form in this soil. Row crops and pasture plants respond to applications of fertilizer. Capability unit IIIe–1; woodland suitability group 2o7.

Rosebloom Series

The Rosebloom series consists of poorly drained soils that formed in loamy alluvial sediment that contains a large amount of silt. These soils are on flood plains. Slope is 0 to 2 percent.

In a representative profile the surface layer is grayish-brown silt loam about 5 inches thick. The next layer, to a depth of 60 inches, is gray silty clay loam that has brownish mottles.

Representative profile of Rosebloom silt loam, frequently flooded, 1 mile east of Monticello and $\frac{1}{5}$ mile north of U.S. Highway 84, NE¼ SE¼ sec. 23, T. 7 N., R. 21 W., in a 40-acre wooded area.

A1—0 to 5 inches, grayish-brown (10YR 5/2) silt loam; common, medium, distinct, dark-brown (10YR 4/3) mottles; weak, medium, granular structure; friable; many fine roots; very strongly acid; abrupt, smooth boundary.

B21g—5 to 16 inches, gray (10YR 5/1) silty clay loam; common, medium, distinct, dark yellowish-brown (10YR 4/4) mottles; weak, medium, subangular blocky structure; firm, plastic; few fine roots; few black and brown concretions; very strongly acid; clear, smooth boundary.

B22g—16 to 30 inches, gray (10YR 5/1) silty clay loam; common, medium, prominent, strong-brown (7.5YR 5/8) mottles; weak, medium, subangular blocky structure; firm, plastic; few fine roots; few black and brown concretions; very strongly acid; clear, smooth boundary.

B23g—30 to 60 inches, gray (10YR 5/1) silty clay loam; weak, medium, subangular blocky structure; firm, plastic; few, fine, black concretions; very strongly acid.

The A1 horizon is grayish brown, dark grayish brown, dark brown, and light brownish gray, or it is mottled with these colors. The B2g horizon is gray or light brownish-gray silty clay loam or silt loam. The content of clay is 18 to 30 percent between depths of 10 and 40 inches. The profile is very strongly acid or strongly acid throughout.

Rosenbloom soils are near Arkabutla, Jena, and Velda soils. They are more poorly drained and are grayer in the upper part of the B horizon than Arkabutla soils. They are more poorly drained and are grayer throughout the profile than Jena and Velda soils, and they contain less sand throughout than Jena soils.

Ro—Rosebloom silt loam, frequently flooded. This soil is on flood plains of streams. It is poorly drained. Slope is 0 to 2 percent. Included in mapping are small areas of Arkabutla, Jena, and Velda soils.

The soil is strongly acid or very strongly acid. Permeability is slow, and the available water capacity is high. Runoff is slow. This soil floods frequently, and the water table is within 1 foot of the surface during winter and spring or during prolonged heavy rainfall.

Almost all of the acreage is used for woodland. Because of the hazards of frequent flooding and wetness, the soil is best suited to trees. Hardwood trees

are suited to this soil. Capability unit Vw–3; woodland suitability group 2w9.

Rosella Series

The Rosella series consists of poorly drained soils that formed in loamy sediment that contains a large amount of silt. These soils are on stream terraces and uplands. Slope is 0 to 2 percent.

In a representative profile the surface layer is gray silt loam about 3 inches thick. The subsurface layer, about 9 inches thick, is light brownish-gray silt loam that has brownish mottles. The next layer, to a depth of 65 inches, is gray silt loam that has strong-brown and yellowish-brown mottles.

Representative profile of Rosella silt loam, 5½ miles south of Monticello, 1½ miles southwest of Arm, and ¾ mile west of river road, NW¼SW¼ sec. 8, T. 6 N., R. 20 W., in a pasture.

Ap—0 to 3 inches, gray (10YR 6/1) silt loam; few, fine, brown mottles and stains; weak, fine and medium, granular structure; friable; many fine roots; few root channels and worm casts; strongly acid; clear, smooth boundary.

A2g—3 to 12 inches, light brownish-gray (10YR 6/2) silt loam; few, medium, distinct, yellowish-brown (10YR 5/8) and strong-brown (7.5YR 5/6) mottles; weak, fine and medium, granular structure; friable, slightly sticky; many fine roots; common, fine and medium, black and brown concretions; strongly acid; gradual, irregular boundary.

B21tg—12 to 25 inches, gray (10YR 6/1) silt loam; common, medium, distinct, strong-brown (7.5YR 5/8) and yellowish-brown (10YR 5/6) mottles; moderate medium, subangular blocky structure; firm, plastic; few fine roots; common, fine and medium, black and brown concretions; films of clay on both vertical and horizontal faces of peds; few dark-gray (10YR 4/1) films of clay; many fine pores; common tongues of light-gray silt loam 1 inch to 3 inches wide extend through this horizon; tongues are platy and slightly brittle; strongly acid; gradual, irregular boundary.

B22tg—25 to 38 inches, gray (10YR 6/1) silt loam; common, coarse, distinct, strong-brown (7.5YR 5/8) mottles; weak, fine and medium, subangular blocky structure; firm, slightly plastic; few fine roots and root channels; common, fine and medium, black and brown concretions; common tongues of light-gray silt loam 1 inch to 3 inches wide; tongues are platy and slightly brittle and have more clayey lenses in the lower part; films of clay on both vertical and horizontal faces of peds; very strongly acid; gradual, smooth boundary.

B23tg—38 to 65 inches, gray (10YR 6/1) silt loam; many, coarse, distinct, strong-brown (7.5YR 5/8) mottles; moderate, medium, subangular blocky structure; firm, slightly plastic; few root channels; common, fine and medium, black and brown concretions; patchy films of clay on faces of peds; very strongly acid.

The Ap and A1 horizons are gray, light gray, light brownish gray, or grayish brown. Where present, the A2 horizon is gray, grayish-brown, or light brownish-gray silt loam or very fine sandy loam 9 to 20 inches thick. The B horizon is silt loam, loam, or silty clay loam. It is grayish brown, light brownish gray, gray, or light gray and is mottled in shades of brown, red, and yellow. The content of clay is 18 to 30 percent in the upper 20 inches of the B horizon. The content of sodium is more than 15 percent between depths of 16 and 36 inches. The profile is very strongly acid to medium acid, except in a surface layer that has been limed.

Rosella soils are near Guyton and Paden soils. They have more sand in the B horizon than Guyton and Paden soils, and unlike those soils, they contain 15 percent or more sodium at a depth between 16 and 36 inches. They lack a fragipan, but Paden soils have one.

Rs—Rosella silt loam. This soil is on stream terraces and is poorly drained. Slope is 0 to 2 percent. Included in mapping are small areas of Guyton and Paden soils.

This soil is very strongly acid to medium acid throughout. It has a high percentage of sodium below a depth of 16 inches. Permeability is slow, and the available water capacity is medium. Runoff is slow to very slow. The seasonal high water table is at or near the surface during winter and early in spring.

Most of the acreage is used for woodland, but a small acreage is used for pasture and row crops. Corn, soybeans, pasture plants, and hardwood and pine trees are suited to this soil. Spring planting may be delayed because the water table is seasonally high and runoff is slow to very slow. A system of open drainage ditches helps to remove surface water and thus permits earlier spring planting. Erosion is not a hazard, and row crops can be grown continuously. Capability unit IIIw–3; woodland suitability group 3w9.

Ruston Series

The Ruston series consists of well-drained soils that formed in loamy marine sediment. The soils are on uplands. Slope is 2 to 12 percent.

In a representative profile the surface layer is dark-brown sandy loam about 3 inches thick. The subsurface layer is brown sandy loam about 3 inches thick. The next layer, to a depth of 80 inches, is yellowish-red clay loam and sandy clay loam in the upper 17 inches; below this, yellowish-red sandy loam that has brownish and reddish mottles; and red sandy clay loam in the lower 33 inches.

Representative profile of Ruston sandy loam, 2 to 5 percent slopes, 3 miles west of New Hebron, 100 yards west of road intersection, and 100 feet north of road, NW¼NE¼ sec. 20, T. 9 N., R 20 W., in a pasture.

Ap—0 to 3 inches, dark-brown (10YR 4/3) sandy loam; weak, medium, granular structure; very friable; many fine roots; medium acid; abrupt, smooth boundary.

A2—3 to 6 inches, brown (10YR 5/3) sandy loam; weak, medium, granular structure; very friable; many fine roots; strongly acid; abrupt, smooth boundary.

B21t—6 to 16 inches, yellowish-red (5YR 4/6) clay loam; moderate, medium, subangular blocky structure; friable; common fine roots; films of clay on faces of peds; strongly acid; clear, smooth boundary.

B22t—16 to 23 inches, yellowish-red (5YR 4/8) sandy clay loam; moderate, medium, subangular blocky structure; friable; common fine roots; films of clay on faces of peds; strongly acid; clear, wavy boundary.

B3t&A'2—23 to 47 inches, yellowish-red (5YR 5/6) sandy loam; weak, medium, subangular blocky structure; friable; thin, patchy films of clay; grains of sand coated and bridged with clay; 2-inch to 6-inch pockets of somewhat brittle, mottled, yellowish-brown (10YR 5/4), pale-brown (10YR 6/3), and yellowish-red (5YR 4/8) fine sandy loam make up about 20 percent of the soil material; strongly acid; gradual, smooth boundary.

B'2t—47 to 80 inches, red (2.5YR 4/6) sandy clay loam; moderate, medium, subangular blocky structure; firm; thin films of clay on faces of peds; grains of sand coated and bridged with clay; strongly acid.

The A horizon is less than 20 inches thick. The Ap and A1 horizons are dark brown, brown, dark grayish brown, pale brown, light yellowish brown, or yellowish brown, but in

relatively small eroded areas, the Ap horizon may be somewhat redder than is normal for the series. The A2 horizon is brown, pale-brown, light yellowish-brown, yellowish-brown, or strong-brown sandy loam or loamy fine sand. The B horizon is fine sandy loam, sandy loam, or loam. The B2t horizon is yellowish red or red. The content of clay averages 18 to 30 percent in the upper 20 inches of the Bt horizon. The B3t and A'2 horizons are yellowish-red or red fine sandy loam, or loam. The B'2t horizon is generally yellowish red or red, but in places it has many mottles in shades of brown, gray, and yellow. The profile is very strongly acid to medium acid throughout except in a surface layer that has been limed.

Ruston soils are near Lucy, Providence, Saffell, and Smithdale soils. They have a less sandy and thinner surface layer than Lucy soils. They contain more sand and have lower base saturation than Providence soils. They do not have the fragipan that is characteristic of Providence soils. They do not contain gravel, which Saffell soils do contain. Unlike the Smithdale soils, they have a bisequal profile.

RuB—Ruston sandy loam, 2 to 5 percent slopes. This soil is on uplands and is well drained. This soil has the profile described as representative of the series. Included in mapping are small areas of Providence, Saffell, and Smithdale soils.

The soil is very strongly acid to medium acid throughout except in a surface layer that has been limed. Permeability is moderate, and the available water capacity is medium. Runoff is medium.

About 90 percent of the acreage is used for row crops or pasture, and the rest is in woodland. Cotton, corn, small grains, soybeans, truck crops, pasture plants, and pine trees are suited to this soil. Erosion is a slight hazard if row crops are grown, but can be controlled by the use of supporting grassed waterways, stripcropping, and parallel terracing. All row crops and pasture plants respond to applications of fertilizer. The soil is easy to till and can be cultivated throughout a wide range of moisture content without crusting or packing. Capability unit IIe–1; woodland suitability group 2o1.

RuC—Ruston sandy loam, 5 to 8 percent slopes. This soil is on uplands and is well drained. It has a surface layer of brown sandy loam 4 inches thick and a subsurface layer of strong-brown loam 3 inches thick. The next layer is yellowish-red sandy clay loam 33 inches thick. The next layer is yellowish-red sandy loam 7 inches thick. Below this is red sandy clay loam to a depth of 80 inches.

Included with this soil in mapping are small areas that have a thin plow layer of yellowish-red fine sandy loam, silt loam, or loam. Within these areas are a few rills and scattered shallow gullies. Also included in mapping are small areas of Providence, Saffell, and Smithdale soils.

The soil is very strongly acid to medium acid. Permeability is moderate and the available water capacity is medium. Runoff is medium, and the hazard of erosion is moderate.

About 75 percent of this soil is used for crops or pasture, and the rest is in woodland. Cotton, corn, small grains, soybeans, truck crops, pasture plants, and pine trees are suited to this soil. Erosion is a moderate hazard in cropped areas, but can be controlled by use of supporting grassed waterways, stripcropping, and parallel terracing. Row crops and pasture plants respond to applications of fertilizer. The soil is easy to till and can be cultivated throughout a wide range of moisture content. Capability unit IIIe–2; woodland suitability group 2o1.

RuD—Ruston sandy loam, 8 to 12 percent slopes. This soil is on uplands and is well drained. It has a surface layer of dark-brown sandy loam 2 inches thick and a subsurface of yellowish-brown sandy loam 6 inches thick. The next layer is yellowish-red sandy clay loam 29 inches thick. The next layer is yellowish-red loamy sand 9 inches thick. Below this is red sandy clay to a depth of 76 inches.

Included with this soil in mapping are small areas of Providence, Saffell, and Smithdale soils. Also included are relatively small areas that have a surface layer of strong-brown or yellowish-red fine sandy loam or loam 2 to 5 inches thick. In these areas are a few rills and shallow gullies and scattered gullies that are not crossable by farm machinery.

The soil is very strongly acid to medium acid. Permeability is moderate, and the available water capacity is medium. Runoff is moderately rapid, and the hazard of erosion is moderate.

About 50 percent of the acreage is used for row crops or pasture, and the rest is in woodland. Cotton, corn, small grain, soybeans, pasture plants, and pine trees are suited to this soil. The hazard of erosion is moderate in cropped areas but can be reduced by the use of supporting grassed waterways, stripcropping, and parallel terracing. The soil is easily tilled and can be cultivated throughout a wide range of moisture content without crusting or packing. Crop and pasture plants respond to applications of fertilizer. Capability unit IVe–2; woodland suitability group 2o1.

Saffell Series

The Saffell series consists of well-drained soils that formed in gravelly loamy material. Slope is 2 to 17 percent.

In a representative profile the surface layer, about 3 inches thick, is dark grayish-brown gravelly sandy loam. The subsurface layer is light yellowish-brown sandy loam 7 inches thick. The next layer is 50 inches thick. In the upper 30 inches it is yellowish-red or red gravelly sandy clay loam, and in the lower 20 inches it is red gravelly sandy loam. The underlying material, to a depth of 80 inches, is stratified yellowish-red gravelly sandy loam and reddish-yellow gravelly sand.

Representative profile of Saffell gravelly sandy loam, 2 to 5 percent slopes, NW¼SE¼ sec. 27, T. 6 N., R. 11 E., in the bank of a gravel pit.

A1—0 to 3 inches, dark grayish-brown (10YR 4/2) gravelly sandy loam; weak, medium, granular structure; very friable; many fine roots; about 15 percent, by volume, quartz pebbles; strongly acid; abrupt, smooth boundary.

A2—3 to 10 inches, light yellowish-brown (10YR 6/4) gravelly sandy loam; weak, medium, granular structure; very friable; many fine roots; about 15 percent by volume, quartz pebbles; strongly acid; abrupt, smooth boundary.

B1—10 to 16 inches, yellowish-red (5YR 5/6) gravelly sandy clay loam; weak, medium, subangular blocky

structure; friable; common fine roots; about 25 percent, by volume, quartz pebbles; strongly acid; clear, smooth boundary.

B2t—16 to 40 inches, red (2.5YR 4/8) gravelly sandy clay loam; moderate, medium, subangular blocky structure; friable; films of clay on faces of peds; about 65 percent, by volume, quartz pebbles; strongly acid; gradual, smooth boundary.

B3—40 to 60 inches, red (2.5YR 4/8) gravelly sandy loam; weak, medium, subangular blocky structure; very friable; grains of sand coated and bridged with clay; about 65 percent, by volume, quartz pebbles; strongly acid; gradual, smooth boundary.

C—60 to 80 inches, stratified, yellowish-red (5YR 5/8) gravelly sandy loam and reddish-yellow (7.5YR 6/8) gravelly sand; massive; very friable; about 55 percent, by volume, quartz pebbles; strongly acid.

The A1 horizon is dark grayish brown, brown, or grayish brown. The A2 horizon is light yellowish brown, yellowish brown, pale brown, or brown. The content of quartz pebbles is 5 to 55 percent, by volume. The B horizon is yellowish-red, red, strong-brown, or yellowish-brown gravelly sandy clay loam or gravelly loam. The content of clay averages 12 to 28 percent in the upper 20 inches of the B horizon and decreases as depth increases. The content of quartz pebbles is 35 to 70 percent, by volume. The B3 horizon is yellowish-red, red, dark-red, or reddish-brown gravelly sandy loam, gravelly loam, or gravelly fine sandy loam. The C horizon is yellowish-red, red, reddish-yellow, strong-brown, yellowish-brown, or light yellowish-brown gravelly loamy sand, gravelly sand, or gravelly sandy loam. The profile is strongly acid or very strongly acid.

Saffell soils are near Freestone, Lucy, Ruston, and Smithdale soils. They do not have a thick, sandy A horizon but Lucy soils do. They have more than 35 percent, by volume, quartz pebbles in the B2 horizon, but Freestone, Lucy, Ruston, and Smithdale soils lack pebbles.

SaB—Saffell gravelly sandy loam, 2 to 5 percent slopes. This gravelly soil is on uplands and is well drained. This soil has the profile described as representative of the series. Included in mapping are small areas of Ruston and Smithdale soils.

The soil is very strongly acid or strongly acid throughout, except in a surface layer that has been limed. Permeability is moderate in the upper 40 inches and rapid below a depth of 40 inches. The available water capacity is medium. Runoff is medium, and the hazard of erosion is slight to moderate.

About 50 percent of the acreage is used for pasture, and the rest is used for woodland. Small grains, pasture plants, and pine trees are suited to this soil. The soil is easy to till and can be cultivated throughout a wide range of moisture content without crusting or packing. In most areas, gravel is near the surface in sufficient quantity to mine. Capability unit IIIe–3; woodland suitability group 4f2.

SaE—Saffell gravelly sandy loam, 12 to 17 percent slopes. This gravelly soil is on uplands and is well drained.

This Saffell soil has a surface layer of grayish-brown gravelly sandy loam 3 inches thick and a subsurface layer of light yellowish-brown gravelly sandy loam 3 inches thick. The next layer is yellowish-red gravelly sandy clay loam 3 inches thick. Below this to a depth of 72 inches is yellowish-red gravelly sandy loam 27 inches thick. Included in mapping are Luck, Ruston, and Smithdale soils.

The soil is very strongly acid or strongly acid. Permeability is moderate in the upper 45 inches and rapid below a depth of 45 inches. The available water capacity is medium. Runoff is moderately rapid, and the hazard of erosion is moderate to severe.

Most of this soil is used for woodland, but a small acreage is used for pasture. Because of the slope and the hazard of erosion, the soil is best suited to pine trees. In most areas, gravel is near the surface in sufficient quantity to mine. Capability unit VIe–2; woodland suitability group 4f2.

Smithdale Series

The Smithdale series consists of well-drained soils that formed in loamy marine sediment. The soils are on uplands. Slope is 15 to about 30 percent.

In a representative profile the surface layer is dark grayish-brown sandy loam about 5 inches thick. The next layer, to a depth of 80 inches, is yellowish-red sandy loam in the upper 5 inches; below this, yellowish-red sandy clay loam; and yellowish-red sandy loam in the lower 40 inches.

Representative profile of Smithdale sandy loam, in an area of Smithdale-Lucy association, hilly, SE¼ NE¼ sec. 29, T. 6 N., R. 10 E., in a large wooded area.

A1—0 to 5 inches, dark grayish-brown (10YR 4/2) sandy loam; single grained; very friable; many fine roots; strongly acid; abrupt, smooth boundary.

B1—5 to 10 inches, yellowish-red (5YR 4/6) sandy loam; weak, medium, subangular blocky structure; very friable; many fine roots; strongly acid; abrupt, smooth boundary.

B21t—10 to 40 inches, yellowish-red (5YR 4/6) sandy clay loam; moderate, medium, subangular blocky structure; firm; common fine roots; films of clay on faces of peds; strongly acid; gradual, smooth boundary.

B22t—40 to 67 inches, yellowish-red (5YR 4/8) sandy loam; moderate, medium, subangular blocky structure; friable; thin, patchy films of clay on faces of peds; grains of sand coated and bridged with clay; few pockets of uncoated grains of sand; strongly acid; clear smooth boundary.

B23t—67 to 80 inches, yellowish-red (5YR 5/8) sandy loam; weak, medium, subangular blocky structure; grains of sand coated and bridged with clay; few pockets of uncoated grains of sand; strongly acid.

The A horizon is sandy loam or fine sandy loam less than 20 inches thick. The A1 horizon is grayish brown, dark grayish brown, dark brown, or brown. The A2 horizon, if any, is pale brown, light yellowish brown, brownish yellow, grayish brown, brown, or yellowish brown. In severely eroded areas the A horizon is yellowish-red. The B1 and B2t horizons are yellowish red or red. The upper part of the Bt horizon is sandy clay loam, clay loam, or loam, and the lower part is loam or sandy loam. The content of clay is 18 to 33 percent in the upper 20 inches of the Bt horizon. The profile is very strongly acid or strongly acid.

Smithdale soils are near Lucy, Providence, Ruston, and Saffell soils. They do not have so thick or sandy an A horizon as Lucy soils. They do not have the fragipan, but Providence soils do. They do not have a bisequel profile, but Ruston soils do. They do not have a high gravel content, but Saffell soils do.

SmE—Smithdale sandy loam, 15 to 30 percent slopes. This soil is moderately steep to steep. It is on uplands and is well drained.

This Smithdale soil has a surface layer of dark grayish-brown sandy loam 4 inches thick and a subsurface layer of light yellowish-brown sandy loam 6 inches thick. The next layer is yellowish-red sandy loam 4 inches thick. The next layer is yellowish-red sandy clay loam 22 inches thick. The next layer is red sandy loam

to a depth of 80 inches. Included in mapping are small areas of Lucy and Saffell soils.

The soil is very strongly acid or strongly acid. Permeability is moderate, and the available water capacity is medium. Runoff is moderately rapid to rapid, and the hazard of erosion is severe if the soil is cultivated.

Most of this soil is used for woodland, and a small part is used for pasture. Because of the hazard of erosion, it is better suited to permanent pasture and pine trees than to cultivated crops. Capability unit VIe–3; woodland suitability group 2o1.

SmE3—Smithdale sandy loam, 15 to 30 percent slopes, severely eroded. This soil is moderately steep to steep. It is on uplands and is well drained.

This Smithdale soil has a surface layer of yellowish-red sandy loam 3 inches thick. The next layer is yellowish-red loam to a depth of 80 inches. In most areas small gullies, rills, eroded spots, and a few gullies that are not crossable by farm machinery are common. Included in mapping are small areas of Lucy and Saffell soils.

The soil is very strongly acid or strongly acid. Permeability is moderate, and the available water capacity is medium. Runoff is moderately rapid to rapid, and the hazard of erosion is severe.

Most of this soil is used for woodland but was once cultivated. Because of the hazard of erosion, this soil is suited to pasture plants and pine trees. Capability unit VIIe–2; woodland suitability group 2o1.

STE—Smithdale-Lucy association, hilly. This association is on uplands. It consists of well-drained soils. The topography is rough and steep. Slopes are 15 to 30 percent. This mapping unit is more variable than most of the other mapping units, but it has been controlled well enough for the expected use.

The Smithdale and similar soils make up 41 percent of this mapping unit and Lucy and closely similar soils 37 percent. Thus, soils within each group have similar use and management. The major soils occur in each delineation.

Smithdale soils have the profile described as representative of their series. They are mostly on the ridgetops and upper slopes.

Smithdale soils are strongly acid or very strongly acid. Permeability is moderate, and the available water capacity is medium. Runoff is rapid, and the hazard of erosion is severe.

Lucy soils have the profile described as representative of the series. They are on the middle and lower slopes.

Lucy soils are very strongly acid or strongly acid. Permeability is rapid in the surface layer and moderate in the lower part of the profile. The available water capacity is medium. Runoff is rapid, and the hazard of erosion is severe.

The soils of this mapping unit are mostly used for woodland, and because of slopes and the severe hazard of erosion, they are not cultivated. They are best suited to pine trees. Smithdale soil is in capability unit VIe–3 and woodland suitability group 2o1; Lucy soil is in capability unit VIIs–1 and woodland suitability group 3s2.

Velda Series

The Velda series consists of well-drained soils that formed in loamy alluvium that contains a large amount of silt. Slope is 0 to 2 percent.

In a representative profile the surface layer is dark yellowish-brown silt loam about 7 inches thick. The next layer is 36 inches thick. In the upper 9 inches it is dark yellowish-brown silt loam, and in the lower 27 inches it is yellowish-brown silt loam that has brownish mottles. The underlying material, to a depth of 66 inches, is dark-brown silt loam that has pale-brown mottles.

Representative profile of Velda silt loam, 2 miles east of Monticello on U.S. Highway 84, 6 miles north on New Hebron paved road, 5 miles west on asphalt road to Culpepper store, left 2½ miles on asphalt road, 2 miles south on gravel road SE¼ SW¼ sec. 28, T. 9 N., R. 21 W., ⅕ mile into cultivated field.

Ap—0 to 7 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, fine, granular structure; friable; many fine roots; strongly acid; abrupt, smooth boundary.

B21—7 to 16 inches, dark yellowish brown (10YR 4/4) silt loam; weak, fine and medium, subangular blocky structure; friable; common fine roots; strongly acid; gradual, smooth boundary.

B22—16 to 28 inches, yellowish-brown (10YR 5/4) silt loam; few, fine, faint, pale-brown and strong-brown mottles; weak, fine and medium, subangular blocky structure; friable; few fine roots; strongly acid; gradual, smooth boundary.

B23—28 to 43 inches, yellowish-brown (10YR 5/4) silt loam; few, fine, faint, pale-brown mottles; weak, medium, subangular blocky structure; friable; strongly acid; gradual, smooth boundary.

C—43 to 66 inches, dark-brown (10YR 4/3) silt loam; common, medium, faint, pale-brown (10YR 6/3) mottles; structureless; friable; few fine strata of pale-brown sandy loam; strongly acid.

The Al or Ap horizon is dark brown, dark yellowish brown, brown, or dark grayish brown. The B horizon is dark-brown, dark yellowish-brown, yellowish-brown, or brown silt loam or very fine sandy loam. The content of clay is 10 to 18 percent between depths of 10 and 40 inches. The C horizon is yellowish-brown, pale-brown, dark-brown, brownish-yellow, or light yellowish-brown silt loam or fine sandy loam. The profile is very strongly acid or strongly acid.

Velda soils are near Arkabutla, Jena, and Rosebloom soils. They are browner, are better drained, and are at a higher elevation than Arkabutla and Rosebloom soils. They have a lower content of fine and coarser sand than Jena soils.

Ve—Velda silt loam. This soil is on flood plains and is well drained. Slopes are 0 to 2 percent. Included in mapping are small areas of Arkabutla, Jena, and Rosebloom soils.

The soil is very strongly acid or strongly acid. Permeability is moderate, and the available water capacity is high. Runoff is slow. This soil floods occasionally during winter and spring.

About 35 percent of the acreage is used for row crops and pasture, and the rest is in woodland. Cotton, corn, soybeans, pasture plants, and adapted hardwood and pine trees are suited to this soil. The soil is easy to till but if cultivated it may crust and pack. Row crops can be grown continuously if good management practices are followed. Capability unit IIw–3; woodland suitability group 1o7.

Wanilla Series

The Wanilla series consists of somewhat poorly drained to moderately well drained soils that formed in loamy alluvium. Slope is 0 to 2 percent.

In a representative profile, the surface layer is dark grayish-brown silt loam about 3 inches thick. The subsurface layer, about 6 inches thick, is mottled dark-brown, pale-brown and brown sandy loam. The next layer, to a depth of 80 inches, is mottled brownish-yellow, light brownish-gray, pale-brown, yellowish-brown, and dark-brown loam in the upper 31 inches; below this, mottled light-gray, brownish-yellow, and light yellowish-brown silt loam; and light-gray and grayish-brown silt loam, in the lower 20 inches, that has strong-brown mottles.

Representative profile of Wanilla silt loam, ⅕ mile northeast of Rosella, NE¼ NE¼ sec. 6, T. 7 N., R. 11 E., 75 feet north into pasture.

Ap—0 to 3 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine and medium, subangular blocky structure; friable; many fine roots; medium acid; abrupt, smooth boundary.

A2—3 to 9 inches, mottled dark-brown (10YR 4/3), pale brown (10YR 6/3), and brown (10YR 5/3) sandy loam; weak, medium, subangular blocky structure; friable; many fine roots; medium acid; abrupt, smooth boundary.

B1&A2—9 to 26 inches, mottled brownish-yellow (10YR 6/8), light brownish-gray (10YR 6/2), and pale-brown (10YR 6/3) loam; weak, medium, subangular blocky structure; friable; few fine roots; pockets of uncoated grains of sand make up 40 percent, by volume; common, medium, brown concretions; strongly acid; clear, irregular boundary.

B21t—26 to 40 inches, mottled yellowish-brown (10YR 5/8), light brownish-gray (10YR 6/2), and dark grayish-brown (10YR 4/2) loam; weak, medium, subangular blocky structure; friable; few tongues of gray silt loam; patchy films of clay and coatings of oxide on faces of peds; common, medium, brown concretions; many fine pores; strongly acid; clear, irregular boundary.

B22t—40 to 60 inches, mottled light-gray (10YR 7/2), brownish-yellow (10YR 6/8), and light yellowish-brown (10YR 6/4) silt loam; weak, medium, subangular blocky structure; friable; few tongues of light brownish-gray (10YR 6/2) silt loam, extend through this horizon; patchy films of clay on faces of peds; many fine pores; strongly acid; clear, irregular boundary.

B23t—60 to 70 inches, light-gray (10YR 7/2) silt loam; many, medium, distinct, strong-brown (7.5YR 5/8) mottles; weak, medium, subangular blocky structure; friable; patchy films of clay on faces of peds; few light-gray (10YR 7/2) tongues of silt loam, about 2 inches wide, extend through this horizon; many fine pores; strongly acid; clear, irregular boundary.

B4t—70 to 80 inches, grayish-brown (10YR 5/2) silt loam; many, medium, distinct, strong-brown (7.5YR 5/8) mottles; weak, medium, subangular blocky structure; friable; few light-gray (10YR 7/2) tongues of silt loam, about 2 inches wide, extend through this horizon; patchy films and coatings of clay on faces of peds; strongly acid.

The A1 horizon is very dark grayish brown, very dark gray, or dark gray. The Ap or A2 horizon is silt loam or sandy loam that either is dark grayish brown, brown, grayish brown, or light yellowish brown, or is mottled in shades of brown, yellow, and gray. The B, A2, and B21t horizons are yellowish brown, brownish yellow, light olive brown, or pale brown sandy loam or loam. They have few to many mottles that have a chroma of 2 or less, or they are mottled in shades of brown, gray, and yellow. The B22t, B23t, and B24t horizons are loam, silt loam, clay loam, or silty clay loam. In places they have only mottles in shades of brown, gray, and yellow, but in other places they have a matrix of grayish brown, light brownish gray, or light gray and are mottled in shades of brown. In the upper 20 inches of the Bt horizon the content of clay is 8 to 18 percent, and the content of silt is 20 to 50 percent. Tongues of silt loam, sandy loam, or loam extend throughout the Bt horizon. They are gray or light brownish gray and are 1 to 3 inches wide. The solum is more than 60 inches thick. The profile is medium acid through very strongly acid throughout, except in a surface layer that has been limed.

Wanilla soils are near Falkner and Paden soils. They have a less clayey B horizon than Falkner soils. They are more poorly drained than Paden soils, and they do not have a fragipan.

Wa—Wanilla silt loam. This soil is on broad flats. It is somewhat poorly drained to moderately well drained. Slope is 0 to 2 percent. Included in mapping are small areas of Falkner and Paden soils.

The soil is very strongly acid to medium acid. Permeability is moderately slow, and the available water capacity is medium. Runoff is slow. A seasonal high water table is within 24 inches of the surface during spring and winter.

About 80 percent of the acreage is used for pasture or row crops, and the rest is in woodland. Corn, soybeans, pasture plants, and hardwood and pine trees are suited to this soil. Erosion is not a hazard, and row crops can be grown every year if good management practices are followed. A system of open ditches helps to remove excess water during periods of heavy rainfall. The soil is easy to till but if cultivated it tends to crust and pack. Capability unit IIIw–4; woodland suitability group 2w8.

Use and Management of the Soils

In the following pages, crops and pasture in Lawrence County are discussed and the system of capability grouping used by the Soil Conservation Service is explained. Estimated yields of principal crops and pasture plants are given. Also discussed is the management of soils for woodland and wildlife habitat. The properties and features that affect engineering uses of the soils and land use planning are listed, mainly in tables.

Crops and Pasture[2]

Most crops in this county respond well to applications of lime and fertilizer. The amount applied should be based on the result of soil tests, such as those made by the Mississippi Agricultural and Forestry Experiment Station. For other information commonly given in this section, see the section "Descriptions of the Soils."

Capability grouping

Some readers, particularly those who farm on a large scale, may find it practical to use and manage alike some of the different kinds of soil on their farm. These

[2] HERMAN S. SAUCIER, conservation agronomist, Soil Conservation Service, helped prepare this section.

readers can make good use of the capability classification system, a grouping that shows, in a general way, the suitability of soils for most kinds of farming.

The grouping is based on permanent limitations of soils when used for field crops, the risk of damage when they are farmed, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops that require special management.

Those familiar with the capability classification system can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations for range, for forest trees, or for engineering.

In the capability system, all kinds of soils are grouped at three levels: the class, the subclass, and the unit. The broadest grouping, the capability class, is designated by Roman numerals I to VIII. In class I are the soils that have the fewest limitations, the widest range of use, and the least risk of damage when they are used. The soils in the other classes have progressively greater natural limitations. In class VIII are soils and landforms so rough, shallow, or otherwise limited that they do not produce worthwhile yields of crops, forage, or wood products. The subclass indicates major kinds of limitations within the classes. Within most classes there can be up to 4 subclasses. The subclasses are indicated by adding a small letter—*e*, *w*, *s*, or *c*—to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* means that water in or on the soil interferes with plant growth or cultivation (in some soils wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c* indicates that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few or no limitations. Class V can contain, at the most, only subclasses w, s, and c, because the soils are subject to little or no erosion but have other limitations that confine their use largely to pasture, range, or wildlife habitat.

Subclasses are further divided into groups called capability units. These are groups of soils that are so much alike that they are suited to the same crops and pasture plants, require about the same management, and have generally similar productivity and other response to management. Capability units are generally identified by numbers assigned locally, for example, IIe–1 or IIIw–3.

The eight classes in the capability system and the subclasses and units in Lawrence County are described in the list that follows. The unit designation is given in the "Guide to Mapping Units."

Class I soils have few limitations that restrict their use (no subclasses).

- Unit I–1. Well-drained, loamy soils that have slopes of 0 to 2 percent; on stream terraces.
- Unit I–2. Well-drained, loamy soils that have slopes of 0 to 2 percent; on flood plains.

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

Subclass IIe soils are subject to moderate erosion unless they are protected.

- Unit IIe–1. Well-drained, loamy soils that have slopes of 2 to 5 percent; on stream terraces and uplands.
- Unit IIe–2. Moderately well-drained, loamy soils that are high in content of silt, have a fragipan, and have slopes of 2 to 5 percent; on uplands.

Subclass IIw soils are moderately limited because of excess water.

- Unit IIw–1. Moderately well drained, loamy soils that are high in content of silt, have a fragipan at a depth of about 18 inches, and have slopes of 0 to 2 percent; on uplands.
- Unit IIw–2. Moderately well drained, loamy soils that are high in content of silt, have a fragipan at a depth of 24 to 32 inches, and have slopes of 0 to 2 percent; on uplands.
- Unit IIw–3. Well-drained, loamy soils that are high in content of silt and have slopes of 0 to 2 percent; on flood plains.

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

Subclass IIIe soils are subject to severe erosion if they are cultivated and not protected.

- Unit IIIe–1. Moderately well drained, loamy soils that are high in content of silt, have a fragipan, and have slopes of 5 to 8 percent; on uplands.
- Unit IIIe–2. Well-drained, loamy soils that have slopes of 5 to 8 percent; on uplands.
- Unit III–3. Well-drained, loamy soils that are high in content of gravel and have slopes of 2 to 5 percent; on uplands.

Subclass IIIw soils are severely limited because of excess water.

- Unit IIIw–1. Somewhat poorly drained soils that have a clayey subsoil and have slopes of 0 to 3 percent; on uplands.
- Unit IIIw–2. Poorly drained, loamy soils that are high in content of silt and have slopes of 0 to 2 percent; on stream terraces.
- Unit IIIw–3. Poorly drained, loamy soils that are high in content of silt, have a high content of sodium, and have slopes of 0 to 2 percent; on stream terraces.
- Unit IIIw–4. Somewhat poorly drained to moderately well drained, loamy soils that have slopes of 0 to 2 percent; on broad flats.

Subclass IIIs soils are severely limited because of low moisture capacity or poor tilth.

- Unit IIIs–1. Well drained to somewhat excessively drained, loamy soils that are high in

content of sand and have slopes of 0 to 5 percent; on stream terraces.

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

Subclass IVe soils are subject to very severe erosion if they are cultivated and not protected.

Unit IVe–1. Somewhat poorly drained to moderately well drained soils that have a clayey subsoil and have slopes of 4 to 8 percent; on uplands.

Unit IVe–2. Well-drained, loamy soils that have slopes of 8 to 12 percent; on uplands.

Subclass IVw soils are very severely limited because of excess water.

Unit IVw–1. Somewhat poorly drained, loamy soils that are high in content of silt and have slopes of 0 to 2 percent; on flood plains that are frequently flooded.

Class V soils are subject to little or no erosion but have other limitations, impractical to remove, that limit their use largely to pasture or range, woodland, or wildlife habitat.

Subclass Vw soils are too wet for cultivation; drainage or protection is not feasible.

Unit Vw–1. Well-drained, loamy soils; on flood plains, that are frequently flooded.

Unit Vw–2. Excessively drained, sandy soils, on flood plains that are frequently flooded.

Unit Vw–3. Poorly drained, loamy soils that are high in content of silt, on flood plains that are frequently flooded.

Class VI soils have very severe limitations that make them generally unsuited to cultivation and limit their use to pasture or range, woodland, or wildlife habitat.

Subclass VIe soils are severely limited, chiefly by risk of erosion, unless protective cover is maintained.

Unit VIe–1. Moderately well drained to somewhat poorly drained soils that have a clayey subsoil and have slopes of 8 to 12 percent; on uplands.

Unit VIe–2. Well-drained, loamy soils that are high in content of gravel and have slopes of 12 to 17 percent; on uplands.

Unit VIe–3. Well-drained, loamy soils that have slopes of 15 to 30 percent; on uplands.

Class VII soils have very severe limitations that make them unsuited to cultivation and limit their use largely to range, woodland, or wildlife food and cover.

Subclass VIIe soils are very severely limited, chiefly by risk of erosion, unless protective cover is maintained.

Unit VIIe–1. Moderately well drained to somewhat poorly drained soils that have a clayey subsoil and have slopes of 20 to 30 percent.

Unit VIII–2. Well-drained, severely eroded loamy soils that have slopes of 15 to 30 percent.

Subclass VIIs soils are very severely limited by available water capacity, stones, or other features.

Unit VIIs–1. Well drained to excessively drained, loamy soils that have slopes of 15 to 30 percent.

Class VIII soils and landforms have limitations that preclude their use for commercial crop production and restrict their use to recreation, wildlife habitat, water supply, or esthetic purposes. (None in Lawrence County.)

Predicted yields

Table 2 lists predicted yields of the principal crops grown in Lawrence County. The predictions are based on estimates made by farmers, soil scientists, and others who have knowledge of yields in the county and on research data. The predicted yields are average yields per acre that can be expected at the level of management that tends to produce the highest economic returns.

The yields are given for dryland farming only, because irrigation is not used extensively in this county.

Crops other than those shown in table 2 are grown in the county, but their predicted yields are not included because their acreage is small or reliable data on yields are not available.

The predicted yields given in table 2 can be expected if the following management is used:

1. Rainfall is effectively used and conserved.
2. Surface or subsurface drainage systems are installed, where appropriate.
3. Crop residue is managed to maintain soil tilth.
4. Minimum but timely tillage is used.
5. Insects, plants, diseases, and weeds are consistently controlled.
6. Fertilizer is applied according to soil tests and crop needs.
7. Adapted crop varieties are seeded at recommended rates.

Woodland [3]

In the following pages the woodland of Lawrence County is described, and the soils are grouped according to their suitability for trees. Information given can be used by woodland owners, foresters, and others in planning tree plantings, conserving and improving existing stands, and managing commercial woodlots.

Of the total 277,120 acres in Lawrence County, about 67.5 percent, or 187,000 acres, is classified as in commercial forest. The woodland is owned as follows: 81,500 acres by farmers, 65,200 acres by private industry, 36,900 acres under private ownership, and 3,400 acres in public ownership (*15*).

The forest types in Lawrence County are loblolly pine-shortleaf pine, 77,000 acres; oak-gum-cypress, 49,500 acres; oak-pine, 38,500 acres; oak-hickory, 16,500 acres; longleaf pine-slash pine that is predominantly species of longleaf pine, 5,000 acres.

Many areas of woodland can be used for grazing, but grazing must be controlled so that desirable tree seedlings are not damaged and forage plants are not overgrazed. Grasses, legumes, forbs, and many of the woody plants in the understory can be used as forage.

[3] T. D. ALLEN, woodland conservationist, and DAVID W. SANDERS, range conservationist, Soil Conservation Service, helped prepare this section.

TABLE 2.—*Predicted average yields per acre of crops and pasture plants under a high level of management*

Soil	Cotton lint	Corn	Soybeans	Coastal bermudagrass		Bahiagrass	
				AUM [1]	Hay	AUM	Hay
	Pounds	*Bushels*	*Bushels*		*Tons*		*Tons*
Alaga loamy sand, 0 to 5 percent slopes				7.5	4.5	7.0	3.5
Arkabutla soils, frequently flooded				9.0	5.0	9.0	5.0
Cadeville-Freestone association, hilly							
Cadeville and Falkner soils, 4 to 8 percent slopes				7.5	4.0	6.5	3.5
Cadeville and Falkner soils, 8 to 12 percent slopes				7.5	4.0	6.0	3.0
Cahaba sandy loam, 0 to 2 percent slopes	800	90	35	9.5	5.0	8.0	4.5
Cahaba sandy loam, 2 to 5 percent slopes	750	85	35	9.5	5.0	8.0	4.5
Falkner silt loam, 0 to 3 percent slopes	550	60	30	9.0	5.0	8.0	4.5
Guyton silt loam	400	40	22	7.0	3.5	6.0	3.0
Jena fine sandy loam	700	85	35	12.0	6.0	10.5	6.0
Jena soils, frequently flooded				4.0		4.0	
Nugent soils, frequently flooded							
Paden silt loam, 0 to 2 percent slopes	600	75	35	8.0	4.5	9.0	5.0
Providence silt loam, 0 to 2 percent slopes	700	85	35	10.0	5.5	9.0	5.0
Providence silt loam, 2 to 5 percent slopes	700	80	35	9.5	5.0	9.0	5.0
Providence silt loam, 5 to 8 percent slopes	650	75	30	9.0	5.0	8.5	5.0
Rosebloom silt loam, frequently flooded							
Rosella silt loam		70	30	6.5	3.0	6.0	3.0
Ruston sandy loam, 2 to 5 percent slopes	500	65	30	10.0	5.5	10.0	5.5
Ruston sandy loam, 5 to 8 percent slopes	500	55	25	9.5	5.0	9.5	5.0
Ruston sandy loam, 8 to 12 percent slopes	400	50	25	8.5	5.0	8.5	5.0
Saffell gravelly sandy loam, 2 to 5 percent slopes				5.5	3.0	5.5	3.0
Saffell gravelly sandy loam, 12 to 17 percent slopes							
Smithdale sandy loam, 15 to 30 percent slopes				7.0		7.0	
Smithdale sandy loam, 15 to 30 percent slopes, severely eroded						6.0	
Smithdale-Lucy association, hilly							
Velda silt loam	750	90	35	10.0	5.5	10.0	5.5
Wanilla silt loam		60	35	7.0	3.5	7.0	3.5

[1] AUM is the animal-unit-month, a term used to express the carrying capacity of pasture. It is the number of animal units per acre a pasture can carry each month without injury to the sod. An acre of pasture that provides 1 month of grazing for 1 cow, 1 horse, 7 sheep, or 5 hogs has a carrying capacity of 1 animal-unit-month.

Table 3 gives information that is based on detailed plot studies measurement of different trees on different soils, published and unpublished records, and the experience and judgment of technicians who work with tree crops in the area.

The amount of forage produced in a woodland area varies with the age of trees, the density of the canopy, the soil, and the forage value of the vegetation. For the purposes of this survey, four canopy classes are recognized. An open canopy shades up to 20 percent of the ground at midday; a sparse canopy, 21 to 35 percent; a medium canopy, 36 to 55 percent; and a dense canopy, 56 to 70 percent.

The potential yield of air-dry forage by canopy classes for each woodland suitability group is shown in table 3.

Forage value is a rating given the vegetation in relation to its potential to furnish forage for livestock production. The most desirable forage is rated *high,* moderately desirable forage is rated *moderate,* and the least desirable forage is rated *low.*

The principal forage plants listed in table 3 are those present when at least 70 percent of the understory is made up of high-value plants and the canopy is 45 percent or less. As the canopy closes, these plants are replaced by shade-tolerant woody species, and forage yields become progressively lower.

In the column headed "Woodland suitability group," each group is made up of soils that are suited to the same kinds of trees, that need about the same kind of management, and that have about the same potential productivity.

Each woodland suitability group is identified by a three-part symbol. The first part of the symbol indicates the relative productivity of the soils; 1 is very high; 2 is high; 3 is moderately high; and 4 is moderate. The second part of the symbol, a letter, indicates the soil property that imposes a moderate or severe hazard of limitation in managing the soils for wood production. The letter *w* shows that excessive water in or on the soil is the chief limitation; *c* shows that clay in the upper part of the soil is a limitation; *s* shows that the soils are sandy; *f* shows that the soils have large amounts of coarse fragments; and *o* shows that the soils have no significant restrictions or limitations for woodland use or management. The third element in the symbol indicates the degree of management problems and the general suitability of the soils for certain kinds of trees (*6, 7*). In this column drainage, geographic position, permeability, and available water capacity of each group of soils is described.

Under the heading "Potential productivity" is a list of some of the commercially important trees that are adapted to the soil and the average site index. These

TABLE 3.—*Soils rated for*

Woodland suitability group	Potential productivity	
	Kinds of trees	Average site index
Group 1o7: well-drained soils on flood plains. Permeability is moderate, and available water capacity is high to medium.	Cottonwood	100
	Water oak	82
	Sweetgum	90
	Yellow-poplar	110
	Loblolly pine	98
Group 1w8: well-drained soils on flood plains that are subject to frequent flooding. Permeability is moderate, and available water capacity is medium.	Cottonwood	100
	Water oak	82
	Sweetgum	90
	Yellow-poplar	110
	Loblolly pine	98
Group 1w9: somewhat poorly drained soils on flood plains. Permeability is moderate, and available water capacity is high.	Cottonwood	85
	Loblolly pine	100
	Water oak	100
	Sweetgum	100
	Yellow-poplar	90
Group 2o1: well-drained soils on uplands. Permeability is moderate, and available water capacity is medium.	Loblolly pine	90
	Slash pine	90
	Longleaf pine	70
Group 2o7: well drained and moderately well drained soils on uplands and stream terraces. Permeability is moderate to slow, and available water capacity is medium.	Cherrybark oak	90
	Loblolly pine	90
	Longleaf pine	70
	Sweetgum	90
Group 2w8: moderately well drained and somewhat poorly drained soils on uplands and stream terraces. Permeability is moderately slow to slow, and available water capacity is medium to high.	Loblolly pine	90
	Longleaf pine	80
	Slash pine	90
	Sweetgum	90
Group 2w9: poorly drained soils on stream terraces and flood plains. Permeability is slow to very slow, and available water capacity is high.	Green ash	90
	Cottonwood	100
	Cherrybark oak	90
	Nuttall oak	95
	Sweetgum	90
	Loblolly pine	90
Group 2s8: excessively drained soils on flood plains that are subject to frequent flooding. Permeability is rapid, and available water capacity is low.	Water oak	95
	Sweetgum	95
	Loblolly pine	90
	Slash pine	90
Group 3w9: poorly drained soils on stream terraces and nearly level uplands. Permeability is slow, and available water capacity is medium.	Water oak	80
	Willow oak	80
	Loblolly pine	80
	Sweetgum	75
Group 3s2: well drained to somewhat excessively drained soils on uplands and stream terraces. Permeability is moderate to rapid, and available water capacity is low to medium.	Loblolly pine	80
	Shortleaf pine	70
	Slash pine	80
	Longleaf pine	70
Group 3c2: moderately well drained soils on uplands. Permeability is very slow, and available water capacity is high.	Loblolly pine	80
	Shortleaf pine	70
	Longleaf pine	75
Group 4f2: well-drained, gravelly soils on uplands. Permeability is moderate to rapid, and available water capacity is medium.	Loblolly pine	70
	Shortleaf pine	60
	Redcedar	----------

woodland and forage use

Hazards and limitations			Suitable trees for planting	Understory vegetation used for forage	
Erosion hazard	Equipment limitations	Seedling mortality		Principal plants	Estimated yield of air-dry forage by canopy class
					Pounds per acre
Slight	Slight	Slight	Cottonwood, loblolly pine, water oak, yellow-poplar, and sweetgum.	Pinehill bluestem, switchgrass, switchcane, uniolas, grassleaf goldaster, and honeysuckle.	Open canopy, 2,000 to 2,400; sparse, 1,500 to 2,000; medium, 800 to 1,500; and dense, 200 to 800.
Slight	Moderate to severe.	Moderate	Cottonwood, loblolly pine, water oak, yellow-poplar, and sweetgum.	Pinehill bluestem, switchgrass, switchcane, uniolas, and honeysuckle.	Open canopy, 2,200 to 2,800; sparse, 2,000 to 2,400; medium, 1,000 to 1,400; and dense, 200 to 800.
Slight	Severe	Slight	Cottonwood, loblolly pine, oak, sweetgum, and yellow-poplar.	Pinehill bluestem, switchgrass, uniolas, and honeysuckle.	Open canopy, 2,200 to 2,800; sparse, 2,000 to 2,400; medium, 800 to 1,500; and dense, 200 to 800.
Slight	Slight	Slight	Loblolly pine, slash pine, and longleaf pine.	Pinehill bluestem, indiangrass, big bluestem, grassleaf goldaster, and perennial lespedeza.	Open canopy, 2,000 to 2,800; sparse, 1,000 to 2,600; medium, 500 to 1,000; and dense, 0 to 500.
Slight	Slight	Slight	Loblolly pine, cherrybark oak, and sweetgum.	Pinehill bluestem, indiangrass, big bluestem, grassleaf goldaster, and perennial lespedeza.	Open canopy, 2,000 to 2,400; sparse, 1,800 to 2,200; and dense, 300 to 700.
Slight	Moderate	Slight	Loblolly pine, shortleaf pine, and sweetgum.	Pinehill bluestem, switchcane, and longleaf uniola.	Open canopy, 2,200 to 2,600; sparse, 2,000 to 2,400; medium, 800 to 1,400; and dense, 400 to 800.
Slight	Severe	Moderate	Green ash, cottonwood, cherrybark oak, Nuttall oak, sweetgum, and loblolly pine.	Pinehill bluestem, switchgrass, switchcane, perennial lespedeza, and honeysuckle.	Open canopy, 2,300 to 2,800: sparse, 2,000 to 2,400; medium, 800 to 1,400; and dense, 200 to 800.
Slight	Moderate	Severe	Water oak, sweetgum, loblolly pine, and slash pine.	Hardwood site: grazing not recommended.	
Slight	Severe	Severe	Shumard oak, loblolly pine, sweetgum, and yellow-poplar.	Pinehill bluestem, switchgrass, switchcane, longleaf uniola, perennial lespedeza, and honeysuckle.	Open canopy, 2,500 to 3,200; sparse, 1,800 to 2,400; medium, 800 to 1,600; and dense, 200 to 1,000.
Slight	Moderate	Moderate	Loblolly pine, longleaf pine, slash pine, and shortleaf pine.	Pinehill bluestem, little bluestem, indiangrass, and broomsedge.	Open canopy, 1,200 to 1,800; sparse, 1,000 to 1,600; medium, 500 to 1,000; and dense, 0 to 500.
Slight to moderate.	Moderate to severe.	Slight to moderate.	Loblolly pine and shortleaf pine.	Pinehill bluestem, longleaf uniola, indiangrass, beaked panicum, grassleaf goldaster, and tickclover.	Open canopy, 1,500 to 2,200; sparse, 1,000 to 2,000; medium, 500 to 1,000; and dense, 0 to 500.
Slight	Slight	Moderate	Loblolly pine, shortleaf pine, and redcedar.	Pinehill bluestem, slender bluestem, low panicum, and piney woods dropseed.	Open canopy, 1,200 to 1,600; sparse, 800 to 1,400; medium, 300 to 800; and dense, 0 to 400.

are the trees that woodland managers generally favor in intermediate or improvement cuttings. The site index is the average height of dominant trees, in feet, at age 25 for planted pines; at age 30 for cottonwood; at age 35 for sycamore; and at age 50 for all other trees.

Erosion hazard measures the risk of soil losses in well-managed woodland. Erosion hazard is *slight* if the expected soil loss is small, *moderate* if some measures to control erosion are needed in logging and construction, and *severe* if intensive treatment or special equipment and methods are needed to prevent excessive soil losses.

Equipment limitations reflect the soil features that restrict the use of equipment normally used in woodland management or harvesting. Slight indicates that equipment use is not limited to certain kinds of equipment or to a certain time of year. Moderate indicates a seasonal limitation or need for modification in methods or equipment. Severe indicates the need for specialized equipment or methods.

Seedling mortality indicates the degree of expected mortality of planted seedlings when plant competition is not a limiting factor. Normal rainfall, good planting stock, and proper planting are assumed. Slight indicates that expected loss is less than 75 percent; moderate indicates a loss of 25 to 50 percent; and severe indicates more than 50 percent losses.

Understory vegetation used for forage refers to the principal plants and estimated yield by canopy class. Productivity is expressed in pounds of air-dry forage per acre. Where yield data are not available and estimates cannot be made, the plants are listed in order of their productivity.

Wildlife[4]

Soils directly influence the kinds and amounts of vegetation and amounts of water available, and in this way indirectly influence the kinds of wildlife that can live in an area. Soil properties that affect wildlife habitat are thickness of soil useful to crops, surface texture, available water capacity to a depth of 40 inches, wetness, surface stoniness or rockiness, hazard of flooding, slope, and permeability of the soil to air and water.

In table 4 the suitability of soils in this survey area for six elements of wildlife habitat and for three kinds of wildlife is shown. *Good* indicates that the habitat is easily improved, maintained, or created, that there are few or no soil limitations in habitat management, and that satisfactory results can be expected. *Fair* indicates that the habitat can be improved, maintained, or created, that moderate soil limitations affect management or development, and that a moderate intensity of management and fairly frequent attention may be needed for satisfactory results. *Poor* means that the habitat can be improved, maintained, or created, but that the soil limitations are severe. It also means that habitat management may be difficult and expensive and require intensive effort, and that results are questionable. *Very poor* means that it is not practical to attempt to improve, maintain, or create a habitat and that unsatisfactory results are probable.

In table 4 the suitability of each soil is rated according to its ability to produce the various plants and other elements that make up the wildlife habitat. The characteristics of the soils and closely related natural factors of the environment are taken into account, but climate, present use of soil, or present distribution of wildlife and people are not considered. For this reason, selection of a site for development as wildlife habitat requires onsite inspection. The suitability ratings for three kinds of wildlife are related to the ratings for elements of habitat. For example, soils that are poorly suited to shallow water developments are also poorly suited to wetland wildlife.

Grain and seed crops are corn, sorghum, millet, soybeans, and other annual grain-producing plants.

Domestic grasses and legumes provide food and cover for wildlife. Among the grasses are bahiagrass, ryegrass, and panicgrass, and among the legumes are annual lespedeza, shrub lespedeza, and other clovers.

Wild herbaceous plants are native or introduced perennial grasses, forbs, and weeds that provide food and cover for upland wildlife. Beggarweed, perennial lespedeza, wild bean, pokeweed, and cheatgrass are typical examples.

Hardwood trees are nonconiferous trees that produce food in the form of fruits, nuts, buds, catkins, or browse. Such plants commonly grow in their natural environment, but they may be planted and developed through wildlife management programs. Typical in this category are oak, beech, cherry, dogwood, and maple.

Wetland plants are annual and perennial herbaceous plants that grow wild on moist and wet sites. They furnish food and cover, mainly for wetland wildlife. Examples of typical plants are smartweed, wild millet, spikerush and other rushes, sedges, burreed, tearthumb, and aneilema. Submerged and floating aquatics are not excavations for controlling water, generally not more included in this category.

Among shallow water areas are impoundments or excavations for controlling water, generally not more than 5 feet deep, so that a habitat suitable for waterfowl can be created. Some areas are designed to be drained, planted, and then flooded; others are permanent impoundments where submerged aquatics grow.

Openland wildlife are birds and mammals that normally live in meadows, pastures, as well as in open areas where grasses, herbs, and shrubby plants grow. Quail, dove, meadowlark, field sparrow, cottontail rabbit, and fox are examples of typical openland wildlife.

Woodland wildlife are birds and mammals that normally live in areas where hardwood trees, coniferous trees, and shrubs grow. Woodcock, thrush, wild turkey, vireo, deer, squirrel, and raccoon are examples of typical woodland wildlife.

Wetland wildlife are birds and mammals that normally live in wet areas, marshes, and swamps. Duck, goose, rail, shore birds, heron, mink, and muskrat are examples of typical wetland wildlife.

[4] EDWARD G. SULLIVAN, biologist, Soil Conservation Service, helped prepare this section.

TABLE 4.—*Suitability of soils for wildlife habitat and kinds of wildlife*

Soil series and map symbols	Elements of wildlife habitat						Kinds of wildlife		
	Grain and seed crops	Domestic grasses and legumes	Wild herbaceous plants	Hard-wood trees	Wetland plants	Shallow water areas	Openland	Woodland	Wetland
Alaga: AlB	Fair	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
Arkabutla: Ar	Poor	Fair	Fair	Good	Fair	Good	Fair	Good	Fair.
Cadeville: CFE, CgC, CgD—For Freestone part of CFE and Falkner parts of CgC and CgD, see those series.	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
Cahaba: ChA, ChB	Good	Good	Good	Good	Poor	Poor	Good	Good	Very poor.
Falkner: FaB	Good	Good	Good	Good	Fair	Very poor	Good	Good	Poor.
Freestone—Mapped only with Cadeville soils.	Poor	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
Guyton: Gu	Poor	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Jena:									
Je	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
JN	Poor	Fair	Fair	Good	Poor	Very poor	Fair	Good	Very poor.
Lucy—Mapped only with Smithdale soils.	Fair	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
Nugent: Nu	Poor	Poor	Fair	Poor	Very poor	Very poor	Poor	Poor	Very poor.
Paden: PaA	Fair	Good	Good	Fair	Poor	Fair	Good	Fair	Poor.
Providence:									
PrA, PrB	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
PrC	Fair	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
Rosebloom: Ro	Poor	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Rosella: Rs	Poor	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Ruston:									
RuB	Good	Good	Good	Good	Poor	Very poor	Good	Good	Poor.
RuC, RuD	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
Saffell:									
SaB	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
SaE	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
Smithdale: SmE, SmE3, STE. For Lucy part of STE, see that series.	Fair	Good	Good	Good	Very poor	Very poor	Good	Gocd	Very poor.
Velda: Ve	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
Wanilla: Wa	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.

Engineering Uses of the Soils[5]

This section is useful to those who need information about soils used as structural material or as foundation upon which structures are built. Among those who can benefit from this section are planning commissions, town and city managers, land developers, engineers, contractors, and farmers.

Among properties of soils highly important in engineering are permeability, strength, compaction characteristics, drainage, shrink-swell potential, grain size, plasticity, and reaction. Also important are depth to the water table, depth to bedrock, and slope. These properties, in various degrees and combinations, affect

[5] PAUL A. CALHOUN, agricultural engineer, Soil Conservation Service, helped prepare this section.

construction and maintenance of roads, airports, pipelines, foundations for small buildings, irrigation systems, ponds and small dams, and systems for disposal of sewage and refuse.

Information in this section of the soil survey can be helpful to those who—

1. Select potential residential, industrial, commercial, and recreational areas.
2. Evaluate alternate routes for roads, highways, pipelines, and underground cables.
3. Seek sources of gravel, sand, or clay.
4. Plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for controlling water and conserving soil.
5. Correlate performance of structures already built with properties of the kinds of soil on which they are built, to help predict performance of structures on the same or similar kinds of soil in other locations.
6. Predict the trafficability of soils for cross-country movement of vehicles and construction equipment.
7. Develop preliminary estimates pertinent to construction in a particular area.

Most of the information in this section is presented in tables. Table 5 shows several estimated soil properties significant in engineering; table 6 gives interpretations for various engineering uses; and table 7 gives the results of engineering laboratory tests on soil samples.

This information, along with the General Soil Map and data in other parts of this publication, can be used to make interpretations in addition to those given in tables 5 and 6, and it can also be used to make other useful maps.

This information, however, does not eliminate the need for further investigations at sites selected for engineering works, especially works that involve heavy loads or that require excavations to depths greater than those shown in the tables, generally depths of more than 6 feet. Also, inspection of sites, especially small ones, is needed, because many delineated areas of a given soil can include small areas of other kinds of soil that have strongly contrasting properties and different suitability or limitations for engineering.

Some of the terms used in this soil survey have special meaning in soil science that is not used in engineering. The Glossary defines many of the terms commonly used in soil science.

Engineering soil classification systems

The two systems most commonly used in classifying samples of soils for engineering are the Unified system used by Soil Conservation Service engineers, the Department of Defense, and others; and the AASHTO system adopted by the American Association of State Highway and Transportation Officials.

In the Unified system (*2*) soils are classified according to particle-size distribution, plasticity, liquid limit, and organic-matter content. Soils are grouped in 15 classes. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt.

The AASHTO system (*1*) is used to classify soils according to properties that affect their use in highway construction and maintenance. In this system, a soil is placed in one of seven basic groups ranging from A–1 through A–7 on the basis of grain-size distribution, liquid limit, and plasticity index. In group A–1 are gravelly soils of high bearing strength, the best soils for subgrade (foundation). At the other extreme, in group A–7, are clay soils that have low strength when wet and that are the poorest soils for subgrade. Where laboratory data are available to justify a further breakdown, the A–1, A–2, and A–7 groups are divided as follows: A–1–a, A–1–b, A–2–4, A–2–5, A–2–6, A–2–7, A–7–5, and A–7–6. As additional refinement, the engineering value of soil material can be indicated by a group index number. Group indexes range from 0 for the best material to 20 or more for the poorest. The AASHTO classification for tested soils, with group index numbers in parentheses, is shown in

TABLE 5.—*Estimated*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The soils in such column of this table. The symbol > means

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	USDA texture	Classification	
				Unified	AASHTO
	Inches	*Inches*			
Alaga: AlB	>60	0–60	Loamy sand, loamy fine sand	SM	A–2
		60–80	Fine sand, loamy sand, loamy fine sand	SM	A–2
Arkabutla: Ar	15	0–17	Silty clay loam, silt loam, loam	CL or ML	A–6 or A–4
		17–33	Silt loam, silty clay loam	ML or CL	A–6 or A–7
		33–80	Silty clay loam, silt loam	CL	A–6 or A–7
*Cadeville: CFE, CgC, CgD	20	0–5	Silt loam, fine sandy loam, loam	ML	A–4
For Freestone part of CFE and Falkner parts of CgC and CgD, see those series.		5–12	Clay, silty clay	CH	A–7
		12–48	Clay loam	CL	A–7
		48–72	Clay loam, silty clay loam	CH	A–7

table 7; the estimated classification, without group index numbers, is given in table 5 for all soils mapped in the survey area.

Estimated properties of the soils

Several estimated soil properties significant in engineering are given in table 5. These estimates are made for typical soil profiles, by layers sufficiently different to have different significance for engineering. The estimates are based on field observations made in the course of mapping, on test data for these and similar soils, and on experience with the same kinds of soil in other counties. Ratings apply only to depths indicated; bedrock is well below these depths. Following are explanations of some of the columns in table 5.

Depth to seasonal high water table is the distance from the surface of the soil to the highest level that ground water reaches in the soil in most years.

USDA texture is described in table 5 in the standard terms used by the Department of Agriculture. These terms take into account relative percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the soil contains gravel or other particles coarser than sand, an appropriate modifier is added, for example, "gravelly loamy sand." "Sand," "silt," "clay," and some of the other terms used are defined in the Glossary.

Permeability is that quality of a soil that enables it to transmit water or air. It is estimated on the basis of those soil characteristics observed in the field, particularly structure and texture. The estimates in table 5 do not take into account lateral seepage or such transient soil features as plowpans and surface crusts.

Available water capacity is the ability of soils to hold water for use by most plants. It is commonly defined as the difference between the amount of water in the soil at field capacity and the amount at the wilting point of most crop plants.

Reaction is the degree of acidity or alkalinity of a soil, expressed in pH values. The pH value and terms used to describe soil reaction are explained in the Glossary.

Shrink-swell potential is the relative change in volume of soil material to be expected with changes in moisture content, that is, the extent to which the soil shrinks as it dries out or swells when it gets wet. The extent of shrinking and swelling is influenced by the amount and kind of clay in the soil. Shrinking and swelling of soils cause much damage to building foundations, roads, and other structures, A *high* shrink-swell potential indicates a hazard to the maintenance of structures built in, on, or with material having this rating.

Engineering interpretations of the soils

The estimated interpretations in table 6 are based on the engineering properties of soils shown in table 5, on test data for soils in this survey area and others nearby or adjoining, and on the experience of engineers and soil scientists with the soils of Lawrence County. In table 6, summarized limitations or ratings of suitability of the soils are given for all listed purposes other than for drainage of cropland and pasture, irrigation, ponds and reservoirs, embankments, and terraces and diversions. For these particular uses, table 6 lists those soil features not to be overlooked in planning, installation, and maintenance.

Topsoil is used for topdressing an area where vegetation is to be established and maintained. Suitability is affected mainly by ease of working and spreading the soil material, as in preparing a seedbed; natural fertility of the material, or plant response when fertilizer is added to the soil; and absence of substances toxic to plants. Texture of the soil material and its content of stone fragments affect suitability, and also considered in the ratings is damage that can result at the area from which topsoil is taken.

Sand and gravel are used in great quantities in many kinds of construction. A soil rated as *good* or *fair* source of sand or gravel generally has a layer at least 3 feet thick, the top of which is within the uppermost 6 feet of soil material. The suitability ratings do

properties of the soils

mapping units may have different properties and limitations, and for this reason it is necessary to refer to other series as indicated in the first more than; the symbol < means less than]

Percentage passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
No. 4 (4.7 mm)	No. 10 (2 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)				
				Inches per hour	*Inches per inch of soil*	*pH*	
100	100	80–95	15–25	6.0–20	0.04–0.09	4.5–6.0	Low.
100	100	80–95	15–20	6.0–20	0.04–0.09	4.5–6.0	Low.
100	100	90–100	70–100	0.6–2.0	0.20–0.22	4.5–5.5	Low.
100	100	90–100	85–100	0.6–2.0	0.18–0.20	4.5–5.5	Low to moderate.
100	100	95–100	85–100	0.6–2.0	0.18–0.20	4.5–5.5	Moderate.
100	100	85–95	55–90	0.6–2.0	0.18–0.22	4.5–5.5	Low.
100	100	90–100	80–100	0–0.06	0.17–0.20	4.5–5.5	High.
100	100	90–100	70–100	0–0.06	0.18–0.20	4.5–5.5	High.
100	100	90–100	80–100	0–0.06	0.18–0.20	4.5–5.5	High.

TABLE 5.—*Estimated*

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	USDA texture	Classification	
				Unified	AASHTO
	Inches	*Inches*			
Cahaba: ChA, ChB	>60	0–14	Sandy loam	SM	A–4
		14–33	Sandy clay loam, clay loam, loam	SC or CL	A–6
		33–43	Sandy clay loam, sandy loam	SM or SC	A–4 or A–6
		43–120	Loamy sand, loamy fine sand, fine sand, sand	SM, SP–SM	A–2 or A–4
Falkner: FaB	16	0–22	Silt loam, silty clay loam	ML or CL	A–4 or A–6
		22–42	Silty clay loam, silt loam	CL	A–6 or A–7
		42–62	Clay, silty clay	CH	A–7
		62–80	Clay loam, silty clay	CL or CH	A–6 or A–7
Freestone	20	0–9	Sandy loam, fine sandy loam	SM	A–4 or A–2
Mapped only with Cadeville soils.		9–23	Sandy clay loam, clay loam, loam	SC or CL	A–6
		23–72	Clay, clay loam, silty clay loam	CH	A–7
Guyton: Gu	<15	0–6	Silt loam	ML	A–4
		6–30	Silt loam, silty clay loam	ML or CL	A–4 or A–6
		30–65	Silty clay loam, silt loam	CL	A–6
Jena: Je, JN	40–72	0–45	Fine sandy loam, sandy loam, loam	SM	A–4
		45–72	Loamy fine sand, fine sandy loam	SM	A–2 or A–4
Lucy	>60	0–26	Loamy sand, loamy fine sand	SM	A–2 or A–4
Mapped only with Smithdale soils.		26–36	Sandy loam, loam, sandy clay loam	SM or ML	A–2 or A–4
		36–72	Loam, sandy clay loam, clay loam	SC or CL	A–4 or A–6
Nugent: Nu	>60	0–39	Sand, loamy sand, fine sand, sandy loam	SM–SP or SM	A–3 or A–2
		39–43	Gravelly sand, loamy sand	GM, SP–SM, or SM	A–2
		43–72	Sand, loamy sand	SP–SM or SM	A–3 or A–2
Paden: PaA	23	0–18	Silt loam, silty clay loam	ML	A–4
		18–48	Silt loam, silty clay loam, clay loam	ML or CL	A–4 or A–6
		48–85	Loam, clay loam, sandy clay loam, silty clay loam.	CL or SC	A–6, A–4
Providence: PrA, PrB, PrC	32	0–9	Silt loam	ML	A–4
		9–27	Silty clay loam, silt loam	CL	A–6
		27–32	Silt loam, sandy clay loam	ML or CL	A–4 or A–6
		32–58	Loam, silt loam, sandy clay loam	CL	A–6
		58–74	Sandy clay loam, loam, silt loam	SC or CL	A–6
Rosebloom: Ro	6	0–5	Silt loam	ML	A–4
		5–60	Silty clay loam, silt loam	CL	A–6
Rosella: Rs	<12	0–25	Silt loam, very fine sandy loam	ML or CL	A–4 or A–6
		25–65	Silt loam, loam, silty clay loam	ML or CL	A–4 or A–6
Ruston: RuB, RuC, RuD	>60	0–6	Sandy loam, loamy fine sand	SM	A–4 or A–2
		6–23	Clay loam to sandy clay loam	SC or CL	A–6
		23–47	Sandy loam, fine sandy loam, loam	SM or ML	A–4 or A–2
		47–80	Sandy clay loam	SC or SM	A–6 or A–4
Saffell: SaB, SaE	>60	0–10	Gravelly sandy loam	SM or ML	A–2 or A–4
		10–40	Gravelly sandy clay loam, gravelly loam	GC or SC	A–2 or A–4
		40–80	Gravelly sandy loam, gravelly loam, gravelly loamy sand, gravelly sand.	GM or SM	A–2 or A–4
*Smithdale: SmE, SmE3, STE	>60	0–10	Sandy loam, fine sandy loam	SM	A–4
For Lucy part of STE, see that series.		10–40	Sandy clay loam, clay loam, loam	SC or CL	A–6
		40–80	Sandy loam, loam	SM	A–4
Velda: Ve	48	0–66	Silt loam, fine sandy loam, very fine sandy loam	ML	A–4
Wanilla: Wa	24	0–9	Silt loam, loam, sandy loam	SM or ML	A–4 or A–2
		9–40	Loam, sandy loam	ML or SM	A–4
		40–80	Silt loam, clay loam, silty clay loam	ML or CL	A–4 or A–6

properties of the soils—Continued

Percentage passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
No. 4 (4.7 mm)	No. 10 (2 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)				
				Inches per hour	*Inches per inch of soil*	*pH*	
100	95–100	80–90	36–50	2.0–6.0	0.10–0.13	4.5–5.5	Low.
100	100	80–95	45–75	0.6–2.0	0.14–0.18	4.5–5.5	Low.
100	100	85–95	40–50	0.6–2.0	0.14–0.18	4.5–5.5	Low.
100	100	60–80	10–40	6.0–20	0.03–0.08	4.5–5.5	Low.
100	100	95–100	85–100	0.2–0.6	0.18–0.22	4.5–5.5	Low.
100	100	95–100	85–95	0.2–0.6	0.18–0.20	4.5–5.5	Moderate.
100	95–100	90–100	75–95	0.06–0.2	0.13–0.17	4.5–5.5	High.
100	95–100	85–100	60–90	0.2–0.6	0.17–0.19	4.5–5.5	Moderate.
100	95–100	60–75	30–50	0.6–2.0	0.10–0.15	5.1–5.5	Low.
100	95–100	80–90	45–75	0.2–0.6	0.14–0.18	5.1–5.5	Moderate.
100	95–100	85–100	70–90	0.06–0.2	0.13–0.17	5.1–5.5	High.
100	100	95–100	85–100	0.2–0.6	0.20–0.22	4.5–5.5	Low.
100	100	95–100	80–100	0.2–0.6	0.20–0.22	4.5–5.5	Low.
100	100	95–100	80–100	0–0.06	0.18–0.20	4.5–5.5	Moderate.
100	100	60–80	36–50	0.6–2.0	0.10–0.13	4.5–5.5	Low.
100	100	70–90	30–45	6.0–20	0.05–0.09	4.5–5.5	Low.
100	95–100	60–90	15–45	6.0–20	0.05–0.10	4.5–5.5	Low.
100	95–100	70–85	30–60	2.0–6.0	0.10–0.15	4.5–5.5	Low.
100	95–100	85–95	35–70	0.6–2.0	0.12–0.15	4.5–5.5	Low.
100	100	60–75	5–35	6.0–20	0.03–0.07	4.5–6.0	Low.
35–100	35–90	30–60	10–20	6.0–20	0.03–0.07	4.5–6.0	Low.
100	100	60–75	5–20	6.0–20	0.03–0.07	4.5–6.0	Low.
100	100	95–100	80–95	0.6–2.0	0.18–0.20	4.5–5.5	Low.
100	100	90–100	75–90	0.06–0.2	0.05–0.10	4.5–5.5	Low.
100	95–100	80–100	45–90	0.06–0.2	0.05–0.10	4.5–5.5	Low to moderate.
100	100	100	85–95	0.6–2.0	0.20–0.22	4.5–6.0	Low.
100	100	90–100	85–100	0.6–2.0	0.20–0.22	4.5–6.0	Moderate.
100	100	80–100	85–95	0.6–2.0	0.15–0.20	4.5–6.0	Low.
100	95–100	85–95	55–80	0.2–0.6	0.05–0.10	4.5–6.0	Low.
100	95–100	70–90	40–65	0.6–2.0	0.10–0.15	4.5–6.0	Low.
100	100	85–100	85–100	0.6–2.0	0.20–0.22	4.5–5.5	Low.
100	100	85–100	85–100	0.06–0.2	0.20–0.22	4.5–5.5	Moderate.
100	100	90–100	60–85	0.06–0.2	0.15–0.18	4.5–6.0	Low.
100	100	90–100	70–85	0.06–0.2	0.15–0.18	4.5–6.0	Low.
100	100	60–75	25–40	0.6–2.0	0.14–0.16	4.5–6.0	Low.
100	100	80–90	45–75	0.6–2.0	0.16–0.18	4.5–6.0	Low.
100	100	60–90	30–65	0.6–2.0	0.10–0.15	4.5–6.0	Low.
100	100	75–95	36–50	0.6–2.0	0.16–0.18	4.5–6.0	Low.
75–90	75–85	40–60	20–55	2.0–6.0	0.08–0.12	4.5–5.5	Low.
40–65	40–60	40–55	25–50	0.6–2.0	0.10–0.15	4.5–5.5	Low.
35–60	25–55	25–50	15–45	6.0–20	0.05–0.10	4.5–5.5	Low.
100	100	60–80	36–50	2.0–6.0	0.14–0.16	4.5–5.5	Low.
100	100	80–90	40–75	0.6–2.0	0.15–0.17	4.5–5.5	Low.
100	100	70–95	36–50	2.0–6.0	0.14–0.16	4.5–5.5	Low.
100	100	80–100	55–100	0.6–2.0	0.18–0.22	4.5–5.5	Low.
100	100	70–100	30–75	2.0–6.0	0.13–0.18	4.5–6.0	Low.
100	100	70–90	40–70	0.2–0.6	0.15–0.17	4.5–6.0	Low.
100	100	90–100	60–100	0.2–0.6	0.18–0.20	4.5–6.0	Low.

TABLE 6.—*Interpretations of engineering*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The soils in such column of

Soil series and map symbol	Suitability as source of—				Soil features affecting—
	Topsoil	Sand	Gravel	Road fill	Highway location
Alaga: AlB	Poor: loamy sand	Fair: may need washing.	Unsuited (not available).	Good	Low shrink-swell potential; well drained to somewhat excessively drained.
Arkabutla: Ar	Fair: silty clay loam below a depth of 5 inches.	Unsuited (improbable source).	Unsuited (improbable source).	Fair: wetness	Moderate shrink-swell potential; wetness; frequent flooding.
*Cadeville: CFE, CgC, CgD. For Freestone part of CFE and Falkner parts of CgC and CgD, see those series.	Poor: clay below a depth of 5 inches.	Unsuited (improbable source).	Unsuited (improbable source).	Poor: high shrink-swell potential.	High shrink-swell potential; low strength and stability.
Cahaba: ChA, ChB	Fair: limited thickness of suitable material.	Poor: excessive fines.	Unsuited (improbable source).	Good	Soil features favorable.
Falkner: FaB	Fair: limited thickness of suitable material.	Unsuited (improbable source).	Unsuited (improbable source).	Poor: poor traffic-supporting capacity.	Wetness; poor traffic-supporting capacity; high shrink-swell potential.
Freestone. Mapped only with Cadeville soils.	Fair: clay below a depth of 23 inches.	Unsuited (improbable source).	Unsuited (improbable source).	Fair: wetness; poor traffic-supporting capacity.	Poor traffic-supporting capacity; wetness; high shrink-swell potential; slope.
Guyton: Gu	Fair to poor: wetness.	Unsuited (improbable source).	Unsuited (improbable source).	Poor: wetness	Wetness; subject to flooding; poor traffic-supporting capacity.
Jena: Je, JN	Good	Poor (improbable source).	Unsuited (improbable source).	Good	Subject to flooding
Lucy. Mapped only with Smithdale soils.	Poor: loamy sand to a depth of 26 inches.	Fair to a depth of 26 inches: needs washing.	Unsuited (improbable source).	Fair: fair strength and stability.	Slopes of more than 15 percent.
Nugent: Nu	Poor: sand	Good to fair: moderate percentage of fines and gravel in places.	Poor: limited quantity of gravel.	Fair to good	Subject to flooding
Paden: PaA	Fair: limited thickness of suitable material; wetness.	Unsuited (improbable source).	Unsuited (improbable source).	Fair: fair traffic-supporting capacity.	Fair traffic-supporting capacity; wetness.

properties of the soils

mapping units may have different properties and limitations, and for this reason it is necessary to refer to other series as indicated in the first this table]

Soil features affecting—Continued					
Farm pond		Agricultural drainage	Irrigation	Terraces and diversions	Waterways
Reservoir areas	Embankments				
Rapid permeability	Poor resistance to erosion; fair slope stability.	Rapid permeability; well drained to somewhat excessively drained.	Rapid permeability; low available water capacity.	Rapid permeability; slow runoff.	Difficult to sod; low available water capacity.
Moderate permeability.	Fair slope stability; moderate resistance to piping and erosion.	Moderate permeability; needs surface drainage; nearly level slope.	Moderate intake rate; high available water capacity.	Slow runoff; some areas receive water from a higher elevation.	Easily sodded; high available water capacity.
Very slow permeability.	High shrink-swell potential.	Moderately well drained; drainage not needed because of slope.	Slope; very slow intake rate; high available water capacity.	Clay below a depth of 5 inches; high shrink-swell potential; slope.	Difficult to sod; high available water capacity; clay.
Rapid permeability below a depth of 43 inches.	Moderate resistance to piping and erosion.	Well drained	Moderate intake rate; medium available water capacity.	Soil features favorable.	Easily sodded; medium available water capacity.
Slow permeability	Fair slope stability; poor resistance to erosion.	Somewhat poorly drained; slow runoff where slopes are nearly level.	Moderate intake rate; high available water capacity.	High shrink-swell potential; slopes of more than 8 percent in places.	Fair resistance to erosion; easily sodded.
Slow permeability	Fair slope stability; medium to high compressibility.	Drainage not needed because of slope.	Slope; medium available water capacity.	High shrink-swell potential; slope.	High shrink-swell potential; medium available water capacity.
Very slow permeability.	Moderate to high piping potential; fair stability; medium compressibility.	Slow runoff; receives water from higher elevations; poorly drained; needs surface drainage.	Slow intake rate; high available water capacity.	Nearly level	Difficult to sod; high available water capacity.
Moderate permeability.	Seepage likely; poor resistance to piping and erosion.	Well drained	Moderate intake rate; medium available water capacity.	Nearly level	Medium available water capacity; easily sodded.
Rapid permeability to a depth of 26 inches. Moderate permeability below a depth of 36 inches.	Moderate resistance to piping and erosion.	Well drained; slopes of more than 15 percent.	Rapid intake rate; low available water capacity to a depth of 26 inches.	Slopes of more than 15 percent; loamy sand to a depth of 26 inches.	Difficult to sod; low available water capacity to a depth of 26 inches.
Excessive rate of seepage.	Poor resistance to piping; fair slope stability.	Excessively drained	Rapid intake rate; low available water capacity.	Slow runoff; surface layer of sand; nearly level.	Low available water capacity; difficult to sod.
Slow permeability	Fair slope stability; moderate resistance to piping and erosion.	Slow runoff; moderately well drained.	Moderate intake rate; medium available water capacity.	Nearly level	Easy to sod; medium available water capacity.

TABLE 6.—*Interpretations of engineering*

Soil series and map symbol	Suitability as source of—				Soil features affecting—
	Topsoil	Sand	Gravel	Road fill	Highway location
Providence: PrA, PrB, PrC	Fair: limited thickness of suitable material.	Unsuited (improbable source).	Unsuited (improbable source).	Fair: fair traffic-supporting capacity.	Fair traffic-supporting capacity.
Rosebloom: Ro	Fair: silty clay loam below a depth of 5 inches.	Unsuited (improbable source).	Unsuited (improbable source).	Poor: wetness	Subject to flooding; moderate shrink-swell potential; wetness.
Rosella: Rs	Poor: wetness	Unsuited (improbable source).	Unsuited (improbable source).	Poor: wetness; subject to flooding.	Wetness; subject to flooding.
Ruston: RuB, RuC, RuD	Fair: clay loam to sandy clay loam below a depth of 6 inches.	Poor (improbable source).	Unsuited (improbable source).	Fair: fair traffic-supporting capacity.	Slopes of 2 to 12 percent.
Saffell: SaB, SaE	Poor: contains gravel.	Poor (improbable source).	Fair: excessive fines.	Good	Slopes of 2 to 17 percent.
*Smithdale: SmE, SmE3, STE. For Lucy part of STE, see Lucy series.	Fair: sandy clay loam below a depth of 10 inches.	Poor (improbable source).	Unsuited (improbable source).	Good	Slopes of 15 to 30 percent.
Velda: Ve	Good	Unsuited (improbable source).	Unsuited (improbable source).	Fair: fair traffic-supporting capacity.	Fair traffic-supporting capacity; subject to flooding.
Wanilla: Wa	Good	Poor (improbable source).	Unsuited (improbable source).	Fair: fair traffic-supporting capacity.	Wetness

not take into account thickness of overburden, location of the water table, or other factors that affect mining of the materials, and neither do they indicate quality of the deposit.

Road fill is soil material used in embankments for roads. The suitability ratings reflect (1) the predicted performance of soil after it has been placed in an embankment that has been properly compacted and provided with adequate drainage and (2) the relative ease of excavating the material at borrow areas.

Soil properties that most affect design and construction of roads and streets are load-supporting capacity, stability of the subgrade, and the workability and quantity of cut-and-fill material available. The AASHTO and Unified classifications of the soil material and the shrink-swell potential indicate traffic-supporting capacity. Wetness and flooding affect stability of the material. Slope, depth to hard rock, content of stones and rocks, and wetness affect ease of excavation and amount of cut and fill needed to reach an even grade.

Farm pond reservoir areas hold water behind a dam or embankment. Soils suitable for pond reservoir areas have low seepage, which is related to their permeability and depth to fractured or permeable bedrock or other permeable material (fig. 5).

Embankments require soil material resistant to seepage and piping and of favorable stability, shrink-swell potential, shear strength, and compactibility. Stones or organic material in a soil are among factors that are unfavorable.

Drainage of soil used for crops or pasture is affected by such soil properties as permeability, texture, and structure; depth to claypan, rock, or other layers that influence rate of water movement; depth to the water table; slope; stability in ditchbanks;

properties of the soils—Continued

Soil features affecting—Continued					
Farm pond		Agricultural drainage	Irrigation	Terraces and diversions	Waterways
Reservoir areas	Embankments				
Shallow to permeable material in places.	Moderate resistance to piping and erosion; moderate compressibility.	Moderately well drained; surface drainage needed where slopes are nearly level.	Moderate intake rate; medium available water capacity.	Soil features favorable.	Easy to sod; medium available water capacity.
Slow permeability	Soil features favorable.	Slow runoff; poorly drained.	Moderately slow intake rate; high available water capacity.	Slow runoff; receives water from higher elevations; nearly level.	Fairly easy to sod; high available water capacity.
Slow permeability	Poor resistance to piping and erosion.	Slow runoff; poorly drained; needs surface drainage.	Slow intake rate; medium available water capacity.	Slow runoff; receives water from higher elevations; nearly level.	Medium available water capacity; difficult to sod in places.
Moderate permeability.	Moderate permeability when compacted.	Well drained	Moderate intake rate; medium available water capacity.	Soil features favorable; slopes of more than 8 percent in places.	Medium available water capacity; easy to sod.
Rapid permeability below a depth of 40 inches.	Poor resistance to piping; fair slope stability.	Well drained	Moderate intake rate; medium available water capacity.	High percentage of gravel; slopes of more than 5 percent in places.	Medium available water capacity; difficult to sod.
Moderately rapid permeability below a depth of 40 inches.	Seepage likely	Well drained; slope	Moderately rapid intake rate; medium available water capacity; slope.	Soil features favorable; slopes of 15 to 30 percent.	Medium available water capacity; slopes of 15 to 30 percent.
Moderate permeability.	Fair stability; poor resistance to erosion.	Slow runoff; nearly level; well drained.	Moderate intake rate; high available water capacity.	Nearly level; soil features favorable.	Easy to sod; high available water capacity.
Moderately slow permeability.	Moderate resistance to piping and erosion.	Slow runoff; moderately slow permeability; needs surface drainage.	Moderate intake rate; medium available water capacity.	Nearly level	Easy to sod; medium available water capacity.

susceptibility to flooding; salinity or alkalinity; and availability of outlets for drainage.

Irrigation of a soil is affected by such features as slope; susceptibility to flooding, water erosion, or soil blowing; soil texture; content of stones; accumulation of salts and alkali; depth of root zone; rate of water intake at the surface; permeability of soil below the surface layer and in fragipans or other layers that restrict movement of water; amount of water available to plants; and need for drainage, or depth to water table or bedrock.

Terraces and diversions are embankments, or ridges, constructed across the slope to intercept runoff so that it soaks into the soil or flows slowly to a prepared outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slopes; depth to bedrock or other unfavorable material; presence of stones; permeability; and resistance to water erosion, soil slipping, and soil blowing. A soil suitable for these structures provides outlets for runoff, and establishing a plant cover on such a soil is not difficult.

Waterways are constructed to channel runoff to outlets at nonerosive velocities. Features that affect the use of the soils for waterways are slope, available water capacity, erodibility, and suitability for permanent vegetation.

Engineering test data

Table 7 contains engineering test data for some of the major soil series in Lawrence County. These tests were made to help evaluate the soils for engineering purposes. The engineering classifications are based on data obtained by mechanical analyses and by tests to determine liquid limit and plastic limit. The mechanical analyses were made by combined sieve and hydrometer methods.

TABLE 7.—*Engineering*

[Tests performed by the Mississippi State Highway Department in accordance with standard

Soil name and location	Mississippi State Highway Department report number 570–Miss.	Depth from surface	Moisture-density data [1]	
			Maximum dry density	Optimum moisture
		Inches	*Pounds per cubic foot*	*Percent*
Cadeville silt loam:				
Sec. 1, T. 8 N., R. 21 W	39–1–1	12–48	105.6	18.3
	39–1–2	48–72	113.4	15.7
Guyton silt loam:				
Sec. 25, T. 9 N., R. 10 E., 0.75 mile west of Oma	39–2–1	6–30	104.7	16.5
	39–2–2	30–65	108.7	15.4
Rosella silt loam:				
Sec. 8, T. 6 N., R. 20 W., 5.5 miles south of Monticello	39–3–1	3–25	110.8	15.0
	39–3–2	25–65	114.6	12.6

[1] Based on the moisture-density relations of soils using a 5.5-pound rammer and 12-inch drop, is AASHTO designation T 99, method A.
[2] Mechanical analyses according to AASHTO designation T 88. Results by this procedure frequently differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHTO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable

Figure 5.—Catfish ponds on Providence silt loam, 5 to 8 percent slopes.

test data

procedures of the American Association of State Highway and Transportation Officials (AASHTO)]

Mechanical analysis [2]								Liquid limit	Plasticity index	Classification	
Percentage passing sieve—				Percentage smaller than—							
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)	0.05 mm	0.02 mm	0.005 mm	0.002 mm			AASHTO[3]	Unified[4]
								Percent			
----------	100	99	99	75	56	44	38	50	28	A-7(26)	CL
----------	100	99	99	77	61	46	39	51	33	A-7(29)	CH
----------	----------	100	99	84	62	15	10	----------	[5] NP	A-4(9)	ML
----------	100	99	98	85	64	29	21	37	17	A-6(16)	CL
----------	100	98	77	71	53	30	25	31	15	A-6(10)	CL
----------	100	97	32	65	47	19	12	19	2	A-4(4)	ML

for naming textural classes for soil.

[3] Based on Standard Specifications for Highway Materials and Methods of Sampling and Testing (Pt. 1, Ed. 8): The Classification of Soils and Soil-aggregate Mixtures for Highway Construction Purposes, AASHTO Designation M 145–49.

[4] Based on the Unified Soil Classification System, Technical Memorandum No. 3–357, volume 1, Waterways Experiment Station, Corps of Engineers, March 1953.

[5] NP means nonplastic.

Moisture-density data are important in earthwork. If a soil material is compacted at a successively higher moisture content, assuming that the compactive effort remains constant, the density of the compacted material increases until the optimum moisture content is reached. After that, density decreases with increase in moisture content. The highest dry density obtained in the compactive test is termed maximum dry density. As a rule, maximum strength of earthwork is obtained if the soil is compacted to the maximum dry density.

Liquid limit and plasticity index indicate the effect of water on the strength and consistence of soil material. As the moisture content of a clayey soil is increased from a dry state, the material changes from a semisolid to a plastic. If the moisture content is further increased, the material changes from a plastic to a liquid. The plastic limit is the moisture content at which the soil material changes from semisolid to plastic; and the liquid limit, from plastic to liquid. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic. In table 7 the data on liquid limit and plasticity index are based on tests of soil samples.

Land Use Planning[6]

Knowledge of soils is necessary in planning and maintaining areas that are being developed. In table 8 the degree of limitation and the kind of limitations to the use of soils in Lawrence County are shown for camp areas, playgrounds, picnic areas, paths and trails, and other purposes. The degrees of limitation are expressed as slight, moderate, or severe for the specified uses. It is assumed that a good cover of vegetation can be established and maintained. *Slight* means that soil properties are generally favorable, and limitations are so minor that they can be easily overcome. *Moderate* means that the limitations can be overcome or modified by planning, by design, or by special maintenance. *Severe* means that costly soil reclamation, special design, intense maintenance, or a combination of these is needed.

Most of the column headings in table 8 are discussed briefly in the following paragraphs.

Dwellings are not more than three stories high and are supported by foundation footings placed in undisturbed soil. The features that affect the rating of a soil for dwellings are those that relate to capacity to support load and resist settlement under load, and those that relate to ease of excavation. Soil properties that affect capacity to support load are wetness, susceptibility to flooding, density, plasticity, texture, and shrink-swell potential. Those that affect excavation are wetness, slope, texture, and content of gravel.

Sewage lagoons are shallow ponds constructed to hold sewage, within a depth of 2 to 5 feet, long enough for bacteria to decompose the solids (fig. 6). A lagoon has a nearly level floor; its sides, or embankments, are of soil material compacted to medium density, and the pond is protected from flooding. Soil properties that affect the pond floor are permeability, organic matter, and slope, and if the floor needs to be leveled, depth to bedrock is important. Soil properties that affect the embankment are the engineering properties of the embankment material as interpreted from the Unified Soil Classification and the amount of gravel or stones,

[6] GEORGE W. YEATES, staff conservationist, Soil Conservation Service, helped prepare this section.

TABLE 8.—*Soil limitations*

Soil series and map symbols	Dwellings	Sewage lagoons	Septic tank absorption fields
Alaga: AlB	Slight	Severe: rapid permeability	Slight
Arkabutla: Ar	Severe: wetness; flooding	Moderate: moderate permeability.	Severe: wetness; flooding
Cadeville:			
CfE For Freestone part, see that series.	Severe: high shrink-swell potential; slope.	Severe: slope	Severe: very slow permeability; slope.
CgC For Falkner part, see that series.	Severe: high shrink-swell potential.	Moderate: slope	Severe: very slow permeability; slope.
CgD For Falkner part, see that series.	Severe: high shrink-swell potential; slope.	Severe: slope	Severe: very slow permeability; slope.
Cahaba: ChA, ChB	Slight	Severe: rapid permeability below a depth of 43 inches.	Slight
Falkner: FaB	Severe: wetness; high shrink-swell potential.	Slight where slopes are 0 to 2 percent. Moderate where slopes are 2 to 8 percent. Severe where slopes are more than 8 percent.	Severe: slow permeability; wetness.
Freestone Mapped only with Cadeville soils.	Severe: slope	Severe: slope	Severe: slope
Guyton: Gu	Severe: wetness; flooding in places.	Moderate: fair material for dams; subject to piping.	Severe: wetness; very slow permeability; flooding in places.
Jena:			
Je	Severe: occasional flooding	Slight	Slight
JN	Severe: frequent flooding	Severe: flooding damages dikes.	Severe: flooding
Lucy Mapped only with Smithdale soils.	Severe: slope	Severe: slope; moderate permeability.	Severe: slope
Nugent: Nu	Severe: flooding	Severe: rapid permeability; flooding.	Severe: flooding
Paden: PaA	Moderate to severe: wetness; medium bearing strength.	Slight	Severe: wetness; slow permeability.
Providence:			
PrA	Moderate: medium bearing strength.	Slight	Severe: moderately slow permeability.
PrB	Moderate: medium bearing strength.	Moderate: slope	Severe: moderately slow permeability.
PrC	Moderate: medium bearing strength.	Moderate: slope	Severe: moderately slow permeability.
Rosebloom: Ro	Severe: flooding; wetness	Severe: not protected from flooding.	Severe: wetness; flooding; slow permeability.
Rosella: Rs	Severe: wetness	Slight	Severe: wetnesss; slow permeability.
Ruston:			
RuB	Slight	Moderate: moderate permeability.	Slight
RuC	Slight	Moderate: moderate permeability; slope.	Slight
RuD	Moderate: slope	Severe: slope	Moderate: slope

for land use planning

Camp areas	Picnic areas	Playgrounds	Paths and trails
Moderate: loamy sand surface layer.	Moderate: loamy sand surface layer.	Moderate: loamy sand surface layer.	Moderate: loamy sand surface layer.
Severe: wetness; flooding	Moderate: wetness; flooding	Severe: flooding; wetness	Moderate: flooding; wetness.
Severe: slope; very slow permeability.	Severe: slope	Severe: slope; very slow permeability.	Moderate: slope.
Severe: wetness; very slow permeability.	Moderate: wetness	Severe: slope; very slow permeability; wetness.	Moderate: wetness.
Severe: very slow permeability; wetness.	Moderate: wetness	Severe: slope; very slow permeability; wetness.	Moderate: wetness.
Slight	Slight	Slight where slopes are 0 to 2 percent. Moderate where slopes are 2 to 5 percent.	Slight.
Moderate: slow permeability; wetness.	Moderate: wetness	Moderate where slopes are less than 5 percent: slow permeability; wetness. Severe where slopes are more than 5 percent.	Moderate: wetness.
Severe: slope	Severe: slope	Severe: slope	Moderate where slopes are 15 to 25 percent. Severe where slopes are more than 25 percent.
Severe: wetness; very slow permeability; flooding in places.	Severe: wetness; flooding in places.	Severe: wetness; very slow permeability; flooding in places.	Severe: wetness; flooding in places.
Slight Severe where subject to flooding	Slight Severe where subject to flooding	Slight Severe where subject to flooding	Slight. Severe where subject to flooding.
Severe: slope	Severe: slope	Severe: slope	Moderate where slopes are 15 to 25 percent. Severe where slopes are more than 25 percent.
Severe: sand surface layer; frequent flooding.	Severe: sand surface layer; frequent flooding.	Severe: sand surface layer; frequent flooding.	Severe: sand surface layer; frequent flooding.
Moderate: wetness; slow permeability.	Moderate: wetness	Moderate: wetness; slow permeability.	Moderate: wetness.
Slight	Slight	Slight	Slight.
Slight	Slight	Moderate: slope	Slight.
Slight	Slight	Severe: slope	Slight.
Severe: wetness; flooding	Severe: wetness; flooding	Severe: wetness; flooding	Severe: wetness; flooding.
Severe: wetness; slow permeability.	Severe: wetness	Severe: wetness; slow permeability.	Severe: wetness.
Slight	Slight	Slight	Slight.
Slight	Slight	Moderate: slope	Slight.
Moderate: slope	Moderate: slope	Severe: slope	Slight.

TABLE 8.—*Soil limitations*

Soil series and map symbols	Dwellings	Sewage lagoons	Septic tank absorption fields
Saffell:			
SaB	Slight	Severe: rapid permeability below a depth of 40 inches; coarse fragments.	Slight
SaE	Moderate: slope	Severe: slope	Severe: slope
Smithdale: SmE, SmE3, STE	Severe: slope	Severe: slope	Severe: slope
Velda: Ve	Severe: flooding	Moderate: moderate permeability; dikes need protection.	Severe: flooding
Wanilla: Wa	Severe: wetness	Severe: wetness	Severe: wetness; moderately slow permeability.

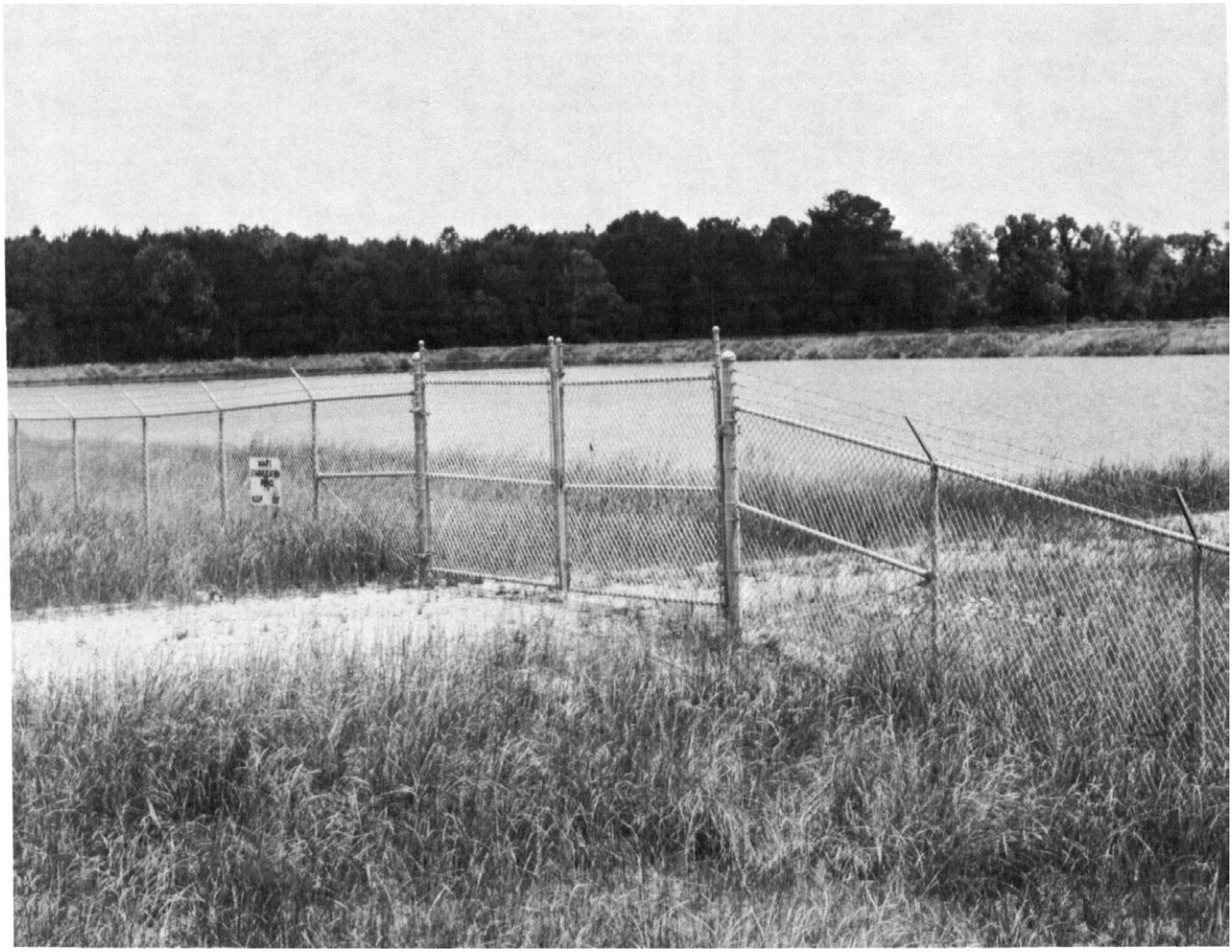

***Figure 6.*—Sewage lagoon built on Paden silt loam, 0 to 2 percent slopes.**

for land use planning—Continued

Camp areas	Picnic areas	Playgrounds	Paths and trails
Slight to moderate: coarse fragments.	Slight to moderate: coarse fragments.	Moderate: coarse fragments	Moderate: coarse fragments.
Moderate: coarse fragments; slope.	Moderate: coarse fragments; slope.	Severe: coarse fragments; slope.	Moderate: coarse fragments; slope.
Severe: slope	Severe: slope	Severe: slope	Moderate: slope.
Severe: flooding	Moderate: flooding	Severe: flooding	Moderate: flooding.
Moderate: wetness	Slight	Moderate: wetness; water table below a depth of 20 inches during peak use.	Slight.

if any, that influence the ease of excavation and compaction of the embankment material.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into natural soil. The soil material between depths of 18 inches to 6 feet is evaluated. Soil properties considered are those that affect both absorption of effluent and construction and operation of the system. Properties that affect absorption are permeability, depth to water table, and susceptibility to flooding. Slope affects layout and construction and also the risk of erosion, lateral seepage, and downslope flow of effluent.

Picnic areas are attractive natural or landscaped tracts used mainly for preparing meals and eating outdoors. These areas are subject to heavy foot traffic. Most of the vehicular traffic is confined to access roads. The best soils are firm after rains but not dusty when dry, are free of flooding during the season of use, and do not have slopes that greatly increase the cost of leveling sites or of building access roads.

Playgrounds are areas used intensively for baseball, football, badminton, and similar organized games. Soils suitable for this use need to withstand intensive foot traffic. The best soils have a nearly level surface that is free of coarse fragments, good drainage, freedom from flooding during periods of heavy use, and a surface that is firm after rains but not dusty when dry.

Paths and trails are used for local and cross-country travel by foot or horseback. Design and layout should require little or no cutting and filling. The best soils are at least moderately well drained, are firm after rains but not dusty when dry, are flooded not more than once during the season of use, and have slopes of less than 15 percent. Also there are few or no coarse fragments on the surface.

Formation and Classification of the Soils

In the following pages, the factors of soil formation and the classification of the soils are briefly discussed. Table 9 shows the classification of series into higher categories.

Factors of Soil Formation

The nature of a soil at any given point depends upon the combined influence of the five factors of soil formation: climate, plant and animal life, parent material, relief, and time (*8*). All five factors affect the genesis of every soil. The importance of each differs from place to place. In some places each is about equal, and in others one factor may dominate.

Climate. As a genetic factor, climate affects the physical, chemical, and biological relationships in the soil, primarily through its influence of precipitation and temperature. Water dissolves minerals, supports biological activity, and transports minerals and biological residue through the soil. The amount of water that percolates through the soil depends mainly upon the rainfall, the relative humidity, and the length of the frost-free period. At any given point, the amount of downward percolation is also affected by physiographic position and by the permeability of the soil.

Temperature influences the kinds of organisms and their growth and the speed of physical and chemical reactions in the soils. Variations in the microclimate cause certain characteristics of the soils to differ from those developed under the prevailing macroclimate.

The climate of Lawrence County is humid, warm, temperate, and continental. It has had a marked effect on the formation of most of the soils. The soils are moist and subject to leaching most of the time from December 1 through August 20. They are usually moderately dry from August 20 through November 30. The soils are seldom frozen and then only to a depth of 1 or 2 inches. Freezing and thawing have had little or no effect on the weathering of soils and the soil-forming processes.

Plant and animal life.—Micro-organisms are indispensable to the development of soils. Bacteria, fungi, and other micro-organisms help to weather rock and decompose organic matter. The larger plants tend to alter the microclimate, to furnish organic matter, and to bring up elements from the subsoil to the surface soil. The kind and number of plants and animals that live on and in the soil are determined in large part by the climate and, to varying degrees, by the parent material, relief, and age of the soil.

TABLE 9.—*Classification of soil series*

Series	Family	Subgroup	Order
Alaga	Thermic, coated	Typic Quartzipsamments	Entisols.
Arkabutla	Fine-silty, mixed, acid, thermic	Aeric Fluvaquents	Entisols.
Cadeville [1]	Fine, mixed, thermic	Albaquic Hapludalfs	Alfisols.
Cahaba	Fine-loamy, siliceous, thermic	Typic Hapludults	Ultisols.
Falkner	Fine-silty, siliceous, thermic	Aquic Paleudalfs	Alfisols.
Freestone	Fine-loamy, siliceous, thermic	Glossaquic Paleudalfs	Alfisols.
Guyton [1]	Fine-silty, siliceous, thermic	Typic Glossaqualfs	Alfisols.
Jena	Coarse-loamy, siliceous, thermic	Fluventic Dystrochrepts	Inceptisols.
Lucy	Loamy, siliceous, thermic	Arenic Paleudults	Ultisols.
Nugent	Sandy, siliceous, thermic	Typic Udifluvents	Entisols.
Paden [1]	Fine-silty, mixed, thermic	Glossic Fragiudults	Ultisols.
Providence	Fine-silty, mixed, thermic	Typic Fragiudalfs	Alfisols.
Rosebloom	Fine-silty, mixed, acid, thermic	Typic Fluvaquents	Entisols.
Rosella	Fine-loamy, siliceous, thermic	Albic Glossic Natraqualfs	Alfisols.
Ruston	Fine-loamy, siliceous, thermic	Typic Paleudults	Ultisols.
Saffell	Loamy-skeletal, siliceous, thermic	Typic Hapludults	Ultisols.
Smithdale	Fine-loamy, siliceous, thermic	Typic Paleudults	Ultisols.
Velda	Coarse-silty, siliceous, thermic	Fluventic Dystrochrepts	Inceptisols.
Wanilla	Coarse-loamy, siliceous, thermic	Aquic Glossudalfs	Alfisols.

[1] In Lawrence County, the following soils are taxadjuncts to the series for which they are named:
Cadeville soils have lower base saturation than is defined as the range for the series.
Guyton soils have a higher ratio of calcium to magnesium than is defined as the range for the series.
Paden soils have a thicker fragipan than is defined as the range for the series.
These differences do not alter the use and behavior of these soils.

Not much is known of the fungi and micro-organisms in the soils of Lawrence County, except that they are confined to the upper few inches. Ants, earthworms, and other invertebrates are most active in the A1 and A2 horizons and in the upper part of the B horizon, where they carry on a slow but continuous cycle of soil mixing.

On most of the uplands the native vegetation was pine. On some of the hills, there was a mixed stand of pine and various broadleaf trees. On bottom lands along streams, the growth was mainly broadleaf trees and an understory of vines, shrubs, and herbaceous plants.

Only the major differences in the original vegetation affect the formation of soils to any extent. Because the virgin forest was cut and the refuse burned after the logging operations had been completed, kinds of trees that grow in the forest have changed, but not to the extent of altering soil development. Clearing of the land for agriculture introduced new plants that may affect the future development of soils.

Parent material.—This material is the unconsolidated mass from which soils develop. It largely determines the chemical and mineralogical composition of soils. In this county, the parent material of the soils is derived from sand, silt, and clay of the Coastal Plain and, in some areas, a thin mantle of loess that covers the Coastal Plain material.

The soils along the streams in the county formed in material transported and deposited by streams. Much of this material originated on nearby uplands. Most of it is of recent deposition.

Relief.—Relief is largely determined by the kinds of geologic formations in the area, the geologic history of the area, and the effect of dissection by streams. It affects the formation of the soils through its effect on moisture relationships, erosion, temperature, and plant cover, but it is modified by the other four factors of soil formation.

The relief of the county is characterized by moderately sloping to steep hills that are dissected by relatively wide stream valleys. The widest of these valleys is that of the Pearl River, which dissects the county from north to south and is 2 to 5 miles wide. Hills range from less than 150 feet to about 400 feet above sea level and are 25 to 200 feet above the floor of the valleys. The tops of most of the hills are gently sloping and relatively wide.

Time.—The length of time required for the development of a soil depends largely on the other factors of soil formation. Less time is required for a soil to form in a humid, warm region where plant growth is abundant than in a dry, cold region where vegetation is sparse. Generally less time is required if the parent material is coarse textured than if it is fine textured.

Geologically, the soils of the county are young. The humid climate and the abundant vegetation have contributed to the rapid development of most of the soils. On the smoother slopes and older stream terraces, many of the soils have developed to maturity. On the younger terraces and more recent alluvial sediment, the soil material has been in place too short a time for mature development.

Classification of the Soils

Soils are classified so that we can more easily remember their significant characteristics. Classification enables us to assemble knowledge about the soils, to see their relationship to one another and to the whole environment, and to develop principles that help us to understand their behavior and their response to management. First through classification, and then through the use of soil maps, we can apply our knowledge of

soils to specific fields and to other tracts of land (*4*).

The narrow categories of classification, such as those used in detailed soil surveys, allow us to organize and apply knowledge about soils in managing farms, fields, and woodlands; in developing rural areas; in engineering work; and in many other ways. Soils are placed in broad classes to facilitate study and comparison in large areas such as countries and continents.

The system of soil classification currently in use was adopted by the National Cooperative Soil Survey in 1965. Because this system is under continual study, readers interested in current developments of the system should search the latest literature available (*10, 11, 13*).

The current system of classification has six categories. Beginning with the broadest, these categories are order, suborder, great group, subgroup, family, and series. In this system the criteria used as a basis for classification are soil properties that are observable and measurable. The properties are chosen, however, so that soils of similar genesis, or mode of origin, are grouped. In table 9, the soil series of Lawrence County are placed in categories of the current system. The classes of the current system are briefly defined in the following paragraphs.

ORDER.—Ten soil orders are recognized. The properties used to differentiate among soil orders are those that tend to give broad climatic groupings of soils. The two exceptions to this are the Entisols and Histosols, which occur in many different climates. Each order is named with a word of three or four syllables ending in *sol* (Ent-i-sol).

SUBORDER.—Each order is subdivided into suborders based primarily on those soil characteristics that seem to produce classes that have the greatest genetic similarity The suborders narrow the broad climatic range permitted in the orders. The soil properties used to separate suborders are mainly those that reflect either the presence or absence of waterlogging, or soil differences resulting from the climate or vegetation. The names of suborders have two syllables. The last syllable indicates the order. An example is *Aquent* (*Aqu,* meaning water or wet, and *ent,* from Entisol).

GREAT GROUP.—Soil suborders are separated into great groups on the basis of uniformity in the kinds and sequence of major soil horizons and features. The horizons used to make separations are those in which clay, iron, or humus have accumulated; those that have pans that interfere with growth of roots, movement of water, or both; and thick, dark-colored surface horizons. The features used are the self-mulching properties of clay, soil temperature, major differences in chemical composition (mainly calcium, magnesium, sodium, and potassium), dark-red and dark-brown colors associated with basic rocks, and the like. The names of great groups have three or four syllables and are made by adding a prefix to the name of the suborder. An example is Haplaquents (*Hapl,* meaning simple horizons, *aqu* for wetness or water, and *ent,* from Entisols).

SUBGROUP.—Great groups are subdivided into subgroups, representing the central (typic) segment of the group, and others called integrades that have properties of the group and also one or more properties of another great group, suborder, or order. Subgroups may also be made in those instances where soil properties intergrade outside of the range of any other great group, suborder, or order. The names of subgroups are derived by placing one or more adjectives before the name of the great group. An example is Typic Haplaquents (a typical Haplaquent).

FAMILY.—Soil families are separated within a subgroup primarily on the basis of properties important to the growth of plants or on the behavior of soils when used for engineering. Among the properties considered are texture, mineralogy, reaction, temperature, permeability, thickness of horizons, and consistence. A family name consists of a series of adjectives preceding the subgroup name. The adjectives are the class names for texture, mineralogy, and so on that are used to differentiate families.

Physical and Chemical Analyses

Physical and chemical data from laboratory analyses are useful to soil scientists in classifying and interpreting soils. Physical and chemical data for selected soils are shown in tables 10 and 11. Analyses were made by the Soil Genesis and Morphology Laboratory of the Mississippi Agricultural and Forestry Experiment Station. Samples were collected from pits at typical locations for each soil and were air-dried and crushed to 2 millimeters.

In the section "Descriptions of the Soils," the profiles of the soils analyzed are described, but the soil textures reported in table 10 are not necessarily the same as those described in the profiles, which are field estimates.

Particle-size distribution in table 10 was determined by the hydrometer method (*5*). Chemical analysis was made by methods described in commonly available references (*5*). Samples were prepared by air-drying, grinding, and screening through a standard 20-mesh sieve.

In table 11 soil reaction (pH) was determined by using a Beckman model pH meter on mixtures of soil and water at a ratio of 1:1. Exchangeable cations were extracted by the neutral, 1 *N* ammonium acetate method (*3, 14*). Exchangeable sodium and potassium were determined by Flamephotometry. Exchangeable calcium and magnesium were determined by atomic absorption. Extractable hydrogen was determined by the barium chloride—TEA method (*3, 14*). Base saturation, in percent, was calculated by getting the sum of exchangeable bases, dividing by the cation exchange capacity, and multiplying by 100.

General Nature of the County

The early settlers were farmers, traders, and industrialists who settled near the present towns of Monticello, New Hebron, Wanilla, Oma, and Silver Creek. When they came to the area that is now Lawrence County, there was a heavy growth of virgin forest,

TABLE 10.—*Particle-size distribution in selected soils*

[Analyzed by the Soil Genesis and Morphology Laboratory of the Mississippi Agricultural and Forestry Experiment Station. Dashes indicate data not reported]

Soil series	Horizon	Depth from surface	Particle-size distribution			
			Clay (less than 0.002 mm)	Silt (0.05 to 0.002 mm)	Sand (2.0 to 0.05 mm)	Very fine sand (0.10 to 0.05 mm)
		Inches				
Arkabutla	A1	0–5	36.3	58.7	5.0	
	B21	5–17	29.2	69.5	1.3	0.54
	B22g	17–33	24.8	73.3	1.9	.88
	B23g	33–70	29.2	69.2	1.6	
	B24g	70–80	36.5	61.9	1.6	
Falkner	Ap	0–3	10.0	76.3	13.7	
	A2	3–6	13.4	75.6	11.0	
	B21t	6–16	21.7	69.5	8.8	
	B22t	16–22	17.0	73.6	9.4	
	B23t	22–42	33.3	57.4	9.3	
	IIB24t	42–62	42.1	36.8	21.1	
	IIB25t	62–80	38.1	38.9	24.0	
Guyton	A1	0–2	7.6	78.2	14.2	
	A21g	2–6	9.6	75.9	14.5	
	A22g	6–18	12.1	75.6	12.3	
	B21tg	18–30	16.8	70.0	13.2	
	B22tg	30–37	20.0	68.2	11.8	
	B23tg	37–50	30.7	55.1	14.2	
	B24tg	50–65	30.4	53.5	16.1	
Rosella	Ap	0–3	8.8	55.8	35.4	
	A2g	3–12	9.5	55.5	35.0	
	B21tg	12–25	18.5	50.7	30.8	
	B22tg	25–38	23.0	51.8	25.2	
	B23tg	38–65	22.4	51.8	25.8	
Velda	Ap	0–7	19.2	73.8	7.0	4.5
	B21	7–16	17.1	76.3	6.6	5.5
	B22	16–28	10.1	58.9	31.0	21.8
	B23	28–43	12.7	73.1	14.2	11.5
	C	43–66	13.5	78.9	7.6	6.2
Wanilla	Ap	0–3	0.2	52.3	47.5	12.9
	A2	3–9	6.0	45.4	48.6	14.0
	B1&A2	9–26	7.6	46.1	46.3	13.6
	B21t	26–40	15.2	36.1	48.7	10.3
	B22t	40–60	11.9	66.8	21.3	
	B23t	60–70	17.1	68.7	14.2	
	B24t	70–80	27.0	68.2	4.8	

consisting mainly of pine trees on uplands and hardwood trees on bottom lands along the Pearl River. There were a few open areas along the streams that the Indians had cleared to grow corn, melons, and beans. For food, the early settlers depended mainly upon fish and game, but they also grew corn in small fields and other vegetables in garden patches. They depended on streams, rivers, and roads as means of travel and transporting freight. The Pearl River was the chief means of travel, but later, railroads provided travel and transportation for agricultural products.

In 1817, Lawrence County was organized, and the town of Monticello became the county seat. For a short time in 1821, Monticello was also the capital of Mississippi. According to the U.S. Bureau of the Census, the population of the county declined from 12,639 in 1950 to 11,137 in 1970, a decline of 9 percent in 20 years.

Agriculture has been the major enterprise since early settlement of the county. The first important crops were cotton, corn, and rice. By 1909, cotton had become the principal cash crop and continued as the main crop for many years. By 1968 the acreage of cotton had declined to 2,900 but the acreage in permanent pasture was 38,000. The acreage of improved pasture increased because of greater emphasis on raising beef cattle and on dairying.

According to the Census of Agriculture there were 15 Grade A dairies in the county in 1968. The farms in the county reported 23,500 cattle and 2,300 hogs and pigs. Corn was grown on 6,100 acres and soybeans on 800 acres and oats on 100 acres (*9*). The number of farms decreased from 1,286 in 1959 to 1,169 in 1964, a decline of about 9 percent. In the same period the land in farms decreased from 159,309 acres to

TABLE 11.—*Chemical analysis of selected soils*

[Analyzed by the Soil Genesis and Morphology Laboratory of the Mississippi Agricultural and Forestry Experiment Station. The symbol < means less than. Dashes indicate data not reported]

Soil series	Horizon	Depth from surface	Reaction 1:1 H_2O	Exchangeable cations						Base saturation by sum of cations
				Calcium	Magnesium	Potassium	Sodium	Extractable acidity	Sum of bases and hydrogen	
		Inches	*pH*	*Meq per 100 grams of soil*	*Meq per 100 grams of soil*	*Meq per 100 grams of soil*	*Meq per 100 grams of soil*	*Meq per 100 grams of soil*		*Percent*
Arkabutla	A1	0–5	4.6	5.1	1.7	0.4	0	24.2	31.5	23
	B21	5–17	4.8	3.3	1.8	.2	0	15.0	20.2	26
	B22g	17–33	4.8	3.0	1.8	.2	0	14.8	19.8	25
	B23g	33–70	4.7	4.2	1.3	.2	.1	16.1	21.9	26
	B24g	70–80	4.4	3.8	2.0	.2	.1	17.4	23.6	26
Falkner	Ap	0–3	5.0	<0.5	.5	.4	.2	10.9	12.5	13
	A2	3–6	5.2	.2	.3	0	.1	8.7	9.3	7
	B21t	6–16	5.3	.2	.4	.1	.2	10.9	11.8	7
	B22t	16–22	5.3	.2	.6	0	.6	10.0	11.2	12
	B23t	22–42	5.2	.9	2.9	.1	1.3	12.7	17.8	29
	IIB24t	42–62	4.7	.3	5.6	.1	3.7	7.9	17.7	55
	IIB25t	62–80	5.4	2.8	5.4	.1	3.5	3.2	15.0	79
Guyton	A1	0–2	5.0	.73	.8	.1	0	4.7	6.4	26
	A21g	2–6	5.2	.53	.6	0	.4	1.3	2.9	55
	A22g	6–18	5.3	1.0	.5	0	.1	3.6	5.2	30
	B21tg	18–30	5.4	1.6	.8	.1	.5	6.3	9.2	32
	B22tg	30–37	4.8	2.9	2.0	.1	.1	7.8	12.8	40
	B23tg	37–50	4.8	6.20	4.6	.1	2.5	7.5	20.9	64
	B24tg	50–65	4.9	7.00	4.9	.1	4.0	6.2	22.1	72
Rosella	Ap	0–3	5.5	.9	.5	0	.2	4.2	5.7	27
	A2g	3–12	5.4	.3	.2	0	.1	3.2	3.8	17
	B21tg	12–25	5.3	.3	.6	0	.8	7.7	9.4	18
	B22tg	25–38	4.8	1.2	3.1	1.1	3.0	8.0	16.3	48
	B23tg	38–65	4.7	1.2	2.7	.1	3.6	6.8	14.4	53
Velda	Ap	0–7	5.3	4.3	2.3	.3	0	9.4	16.3	42
	B21	7–16	5.0	2.6	1.2	.2	0	10.0	14.0	29
	B22	16–28	5.1	2.3	.9	.2	0	4.7	8.0	47
	B23	28–43	5.2	3.7	1.2	.2	0	4.8	9.9	51
	C	43–66	5.0	3.3	1.1	.2	0	8.1	12.8	36
Wanilla	Ap	0–3	5.4	1.7	.4	.1	0	2.6	4.8	46
	A2	3–9	5.4	1.1	.2	.1	0	3.1	4.6	31
	B1&A2	9–26	5.4	.1	.1	.1	.1	5.8	6.2	6
	B21t	26–40	5.4	0	.5	.1	.7	7.8	9.1	14
	B22t	40–60	5.0	.6	1.6	.2	1.1	7.6	11.1	31
	B23t	60–70	5.1	1.5	3.0	.2	2.7	4.7	12.2	62
	B24t	70–80	5.3	2.4	4.2	.3	4.0	7.0	17.8	61

152,331 acres, and the average farm increased from 102.5 acres to 165.1 acres.

Physiography, Drainage, and Relief

Lawrence County is in the southwestern part of the state and is within two physiographic areas. Most wide ridges are in the thin loess physiographic areas, and the steeper slopes and wide bottom lands along the rivers are in the Lower Coastal Plain physiographic areas.

The county as a whole is on a plain, 150 to 400 feet above sea level, that is cut by several rather broad valleys and numerous small drainageways. In the northeast-central and southwest-central parts of the county, adjacent to bottom lands along the Pearl River, are rough broken, hilly areas. Along the Pearl River, which runs from north to south through the central part of the county, is a wide, nearly level to gently sloping valley. The rest of the county is undulating, rolling, and hilly and broken by wide, gently sloping ridges, steep side slopes, and level strips along the rivers and creeks.

The two major watersheds in Lawrence County are the Pearl River and the Bogue Chitto River. Except for the extreme southwestern part, the entire county is drained by the Pearl River, Bahala Creek, Crooked Creek, Fair River, Silver Creek, Halls Creek, Whitesand Creek and other minor tributaries. The southwestern part of the county is drained by Topisaw Creek, which is a part of the Bogue Chitto River watershed. From each of these streams many branches finger out in all directions and form a broken pattern

of narrow valleys and ridges. In many places the ridgetops are 100 feet higher than the valley floors.

The relief of Lawrence County ranges from nearly level in the flood plains to very steep in the uplands.

Climate[7]

Lawrence County is in a subtropical area where warm, moist air from the Gulf of Mexico alternates with cold, drier air. Transitions from the warm air to the cold air frequently bring abrupt weather changes. Precipitation, on the average, occurs on about 2 days out of 7 and generally occurs as showers. Winds from the Gulf of Mexico bring warm, moist air favorable to the sporadic development of thundershowers. Prolonged rains are infrequent and usually occur in winter and spring, often as the result of warm air from the Gulf overriding a mass of cold air at the surface. Excessive rainfall, more than ¼ inch in 5 minutes, may occur in any season. Rainfall of more than 3 inches in a day may occur in any month and cause local flash flooding. As shown in table 13, occasionally, torrential rains occur.

Table 12 shows temperature and precipitation data; table 13 shows frequency of rainfall; and table 14 shows probability of low temperatures in spring and fall.

In Lawrence County, summers are consistently warm, and winters are comparatively mild. In most years there is 1 day or more in summer when the temperature is 100°F or higher and 1 day or more in

[7] By E. J. SALTSMAN, climatologist for Mississippi, National Weather Service, U.S. Department of Commerce, at Jackson.

TABLE 12.—*Temperature and precipitation data*

[All data from the Monticello station]

Month	Temperature						Precipitaton			
	Average daily maximum	Average daily minimum	Average highest maximum	Average lowest minimum	Mean number of days with—		Mean number of days with 0.10 inch or more	Average monthly total	One year in 10 will have—	
					Maximum of 90° F. or more	Minimum of 32° F. or less			Less than—	More than—
	°F	°F	°F	°F				Inches	Inches	Inches
January	61	36	78	19	----------	14	8	5.1	2.3	8.4
February	64	39	79	22	----------	10	7	5.3	2.3	8.8
March	70	44	84	27	----------	5	8	6.6	2.5	11.5
April	79	53	88	36	(1)	(1)	6	5.2	1.8	9.4
May	85	60	93	45	8	----------	6	4.9	1.5	9.1
June	91	67	97	57	20	----------	7	4.0	1.0	7.9
July	93	69	99	64	25	----------	8	5.0	2.0	8.8
August	93	69	99	60	24	----------	7	4.0	1.4	6.5
September	88	63	97	49	14	----------	5	3.7	1.1	6.9
October	80	51	91	34	3	1	3	2.6	0.4	5.6
November	70	42	84	24	----------	7	5	4.0	1.0	8.0
December	62	37	78	21	----------	13	7	5.7	2.9	8.9
Year	78	52	[2] 101	[3] 16	94	50	77	56.1	42.6	69.5

[1] Less than ½ day.
[2] Mean annual highest temperature.
[3] Mean annual lowest temperature

TABLE 13.—*Frequency of rainfall*

Duration of rainfall	Amount of rainfall, in inches, at a central location for a return period of—			
	2 years	10 years	50 years	100 years
10 minutes	0.9	1.3	1.6	1.8
1 hour	2.1	2.8	3.6	3.9
3 hours	2.9	4.1	5.1	5.7
12 hours	4.2	6.0	7.7	8.7
1 day	4.7	7.0	9.1	10.0
2 days	5.6	8.1	11.3	11.8
7 days	7.7	11.3	14.7	15.7

TABLE 14.—*Probabilities of low temperatures in spring and fall*

[All data from Monticello Station]

Probability	Dates for given probability and temperature [1]				
	24° F or lower	28° F or lower	32° F or lower	36° F or lower	40° F or lower
Spring:					
1 year in 10 later than	March 16	March 27	April 9	April 25	May 7
2 years in 10 later than	March 5	March 19	April 3	April 18	April 30
5 years in 10 later than	February 13	March 2	March 23	April 6	April 18
Fall:					
1 year in 10 earlier than	November 5	October 30	October 19	October 9	October 3
2 years in 10 earlier than	November 17	November 6	October 25	October 14	October 8
5 years in 10 earlier than	December 9	November 18	November 4	October 23	October 17

[1] Temperature measured in a standard National Weather Service instrument shelter with the thermometer 4½ feet above ground. On clear, calm nights, shelter-level temperatures usually will be several degrees warmer than the air near the ground. Under these conditions, frost could form on vegetation at ground level, even though the temperature in the shelter is above 32 degrees. The length of the "freeze-free period" between the last 32° F temperature in the spring and the first 32° F temperature in the fall is used to determine the length of the "growing season." The effect of temperature varies according to the kind, type, and variety of vegetation. These data are based on 49–50 years of record during 1921–70, and have been adjusted, where necessary, for seasons not having temperatures as low as the indicated threshold. These data are applicable to most farming areas of Lawrence County.

winter when the temperature is 17° or lower. In Monticello, the temperature reached 108° in July 1924 and was 3° in January 1940. The number of days in any one year when a temperature of 90° or higher has occurred during the period April to October ranges from less than 70 to more than 120, and the number of days when a temperature of 30° or lower has occurred during the period October to April ranges from less than 30 to more than 70. Cold spells are usually brief, but there have been a few years when the temperature did not rise above 32° for a period of 1 to 3 days. The ground freezes occasionally, but not to a great depth; it usually thaws rapidly. The probabilities of low temperatures are shown in table 14.

Occasionally during the warmer season, when the pressure distribution alters to bring westerly to northerly winds, there are periods of hot dry weather. If these periods are prolonged, drought may develop and the risk of forest fires increases. Some places in Lawrence County have reported periods of more than a month when no rain fell.

During the colder part of the year, the usual weather cycle consists of rain, a few relatively warm balmy days, and then more rain. Snowfall averages less than an inch a year, but there is no snow in some years. An inch or more of snow has been reported in December, January, and February, but it seldom remains on the ground more than 2 or 3 days.

Sunshine is an important factor in crop production. Over a period of years, sunshine in Lawrence County averages slightly less than two-thirds of the annual possible sunshine. The period between sunrise and sunset ranges from 10 hours and about 6 minutes on December 22 (winter solstice) up to 14 hours and about 13 minutes on June 21 (summer solstice).

Winds near 40 miles an hour or more can occur in any month. The wind speed is generally less than 10 miles an hour, except during periods of storms. Winds blow from the southeast to the southwest for more hours than from any other sector of the compass. A sustained wind speed of 75 miles an hour or more at a height of 30 feet above ground is estimated to have a 50-year mean recurrence interval, but during sustained winds, the gusts would be higher. Some thunderstorms have gusts of 100 miles an hour or more.

The amount of water lost by soil and crops is indicated by evaporation from a large pan. In a National Weather Service class A pan, the mean annual evaporation is about 61 inches. About 41 inches, or 68 percent of this evaporation, occurs in the period May through October. The pan evaporation represents a maximum or potential evaporation. The mean annual lake evaporation is about 45 inches. In most years the actual loss from soil is less because in many years the amount of soil moisture is limited.

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Glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as crumbs, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern.

Available water capacity (also termed 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 capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Base saturation. The degree to which material that has base-exchange properties is saturated with exchangeable cations other than hydrogen, expressed as a percentage of the cation-exchange capacity.

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 clay on the surface of a soil aggregate. Synonyms: clay coat, clay skin.

Complex, soil. A mapping unit consisting of different kinds of soils that occur in such small individual areas or in such an intricate pattern that they cannot be shown separately on a publishable soil map.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds, or of soil grains cemented together. The composition of some concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Decreaser. Any of the climax range plants most heavily grazed. Because they are the most palatable, they are first to be destroyed by overgrazing.

Erosion. The wearing away of the land surface by wind (sandblast), running water, and other geological agents.

Fallow. Cropland left idle in order to restore productivity, mainly through accumulation of water, nutrients, or both. Summer fallow is a common stage before cereal grain in regions of limited rainfall. The soil is tilled for at least one growing season to control weeds, to aid decomposition of plant residues, and to encourage the storage of moisture for the succeeding grain crop.

Fertility, soil. The quality of a soil that enables it to provide compounds, in adequate amounts and in proper balance, for the growth of specified plants, when other growth factors such as light, moisture, temperature, and the physical condition of the soil are favorable.

Flood plain. Nearly level land, consisting of stream sediments, that borders a stream and is subject to flooding unless protected artificially.

Fragipan. A loamy, brittle, subsurface horizon that is very low in organic-matter content and clay but is rich in silt or very fine sand. The layer is seemingly cemented. When dry, it is hard or very hard and has a high bulk density in comparison with the horizon or horizons above it. When moist, the fragipan tends to rupture suddenly if pressure is applied, rather than to deform slowly. The layer is generally mottled, is slowly or very slowly permeable to water, and has few or many bleached fracture planes that form polygons. Fragipans are a few inches to several feet thick; they generally occur below the B horizon, 15 to 40 inches below the surface.

Genesis, soil. The manner in which a soil originates. Refers especially to the processes initiated by climate and organisms that are responsible for the development of the solum, or true soil, from the unconsolidated parent material, as conditioned by relief and age of landform.

Gleyed soil. A soil in which waterlogging and lack of oxygen have caused the material in one or more horizons to be neutral gray in color. The term "gleyed" is applied to soil horizons with yellow and gray mottling caused by intermittent waterlogging.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rains. The distinction between gully and rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by normal tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage. V-shaped gullies result if the material is more difficult to erode with depth; whereas U-shaped gullies result if the lower material is more easily eroded than that above it.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed.

If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Loess. Fine-grained material, dominantly of silt-sized particles, that has been deposited by wind.

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 their thickness and arrangement in the soil profile.

Mottling, soil. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of 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 these: *fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Munsell notation. A system for designating color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with a hue of 10YR, a value of 6, and a chroma of 4.

Ped. An individual natural soil aggregate, such as a crumb, a prisim, or a block, in contrast to a clod.

Permeability. The quality that enables the soil to transmit water or air. Terms used to describe permeability are as follows: *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

Phase, soil. A subdivision of a soil, series, or other unit in the soil classification system made because of differences in the soil that affect its management but do not affect its classification in the natural landscape. A soil series, for example, may be divided into phases because of differences in slope, stoniness, thickness, or some other characteristic that affects its management but not its behavior in the natural landscape.

pH value. A numerical means for designating acidity and alkalinity in soils. A pH value of 7.0 indicates precise neutrality; a higher value, alkalinity; and a lower value, acidity.

Plowpan. A compacted layer formed in the soil immediately below the plowed layer.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher.

Sand. Individual rock or mineral fragments in a soil that range in diameter from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that 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.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. 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 together without any regular cleavage, as in many claypans and hardpans).

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it may soak into the soil or flow slowly to a prepared outlet without harm. Terraces in fields are generally built so they can be farmed. Terraces intended mainly for drainage have a deep channel that is maintained in permanent sod.

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."

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

GUIDE TO MAPPING UNITS

For a full description of mapping units, read both the description of the mapping unit and that of the soil series to which the mapping unit belongs. Other information is given in the text and tables as follows:

Acreage and extent, table 1, p. 5.
Predicted yields, table 2, p. 23.
Woodland suitability groups, table 3, p. 24.
Use of soils for wildlife, table 4, p. 27.
Engineering, tables 5, 6, and 7 pp. 28 through 37.

Map symbol	Mapping unit	Described on page	Capability unit Symbol	Woodland suitability group Symbol
AlB	Alaga loamy sand, 0 to 5 percent slopes	6	IIIs-1	3s2
Ar	Arkabutla soils, frequently flooded	6	IVw-1	1w9
CFE	Cadeville-Freestone association, hilly	7	VIIe-1	------
	Cadeville part	----	------	3c2
	Freestone part	----	------	2w8
CgC	Cadeville and Falkner soils, 4 to 8 percent slopes	7	IVe-1	------
	Cadeville part	----	------	3c2
	Falkner part	----	------	2w8
CgD	Cadeville and Falkner soils, 8 to 12 percent slopes	8	VIe-1	------
	Cadeville part	----	------	3c2
	Falkner part	----	------	2w8
ChA	Cahaba sandy loam, 0 to 2 percent slopes	9	I-1	2o7
ChB	Cahaba sandy loam, 2 to 5 percent slopes	9	IIe-1	2o7
FaB	Falkner silt loam, 0 to 3 percent slopes	10	IIIw-1	2w8
Gu	Guyton silt loam	11	IIIw-2	2w9
Je	Jena fine sandy loam	11	I-2	1o7
JN	Jena soils, frequently flooded	11	Vw-1	1w8
Nu	Nugent soils, frequently flooded	12	Vw-2	2s8
PaA	Paden silt loam, 0 to 2 percent slopes	14	IIw-1	2o7
PrA	Providence silt loam, 0 to 2 percent slopes	14	IIw-2	2o7
PrB	Providence silt loam, 2 to 5 percent slopes	15	IIe-2	2o7
PrC	Providence silt loam, 5 to 8 percent slopes	15	IIIe-1	2o7
Ro	Rosebloom silt loam, frequently flooded	15	Vw-3	2w9
Rs	Rosella silt loam	16	IIIw-3	3w9
RuB	Ruston sandy loam, 2 to 5 percent slopes	17	IIe-1	2o1
RuC	Ruston sandy loam, 5 to 8 percent slopes	17	IIIe-2	2o1
RuD	Ruston sandy loam, 8 to 12 percent slopes	17	IVe-2	2o1
SaB	Saffell gravelly sandy loam, 2 to 5 percent slopes	18	IIIe-3	4f2
SaE	Saffell gravelly sandy loam, 12 to 17 percent slopes	18	VIe-2	4f2
SmE	Smithdale sandy loam, 15 to 30 percent slopes	18	VIe-3	2o1
SmE3	Smithdale sandy loam, 15 to 30 percent slopes, severely eroded	19	VIIe-2	2o1
STE	Smithdale-Lucy association, hilly	19	------	------
	Smithdale part	----	VIe-3	2o1
	Lucy part	----	VIIs-1	3s2
Ve	Velda silt loam	19	IIw-3	1o7
Wa	Wanilla silt loam	20	IIIw-4	2w8

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