SOIL SURVEY

Pontotoc County Mississippi

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service and Forest Service
in cooperation with
MISSISSIPPI AGRICULTURAL AND FORESTRY EXPERIMENT STATION
Issued December 1973

Major fieldwork for this soil survey was done in the period 1958–69. Soil names and descriptions were approved in 1969. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1969. This survey was made cooperatively by the Soil Conservation Service and Forest Service and the Mississippi Agricultural and Forestry Experiment Station. It is part of the technical assistance furnished to the Pontotoc County Soil Conservation District.

Either enlarged or reduced copies of the soil map in this publication can be made by commercial photographers, or they can be purchased on individual order from the Cartographic Division, Soil Conservation Service, United States Department of Agriculture, Washington, D.C. 20250.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms 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 Pontotoc 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 are 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.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay 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 with a moderate limitation can be colored yellow, and those with 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 discussion in the section "Management for Crops and Pasture."

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, sportsmen, and others can find information about soils and wildlife in the section "Wildlife."

Community planners and others can read about soil properties that affect the choice of sites for nonindustrial buildings and for recreation areas in the section "Town and Country Planning."

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.

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 to Pontotoc 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 PONTOTOC COUNTY, MISSISSIPPI

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

PONTOTOC COUNTY is in the northeastern part of Mississippi (fig. 1). It has a land area of 320,640 acres, or 501 square miles. Cotton, soybeans, dairying, and raising beef cattle are the main enterprises. Industry is expanding rapidly.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in Pontotoc County, where they are located, and how they can be used. The soil scientists went into the county knowing they likely would 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, and many 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 soil classification most used in a local survey (*5*).[1]

Soils that have profiles almost alike make up a soil series. Except for 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. Bude and Falaya, for example, are the names of two soil series. All the soils in the United States having the same series name are are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface soil and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such

[1] Italic numbers in parentheses refer to Literature Cited, p. 70.

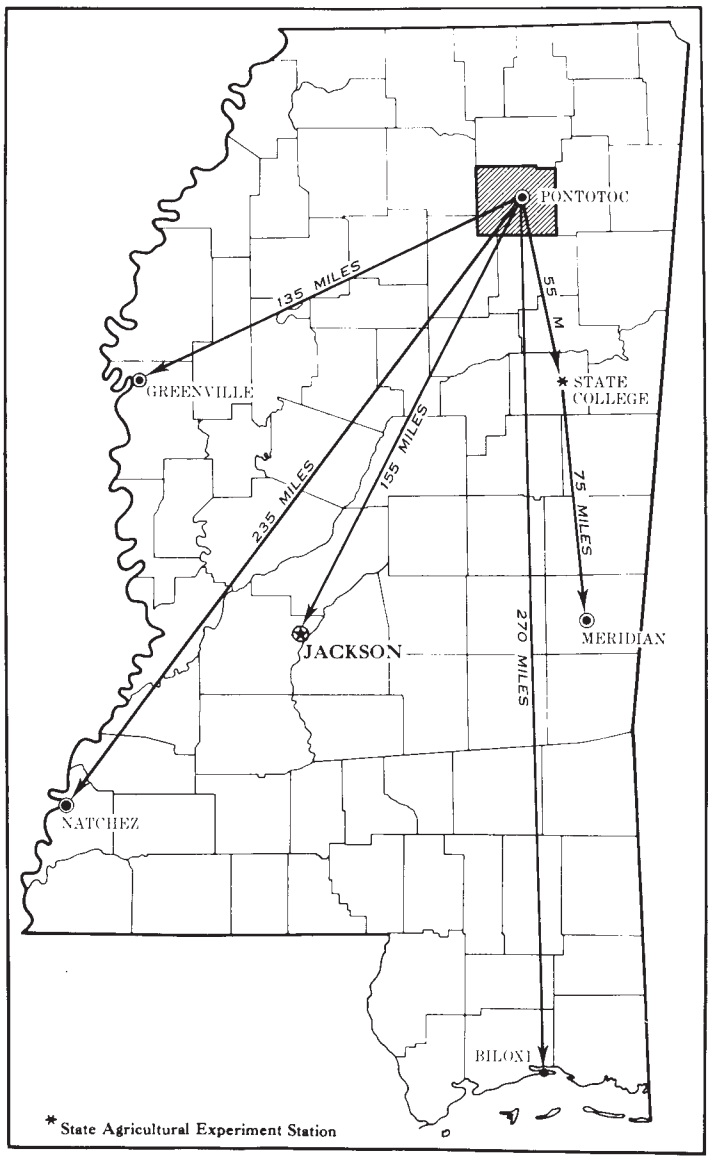

Figure 1.—Location of Pontotoc County in Mississippi.

differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Bude silt loam, 0 to 2 percent slopes, is one of two phases in this county that is within the Bude 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 soil map in the back of this publication was prepared from the 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. Three such kinds of mapping units are shown on the soil map of Pontotoc County: soil complexes, soil associations, and undifferentiated groups.

A soil complex consists of areas of two or more soils, so intermingled or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. The name of a soil complex consists of the names of the dominant soils, joined by a hyphen. Gullied land-Oktibbeha complex, 5 to 20 percent slopes, is an example.

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 one from another. The name of an association consists of the names of the dominant soils, joined by a hyphen. Oktibbeha-Ruston association, hilly, 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 soil 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 generally consists of the names of the dominant soils, joined by "and." Iuka and Ochlockonee soils is an example.

In most areas surveyed there are places where the soil material is so rocky, so shallow, or so severely eroded that it cannot be classified by soil series. These places are shown on the soil map and are described in the survey, but they are called land types and are given descriptive names. Gullied land is a land type in Pontotoc County.

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 practices are assembled from farm records and from field or plot experiments on the same kinds of soil. Yields under defined management are 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 readily useful to different groups of users, among them farmers, managers of woodland and rangeland, 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; 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 Pontotoc 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 soil associations in Pontotoc County are described in the following pages.

1. Arkabutla-Cascilla-Urbo Association

Nearly level, somewhat poorly drained and well-drained soils that have a loamy and clayey subsoil; on flood plains

This association is on flood plains that are subject to overflow of short duration, mainly in winter. Most of the larger streams have been rechanneled.

This association makes up about 13 percent of the county. It is about 60 percent Arkabutla soils, 17 percent Cascilla soils, and 14 percent Urbo soils. The remaining 9 percent is made of up Falaya, Iuka, Mantachie, Ochlockonee, and Rosebloom soils, all of minor extent.

Arkabutla soils are somewhat poorly drained. They have a dark-brown silt loam surface layer and a dark-

brown to light brownish-gray silt loam and silty clay loam subsoil.

Cascilla soils are well drained and are on old natural stream levees. They have a dark-brown silt loam surface layer. The upper part of the subsoil is brown and dark yellowish-brown silt loam; the lower part is mottled gray and brown silt loam.

Urbo soils are somewhat poorly drained. They have a dark grayish-brown silty clay loam surface layer and a grayish-brown silty clay subsoil.

Most of this association is used for row crops and pasture. Cotton, corn, and soybeans are the principal crops. Farms range from about 100 to 200 acres in size and extend into the adjacent hills. The hazard of overflow severely limits these soils for most nonfarm uses.

2. Robinsonville-Commerce-Mantachie Association

Nearly level, well-drained and somewhat poorly drained soils that are loamy throughout; on flood plains

This association is on stream flood plains in the eastern half of the county. It makes up about 11 percent of the county. About 30 percent is Robinsonville soils, 17 percent Commerce soils, and 17 percent Mantachie soils. The remaining 36 percent is made up of Catalpa, Chewacla, Iuka, Leeper, Marietta, and Ochlockonee soils.

Robinsonville soils are well drained. They have a dark yellowish-brown sandy loam surface layer and a dark yellowish-brown sandy loam subsoil.

Commerce soils are somewhat poorly drained. They have a brown silt loam surface layer and a dark grayish-brown to light-gray silt loam and silty clay loam subsoil.

Mantachie soils are somewhat poorly drained and have a brown sandy loam surface layer. The upper part of the subsoil is a brown sandy loam, and the lower part is gray clay loam that contains brown mottles.

Most of this association is cultivated or is used for pasture. Overflow of short duration occurs in winter and in spring. Most of the large stream channels have been reworked to reduce overflow. Farms range from about 100 to 200 acres in size and extend into the adjacent hills. Cotton, corn, and soybeans are the principal crops. The hazard of overflow severely limits the use of these soils for most nonfarm purposes.

3. Tippah-Providence-Wilcox Association

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

This association is in the western third of the county. The landscape is mainly covered with pine forest, is hilly, and has a dendritic drainage pattern. The ridges are narrow, generally less than a quarter of a mile wide. The side slopes are long, wide, and irregular in shape. Their gradient generally is more than 17 percent. They are intersected by very narrow stream flood plains, which contain springs that are active most of the year. Inactive gullies are features of the terrain.

This association makes up about 19 percent of the county. It is about 26 percent Tippah soils, 22 percent Providence soils, and 9 percent Wilcox soils. The remaining 43 percent is Bude, Cahaba, Henry, and Ruston soils.

Tippah soils are moderately well drained and are on the ridges and the upper two-thirds of the side slopes. The surface layer is yellowish-brown silt loam, and the subsoil ranges from yellowish-red silty clay loam to red silty clay mottled with brownish gray and gray.

Providence soils are moderately well drained and are on the tops and sides of ridges. They have a brown silt loam surface layer and a yellowish-red silty clay loam subsoil over a fragipan. Underlying the fragipan is red and strong-brown sandy clay loam mottled with brown and gray.

Wilcox soils are somewhat poorly drained and are on the lower side slopes. The surface layer is dark yellowish-brown silty clay loam. The upper part of the subsoil is silty clay loam mottled with red, yellow, brown, and gray; the lower part is gray silty clay.

Most of this association is used for pasture and woodland. Farms range from 100 to 400 acres in size. Small areas of some of the smaller farms are under cultivation; larger farms are mostly in woodland.

Most of this association is steep. With the exception of the Providence soils, the soils have a high shrink-swell potential that severely limits their use for most nonfarm purposes.

4. Falkner-Providence-Mayhew Association

Nearly level to rolling, moderately well drained to poorly drained soils that have a loamy and clayey subsoil; on uplands

This association is on uplands in the west-central part of the county. The ridges are a quarter to a half mile wide, and the side slopes are irregular. Gullies have formed on some of the steeper slopes.

This association makes up about 23 percent of the county. It is about 37 percent Falkner soils, 24 percent Providence soils that have a heavy substratum, and 11 percent Mayhew soils. The rest is mainly Frizzell, Henry, Adaton, Tippah, and Wilcox soils.

Falkner soils are on ridges and side slopes. They are somewhat poorly drained and nearly level to sloping. Slopes are less than 8 percent. The surface layer is brown silt loam. The upper part of the subsoil is yellowish-brown silt loam that grades to silty clay loam mottled in shades of yellow, brown, and gray. The lower part of the subsoil is grayish silty clay.

Providence soils are on ridgetops and side slopes. They are moderately well drained. The surface layer is brown silt loam. The subsoil is yellowish-red silty clay loam. Below this is a fragipan. The upper part of the fragipan is yellowish-red silt loam mottled with brown, and the lower part is strong-brown loam mottled with shades of red, brown, and gray.

Mayhew soils are on ridgetops and hillsides. They are poorly drained. The surface layer is dark grayish-brown silty clay loam. The upper part of the subsoil is gray silty clay loam, and the lower part is gravish silty clay mottled with shades of brown.

Most of this association is used for pasture and row crops. Cotton and soybeans are the principal crops. Farms are about 100 to 200 acres in size.

Falkner and Mayhew soils have high shrink-swell potential that severely limits their suitability for most nonfarm uses. Providence soils have a low shrink-swell potential above the fragipan.

5. Oktibbeha-Ruston-Atwood Association

Nearly level to very steep, moderately well drained and well drained soils that have a loamy and clayey subsoil; on uplands

This association is on uplands in the eastern part of the county. The landscape consists of ridgetops an eighth to a half mile wide and side slopes that are sloping to very steep. The side slopes are broken by numerous drainageways and gullies. The narrow flood plains are made up of loamy materials that are kept wet in most years by numerous springs.

This association makes up about 26 percent of the county. It is about 34 percent Oktibbeha soils, 24 percent Ruston soils, and 13 percent Atwood soils. The rest is mainly Cahaba, Frizzell, Mashulaville, Ora, and Providence soils.

Oktibbeha soils are generally on the lower side slopes. They are moderately well drained. The surface layer is dark-brown loam. The upper part of the subsoil is brown and yellowish-red silty clay that grades to mottled shades of brown and gray silty clay loam in the lower part.

Ruston soils are generally on ridges and the upper part of side slopes. They are well drained. The surface layer is brown sandy loam, and the subsoil is yellowish-red loam and sandy loam.

Atwood soils are on ridgetops. They are well drained. The surface layer is dark-brown silt loam, and the subsoil is dark reddish-brown silty clay loam.

Most of this association is used for woodland and pasture. Some of the broader ridgetops and flood plains are cultivated. Cotton, corn, and soybeans are the principal crops. Farms range from 100 to 200 acres in size.

Most soils on ridgetops and side slopes that are not too steep are suitable for most nonfarm uses. Oktibbeha soils are an exception because they have a high shrink-swell potential below the surface layer.

6. Ora-Kipling-Boswell Association

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

This association is in the extreme eastern part of the county. The landscape consists of broad, rolling ridges that range from a fourth to three-fourths of a mile wide. The ridges break to smooth side slopes of 5 to 12 percent. These side slopes are in some places interrupted by choppy steep terrain. The steep areas break smoothly to nearly level, south-facing terracelike areas along major streams. The narrow stream flood plains are composed of loamy materials.

This association makes up about 8 percent of the county. It is about 50 percent Ora soils, 18 percent Kipling soils, and 5 percent Boswell soils. The remaining 27 percent is Frizzell, Mashulaville, and Oktibbeha soils.

The moderately well drained Ora soils are on ridgetops and side slopes. They have a dark yellowish-brown loam surface layer and a yellowish-red loam subsoil that has strong-brown mottles. This part of the subsoil is underlain by a brown and yellowish-red loam and sandy clay loam fragipan mottled in shades of brown, red, and gray.

The somewhat poorly drained Kipling soils are on ridgetops and side slopes. They have a dark yellowish-brown silt loam surface layer that has pale-brown mottles. The upper part of the subsoil is yellowish-brown silty clay loam that has brownish and reddish mottles. The lower part of the subsoil is silty clay mottled with shades of gray, brown, and red. This is underlain by yellowish-brown silty clay mottled with gray.

The moderately well drained Boswell soils are mainly on ridgetops. They have a brown silt loam surface layer. The upper part of the subsoil is yellowish-red silty clay. The lower part of the subsoil is yellowish-brown silty clay mottled with shades of red, gray, and brown.

This association is used mostly for pasture, but the broader ridgetops and flood plains are cultivated. The principal crops are cotton, corn, and soybeans. Farms range from 100 to 200 acres in size.

With the exception of Ora soils, the major soils in this association have a high to very high shrink-swell potential and are poorly suited to most nonfarm uses.

Descriptions of the Soils

This section describes the soil series and mapping units in Pontotoc County. Each soil series is described in considerable detail, and then, briefly, each mapping unit in that series. 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 is the soil profile, that is, the sequence of layers ping unit, it is necessary to read both the description of the mapping unit and the description of the soil series to which it belongs.

An important part of the description of each soil series in the soil profile, that is, the sequence of layers from the surface downward to rock or other underlying material. Each series contains two descriptions of this profile. The first is brief and in terms familiar to the layman. The second, detailed and in technical terms, is for scientists, engineers, and others who need to make thorough and precise studies of soils.

As mentioned in the section "How This Survey Was Made," not all mapping units are members of a soil series. Gullied land, for example, does not belong to a soil series, but nevertheless is listed in alphabetic order along with the soil series.

Following the name of each mapping unit is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. The capability unit and woodland group in which the mapping unit has been placed are designated at the end of each mapping unit description. Suggestions on use and management are given in each mapping unit description.

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 at the end of this survey, and more detailed information about the terminology and methods of soil mapping can be obtained from the Soil Survey Manual (*5*).

Adaton Series

The Adaton series consists of poorly drained soils that formed in loamy material high in content of silt.

In a representative profile the surface layer is grayish-brown silt loam about 7 inches thick. The subsurface layer is light brownish-gray silt loam mottled with yellowish brown and is about 9 inches thick. The upper part of the subsoil is gray silt loam that is mottled with light yellowish brown and extends to a depth of about 28 inches. Below this is gray silty clay loam that is mottled with yellowish brown, pale brown, and brownish yellow and extends to a depth of about 61 inches.

Representative profile of Adaton silt loam in a cultivated field 5 miles north of Pontotoc along Mississippi Highway No. 15, 1½ miles west on paved county road, 100 feet north of road, SE¼SW¼ sec. 2, T. 9 S., R. 2 E.:

Ap—0 to 7 inches, grayish-brown (10YR 5/2) silt loam; weak, fine, granular structure; friable; few fine roots; a few very dark grayish-brown organic stains on ped faces; strongly acid; abrupt, smooth boundary.

A2g—7 to 16 inches, light brownish-gray (10YR 6/2) silt loam; common, medium, distinct, yellowish-brown (10YR 5/6) and light yellowish-brown (10YR 6/4) mottles; weak, medium and fine, subangular blocky structure; friable, slightly plastic; few fine roots; strongly acid; gradual, smooth boundary.

B21tg—16 to 22 inches, gray (10YR 6/1) silt loam; few medium, distinct, light yellowish-brown (10YR 6/4) mottles; moderate, medium, subangular blocky structure; friable, slightly plastic; few patchy clay films; very strongly acid; abrupt, smooth boundary.

B22tg—22 to 28 inches, gray (10YR 6/1) silt loam; common medium, distinct, light yellowish-brown (10YR 6/4) mottles; moderate, medium, subangular blocky structure; firm, slightly plastic; few patchy clay films; very strongly acid; gradual, smooth boundary.

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

Soil	Area	Extent
	Acres	*Percent*
Adaton silt loam	2, 960	0. 9
Arkabutla silt loam	24, 734	7. 7
Atwood silt loam, 0 to 2 percent slopes	490	. 2
Atwood silt loam, 2 to 5 percent slopes	3, 870	1. 2
Atwood silt loam, 2 to 5 percent slopes, eroded	2, 768	. 9
Atwood silt loam, 5 to 8 percent slopes, severely eroded	3, 640	1. 1
Atwood silt loam, 8 to 12 percent slopes, severely eroded	639	. 2
Boswell silt loam, 2 to 5 percent slopes, eroded	660	. 2
Boswell silt loam, 5 to 8 percent slopes, eroded	565	. 2
Bude silt loam, 0 to 2 percent slopes	1, 278	. 4
Bude silt loam, 2 to 5 percent slopes	3, 369	1. 1
Cascilla silt loam	7, 282	2. 3
Catalpa silty clay loam	1, 870	. 6
Chewacla loam	2, 138	. 7
Chewacla soils	3, 408	1. 1
Commerce silt loam	6, 025	1. 9
Falaya soils	3, 621	1. 1
Falkner silt loam, 0 to 2 percent slopes	3, 884	1. 1
Falkner silt loam, 2 to 5 percent slopes	17, 373	5. 4
Falkner silt loam, 5 to 8 percent slopes	5, 086	1. 6
Falkner silt loam, 5 to 8 percent slopes, eroded	2, 130	. 6
Frizzell silt loam, 0 to 2 percent slopes	8, 552	2. 7
Frizzell silt loam, 2 to 5 percent slopes	3, 406	1. 1
Gullied land-Oktibbeha complex, 5 to 20 percent slopes	1, 175	. 3
Henry silt loam	1, 202	. 4
Iuka and Ochlockonee soils	2, 120	. 7
Kipling silt loam, 2 to 5 percent slopes	775	. 2
Kipling silt loam, 5 to 8 percent slopes	850	. 2
Kipling silt loam, 8 to 12 percent slopes, eroded	1, 475	. 5
Kipling soils, 8 to 12 percent slopes, severely eroded	1, 704	5
Leeper silty clay loam	917	3
Mantachie sandy loam	6, 027	1. 9
Marietta loam	4, 643	1. 4
Mashulaville silt loam	1, 220	. 4
Mayhew silty clay loam, 0 to 2 percent slopes	6, 212	1. 9
Mayhew silty clay loam, 2 to 5 percent slopes	1, 942	. 6
Mayhew silty clay loam, 5 to 12 percent slopes	1, 561	. 5
Mayhew silty clay loam, 8 to 12 percent slopes, eroded	710	. 2
Oktibbeha soils, 17 to 30 percent slopes, severely eroded	4, 047	1. 3
Oktibbeha-Ruston association, hilly	49, 072	15. 3
Ora loam, 2 to 5 percent slopes	4, 473	1. 4
Ora loam, 2 to 5 percent slopes, eroded	2, 769	. 9
Ora loam, 5 to 8 percent slopes	640	. 2
Ora loam, 5 to 8 percent slopes, eroded	3, 621	1. 1
Ora loam, 8 to 12 percent slopes, eroded	1, 961	. 6
Providence silt loam, 2 to 5 percent slopes	1, 128	. 4
Providence silt loam, 2 to 5 percent slopes, eroded	1, 704	. 5
Providence silt loam, 5 to 8 percent slopes, eroded	3, 652	1. 1
Providence silt loam, 8 to 12 percent slopes, severely eroded	1, 230	. 4
Providence silt loam, heavy substratum, 2 to 5 percent slopes	4, 647	1. 4
Providence silt loam, heavy substratum, 2 to 5 percent slopes, eroded	1, 278	. 4
Providence silt loam, heavy substratum, 5 to 8 percent slopes	1, 920	. 6
Providence silt loam, heavy substratum, 5 to 8 percent slopes, eroded	5, 751	1. 8
Providence silt loam, heavy substratum, 8 to 12 percent slopes, eroded	4, 473	1. 4
Providence-Gullied land complex, 17 to 30 percent slopes	15, 705	4. 9
Robinsonville sandy loam	10, 244	3. 2
Rosebloom silt loam	1, 236	. 4
Ruston and Cahaba sandy loams, 17 to 30 percent slopes	5, 377	1. 7
Ruston and Cahaba sandy loams, 12 to 30 percent slopes, eroded	5, 951	1. 9
Tippah silt loam, 2 to 5 percent slopes	639	. 2
Tippah silt loam, 5 to 8 percent slopes	1, 010	. 3
Tippah-Providence-Wilcox association, hilly	36, 702	11. 4
Urbo silty clay loam	6, 165	1. 9
Wilcox silty clay loam, 2 to 5 percent slopes	2, 140	. 7
Wilcox silty clay loam, 5 to 8 percent slopes	824	. 3
Total	320, 640	100. 0

B23tg—28 to 39 inches, gray (10YR 6/1) silty clay loam; few, fine, distinct, yellowish-brown mottles; strong, medium, angular blocky structure; firm, slightly plastic, sticky; patchy clay films; very strongly acid; gradual, smooth boundary.

B24tg—39 to 50 inches, gray (10YR 6/1) silty clay loam; few, medium, distinct, pale-brown (10YR 6/3) and brownish-yellow (10YR 6/6) mottles; moderate, medium, angular blocky structure; firm, plastic, sticky; patchy clay films; few dark-brown stains; few dark-brown concretions; very strongly acid; gradual, smooth boundary.

B25tg—50 to 61 inches, gray (10YR 6/1) silty clay loam; common, fine, distinct, yellowish-brown and brown mottles; strong, medium, angular blocky structure; firm, plastic, sticky; few slickensides about 1 inch square in lower part of horizon; very strongly acid.

The Ap horizon is grayish brown to gray. The A2 horizon is light brownish gray or gray mottled with shades of brown. The upper part of the Bt horizon is gray to light brownish-gray silt loam or silty clay loam mottled in shades of brown. The lower part is gray or light brownish gray mottled in shades of brown and yellow. Texture of the lower part of the Bt horizon is silty clay loam or silty clay. Content of dark-brown concretions ranges from none to common. Reaction is strongly acid or very strongly acid throughout the profile.

Adaton soils are associated with Falkner, Mayhew, Providence, and Wilcox soils. They have a coarser textured B horizon than Mayhew and Wilcox soils. In contrast with Providence soils, they do not have a fragipan. They have a grayer B horizon than the Falkner soils.

Adaton silt loam (Ad).—This soil is poorly drained. Slopes are 0 to 2 percent. Permeability is slow, and available water capacity is very high. Runoff is slow, and water ponds in low areas. Reaction is strongly acid or very strongly acid. When the moisture content is favorable, this soil is easy to work.

Included with this soil in mapping are small areas of Falkner and Mayhew soils.

This soil is used for pasture and trees, and to some extent, for row crops. It is suited to soybeans, pasture plants, adapted hardwoods, and pine trees. Drainage by V- or W-ditches and row arrangement are needed to remove excess water. If this soil is drained, it can be used for row crops, but it is best suited to permanent vegetation. Capability unit IIIw-3; woodland group 3w9.

Arkabutla Series

The Arkabutla series consists of somewhat poorly drained soils on flood plains. These soils formed in loamy material high in content of silt.

In a representative profile the surface layer is dark-brown silt loam about 6 inches thick. The upper part of the subsoil is dark-brown silty clay loam about 10 inches thick that is mottled in shades of yellow and gray. The lower part of the subsoil is light brownish-gray silt loam that has brownish mottles and extends to a depth of about 55 inches.

Representative profile of Arkabutla silt loam in a cultivated field 4½ miles southwest of Pontotoc, on Mississippi Highway No. 341, 300 feet south of highway, NW¼NE¼ sec. 27, T. 10 S., R. 2 E.:

Ap—0 to 6 inches, dark-brown (10YR 4/3) silt loam; common, fine and medium, distinct, light brownish-gray (10YR 6/2) mottles; weak, fine, granular structure; friable; few fine roots; strongly acid; abrupt, smooth boundary.

B21—6 to 16 inches, dark-brown (10YR 4/3) silty clay loam; common, medium, distinct, light brownish-gray (10YR 6/2) mottles and a few medium, distinct, brownish-yellow (10YR 6/6) mottles; weak, fine, subangular blocky structure; friable, slightly plastic; few fine roots; few, medium, black concretions; strongly acid; clear, smooth boundary.

B22g—16 to 40 inches, light brownish-gray (10YR 6/2) silt loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, medium, subangular blocky structure; friable, slightly plastic; common, medium, black concretions; few fine roots; strongly acid; gradual boundary.

B3g—40 to 55 inches, light brownish-gray (10YR 6/2) silt loam; common, fine and medium, distinct, brown (10YR 5/3) mottles; weak, medium, subangular blocky structure; friable, slightly plastic; common black concretions; strongly acid.

The Ap horizon ranges from dark brown to grayish brown. The upper part of the B horizon is mottled in shades of brown, yellow, and gray or has a matrix color of mottled dark brown. The lower part of the B horizon is silt loam or silty clay loam. It is light brownish gray or gray mottled in shades of brown. Reaction is strongly acid or very strongly acid throughout the profile.

Arkabutla soils are associated with Cascilla, Rosebloom, and Urbo soils. They are grayer in the lower part of the B horizon than Cascilla soils. They are browner in the upper part than Rosebloom soils and contain less clay than Urbo soils.

Arkabutla silt loam (Ar).—This is a somewhat poorly drained soil on flood plains. Slopes are 0 to 2 percent. Permeability is moderate. Available water capacity is very high. Runoff is slow. The soil is subject to occasional flooding for short periods, and it crusts and cracks if left bare. Reaction is strongly acid or very strongly acid.

Included with this soil in mapping are small areas of Cascilla, Rosebloom, and Urbo soils.

Most areas of this soil are cultivated or used for pasture. A small acreage is wooded. Cotton, corn, soybeans, small grain, pasture plants, and adapted species of hardwood and pine trees are suited. Management for row crops includes surface drainage by V- and W-ditches, row arrangement, and return of crop residue to the soil. If drained, this soil can be used intensively for row crops. Capability unit IIw-5; woodland group 1w9.

Atwood Series

The Atwood series consists of well-drained soils that formed in loamy material high in content of silt. Slopes are 0 to 12 percent.

In a representative profile the surface layer is dark-brown silt loam about 6 inches thick. The upper part of the subsoil is dark reddish-brown silty clay loam that extends to a depth of about 45 inches. The middle part is dark reddish-brown clay loam that extends to a depth of about 57 inches. The lower part is dark-red clay loam that extends to a depth of 79 inches.

Representative profile of Atwood silt loam, 0 to 2 percent slopes, in a cultivated field 2½ miles south of Pontotoc, on Mississippi Highway No. 15, one-fourth mile west on gravel road, SW¼NE¼ sec. 17, T. 10 S., R. 3 E.:

Ap—0 to 6 inches, dark-brown (7.5YR 4/4) silt loam; weak, fine and medium, granular structure; friable; common fine roots; few worm coats; some material from

the B horizon in wormholes and rootholes; slightly acid; abrupt, smooth boundary.

B21t—6 to 18 inches, dark reddish-brown (5YR 3/4) silty clay loam; moderate, fine and medium, subangular blocky structure; friable, slightly plastic; few fine roots; few, fine, black concretions; few root channels filled with material from the Ap horizon; patchy clay films on peds and in root channels; slightly acid; gradual, smooth boundary.

B22t—18 to 31 inches, dark reddish-brown (2.5YR 3/4) silty clay loam; moderate, medium and coarse, subangular and angular blocky structure; friable, slightly plastic; few fine roots; common, fine to coarse, black coatings and many, fine, black concretions; clay films on peds and in cracks; a few root channels and wormholes filled with material from the Ap horizon; slightly acid; gradual, smooth boundary.

B23t—31 to 45 inches, dark reddish-brown (2.5YR 3/4) silty clay loam; moderate, medium and coarse, subangular and angular blocky structure; friable, slightly plastic; few fine roots; common, fine to coarse, black coatings and common, fine, black concretions; clay films on ped faces and in cracks; few root channels filled with material from B22t horizon; slightly acid; gradual, smooth boundary.

B24t—45 to 57 inches, dark reddish-brown (2.5YR 3/4) clay loam; moderate, medium and coarse, subangular and angular blocky structure; friable, slightly plastic; few fine roots; common, fine, black concretions; clay films on ped faces and in cracks; strongly acid; gradual, smooth boundary.

IIB25t—57 to 79 inches, dark-red (10YR 3/6) clay loam; moderate, medium and coarse, subangular and angular blocky structure; friable, slightly plastic; few, fine, black coatings; few concretions; patchy clay films on ped faces and in cracks; slightly acid.

The Ap horizon is yellowish-brown, reddish-brown, dark-brown, brown, or yellowish-red silt loam 3 to 6 inches thick. The upper part of the Bt horizon is dark reddish brown, dark red, or red. Brownish-yellow mottles are present in places. The B horizon is silt loam, silty clay loam, or clay loam. Sand content increases with depth. Black coatings and concretions range from few to common. The IIBt horizon is dark-red, red, dark reddish-brown, or yellowish-red clay loam or silty clay loam. Reaction is slightly acid to strongly acid throughout the profile.

Atwood soils are associated with Cahaba, Oktibbeha, Ora, and Ruston soils. They have a B horizon that contains more silt than Cahaba, Ora, and Ruston soils. They have a less clayey Bt horizon than Oktibbeha soils and do not have an alkaline C horizon. In contrast with Ora soils, they do not have a fragipan.

Atwood silt loam, 0 to 2 percent slopes (AtA).—This is a well-drained soil on ridgetops. It has the profile described as representative for the series.

Permeability is moderate, and the available water capacity is very high. Runoff is slow, and the hazard of erosion is slight. Reaction is slightly acid to strongly acid. Plowpans form in the soil, and the soil packs and crusts if left bare. Good tilth can be maintained if crop residue is used.

Included in mapping are small areas of Providence soils.

Most areas of this soil are cultivated. Cotton, corn, soybeans, small grain, truck crops, pasture plants, and adapted hardwood and pine trees are well suited. Row crops can be grown continuously. Capability unit I–1; woodland group 2o7.

Atwood silt loam, 2 to 5 percent slopes (AtB).—This is a well-drained soil that occurs on broad ridgetops. The surface layer is brown silt loam about 6 inches thick. The upper part of the subsoil is dark reddish-brown, red, or dark-red silty clay loam. Below this is mottled yellowish-red to dark-red clay loam that reaches to a depth of about 60 inches.

Included in mapping are small areas of Ora and Providence soils.

Permeability of this soil is moderate, and available water capacity is very high. Runoff is medium, and the erosion hazard is slight to moderate where this soil is cultivated. A plowpan forms in this soil in places. Reaction is slightly acid to strongly acid. This soil crusts and packs if left bare. Good tilth can be maintained through the use of crop residue. The erosion hazard is moderate.

Most of this acreage is cultivated or used for pasture. A small acreage is wooded. Cotton, corn, soybeans, small grain, truck crops, pasture plants, loblolly pine, and adapted hardwoods are well suited. Row crops can be grown continuously under good management. The hazard of erosion on cropland can be controlled by using terraces, grass waterways, stripcropping, and arrangement of crop rows. Capability unit IIe–1; woodland group 2o7.

Atwood silt loam, 2 to 5 percent slopes, eroded (AtB2).—This soil is well drained and occurs on broad ridgetops. The surface layer is yellowish-red silt loam about 4 inches thick. The upper part of the subsoil is dark reddish-brown silty clay loam to a depth of about 66 inches. Below this is dark-red silty clay loam and clay loam mottled with brownish yellow. Some of the surface layer has been mixed with the subsoil.

Permeability is moderate, and available water capacity is very high. Runoff is medium, and where this soil is cultivated, the erosion hazard is moderate. Reaction is slightly acid to strongly acid. Tilth can be maintained by using crop residue. This soil crusts and packs if left bare.

Included with this soil in mapping are small areas of Ora and Providence soils.

Most of this soil is cultivated or used for pasture. A small acreage is wooded. Cotton, corn, soybeans, small grain, truck crops, pasture plants, loblolly pine, and adapted hardwood trees are well suited. The hazard of erosion on cropland can be controlled by terraces, grass waterways (fig. 2), stripcropping, and row arrangement. Capability unit IIe–1; woodland group 2o7.

Atwood silt loam, 5 to 8 percent slopes, severely eroded (AtC3).—This soil is well drained and occurs on ridgetops. The surface layer is reddish-brown silt loam about 3 inches thick. The upper part of the subsoil is reddish-brown, red, or dark-red silty clay loam that extends to a depth of about 32 inches. Below this is dark-red silty clay loam to clay loam. Erosion has removed most of the original surface layer, and in many places the subsoil is exposed. A few deep gullies and common to many shallow gullies have formed.

Permeability is moderate, and available water capacity is very high. Runoff is rapid. Reaction is slightly acid to strongly acid. Where this soil is cultivated without a complete water disposal system, there is a severe hazard of erosion. In cultivated areas, crop residue should be returned to the surface layer.

Included with this soil in mapping are small areas of Cahaba, Ora, and Ruston soils.

Most of the acreage is cultivated or used for pasture. A small acreage is wooded. Cotton, corn, soybeans, small

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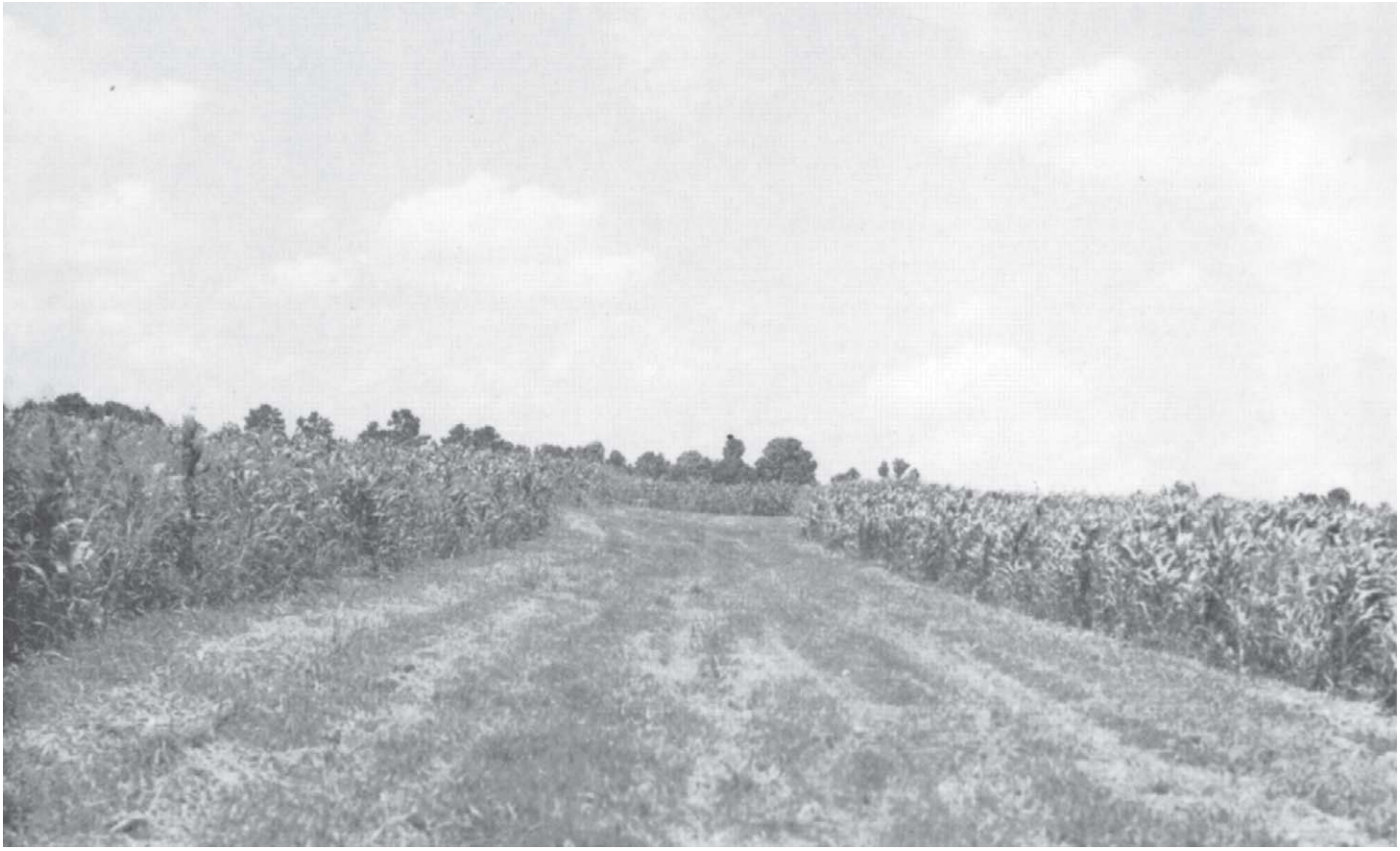

Figure 2.—**Grass waterway on Atwood silt loam, 2 to 5 percent slopes, eroded.**

grain, pasture plants, loblolly pine, and adapted hardwood trees are suited. Management for row crops should include terraces, vegetated waterways, contour tillage, and the use of close-growing crops about half the time. Capability unit IIIe–1; woodland group 2o7.

Atwood silt loam, 8 to 12 percent slopes, severely eroded (AtD3).—This soil is well drained and is on side slopes. The surface layer is reddish-brown silt loam about 3 inches thick. The upper part of the subsoil is reddish-brown silty clay loam that extends to a depth of about 30 inches. The lower part is red clay loam. This soil is marked by frequent shallow gullies and a few deep gullies.

Included with this soil in mapping are small areas of Cahaba and Ruston soils.

Permeability is moderate. Available water capacity is very high. Reaction is strongly acid to slightly acid. Runoff is rapid, and where this soil is cultivated, the hazard of erosion is very severe. The soil crusts and packs if left bare. In cultivated areas, residue should be returned to the surface.

Most of the acreage is in pasture and woodland. A small acreage is cultivated. Small grain, cotton, pasture plants, and pine trees are suited. Management for row crops should include terraces, vegetated waterways, contour tillage, and use of close-growing crops about two-thirds of the time. Capability unit IVe–1; woodland group 2o7.

Boswell Series

The Boswell series consists of moderately well drained soils that formed in clayey material. Slopes are 2 to 8 percent.

In a representative profile the surface layer is brown silt loam about 5 inches thick. The upper part of the subsoil is yellowish-red silty clay that reaches to a depth of about 14 inches. Below this, to a depth of about 59 inches, is yellowish-brown silty clay mottled with yellowish red, light gray, and strong brown.

Representative profile of Boswell silt loam, 2 to 5 percent slopes, eroded, in a wooded area 3 miles east of Troy and 50 feet south of a county road, NE¼NE¼ sec. 24, T. 11 S., R. 4 E.:

O1—1 inch to 0, leaves and leaf mold.

Ap—0 to 5 inches, brown (10YR 5/3) silt loam; moderate, fine, granular structure; friable; common yellowish-red worm casts; common fine roots; strongly acid; clear, wavy boundary.

B21t—5 to 14 inches, yellowish-red (5YR 5/8) silty clay; strong, fine, subangular blocky structure; firm, plastic; patchy clay films; few fine roots; strongly acid; clear, wavy boundary.

B22t—14 to 20 inches, yellowish-brown (10YR 5/8) silty clay; many, medium, distinct, yellowish-red (5YR 4/6) mottles; strong, fine, subangular blocky structure; firm, plastic; near continuous clay films; few fine roots; strongly acid; clear, wavy boundary.

B23t—20 to 31 inches, mottled yellowish-brown (10YR 5/4), yellowish-red (5YR 5/6), and light-gray (2.5YR 7/2)

silty clay; strong, fine to medium and coarse, angular blocky structure; firm, plastic; continuous clay films; few small slickensides in lower part of horizon; few fine roots; strongly acid; gradual, wavy boundary.

B24t—31 to 59 inches, yellowish-brown (10YR 5/8) silty clay; common, medium, distinct, light-gray (2.5Y 7/2) mottles and common, medium, faint, strong-brown (7.5Y 5/8) mottles; moderate prismatic structure parting to strong, medium and coarse, angular blocky structure; firm, plastic; continuous clay films; few fine roots; few slickensides; root channels coated with light-gray (10YR 7/2) silt; few manganese concretions at a depth of 50 inches; strongly acid.

The Ap horizon is grayish-brown, dark grayish-brown, brown, or yellowish-brown silt loam 5 to 6 inches thick. The upper part of the Bt horizon is strong brown, yellowish brown, yellowish red, or red. The lower part has matrix colors that are similar to those in the upper part and is mottled with shades of gray, brown, and red. The Bt horizon is silty clay loam, silty clay, clay loam, and clay. It is 35 to 50 percent clay.

Boswell soils are associated with Kipling, Oktibbeha, Ruston, and Ora soils. They are better drained than Kipling soils. They are not so well drained as Ruston soils and have a clayey B horizon. They do not have the alkaline lower part of the Bt horizon characteristic of Oktibbeha soils. They have a more clayey B horizon than Ora soils and, unlike them, they do not have a fragipan.

Boswell silt loam, 2 to 5 percent slopes, eroded (BoB2).—This soil is moderately well drained and is on ridgetops. It has the profile described as representative for the series. There are a few rills and an occasional shallow gully that exposes the subsoil.

Included with this soil in mapping are small areas of Kipling and Ora soils and other soils that are slightly acid to mildly alkaline in the lower parts of the subsoil.

Permeability is slow, and available water capacity is high. Runoff is medium, and the hazard of erosion is severe where this soil is cultivated. Reaction is strongly acid. This soil shrinks and cracks when dry. It is difficult to work and can be tilled only within a narrow range of moisture content.

Most of the acreage is in pasture or woodland; however, a small acreage is cultivated or used for pasture. Cotton, corn, soybeans, small grain, adapted kinds of pine, and redcedar are suited. Management for row crops should include terraces, vegetated waterways, contour tillage, and use of a close-growing crop in the cropping system. Capability unit IIIe–5; woodland group 3c2.

Boswell silt loam, 5 to 8 percent slopes, eroded (BoC2).—This soil is moderately well drained. It occurs on ridgetops and hillsides that have many rills and an occasional shallow gully.

The surface layer is dark grayish-brown and brown silt loam about 6 inches thick. The upper part of the subsoil is yellowish-red to red silty clay that reaches to a depth of about 17 inches. The lower part is silty clay that is mottled with shades of red, gray, and brown and extends to a depth of about 31 inches. Below this is mottled silty clay.

Included in mapping are small areas of Kipling and Ora soils and other soils that are slightly acid to mildly alkaline in the lower part of the subsoil.

Permeability is slow, and available water capacity is high. This soil erodes readily if not protected. It crusts and packs if left bare, and it shrinks and cracks when dry. Runoff is rapid, and where the soil is cultivated, the erosion hazard is severe. Reaction is strongly acid.

Most of the soil is used for pasture and woodland; however, a small acreage is used for row crops. Cotton, corn, soybeans, small grain, pasture plants, pine trees, and redcedar are suited. Management for row crops should include terraces, vegetated waterways, contour tillage, and the use of close-growing crops. Capability unit IVe–3; woodland group 3c2.

Bude Series

The Bude series consists of somewhat poorly drained soils that have a fragipan. These soils formed in loamy materials that have a high silt content. They are on uplands. Slopes are 0 to 5 percent.

In a representative profile the surface layer is brown silt loam about 7 inches thick. The upper part of the subsoil is yellowish-brown silt loam that has pale-brown mottles and extends to a depth of about 12 inches. The lower part is yellowish-brown silt loam that has grayish and brownish mottles grading to mottled shades of brown and gray. This part extends to a depth of about 24 inches. Beneath is a thick fragipan of silt loam mottled with shades of brown and gray. It extends to a depth of more than 60 inches.

Representative profile of Bude silt loam, 0 to 2 percent slopes, in a cultivated field one-eighth mile west of county road, 1 mile south of Toccopola, SE¼NE¼ sec. 6, T. 10 S., R. 1 E.:

Ap—0 to 7 inches, brown (10YR 4/3) silt loam; moderate, medium, platy structure; friable; few fine roots; strongly acid; abrupt, smooth boundary.

B21—7 to 12 inches, yellowish-brown (10YR 5/6) silt loam; common, fine, faint, dark yellowish-brown and pale-brown mottles; weak to moderate, medium, subangular blocky structure; friable; many fine pores; few fine roots; few dark-brown concretions; strongly acid; clear, smooth boundary.

B22—12 to 17 inches, yellowish-brown (10YR 5/4) silt loam; common, medium, faint and distinct, dark yellowish-brown (10YR 4/4) and light brownish-gray (10YR 6/2) mottles; weak, medium, subangular blocky structure; friable; few fine roots; few brown and black concretions; common fine pores; strongly acid; clear, smooth boundary.

A′2—17 to 24 inches, mottled light brownish-gray (10YR 6/2), pale-brown (10YR 6/3), light-gray (10YR 7/2), and yellowish-brown (10YR 5/6) silt loam; weak, medium, subangular blocky structure; friable; few fine roots; all peds are coated with light-gray silt; few fine voids; common, fine and medium, brown concretions; strongly acid; gradual, smooth boundary.

B′x1—24 to 34 inches, mottled yellowish-brown (10YR 5/8), dark yellowish-brown (10YR 4/4), and gray (10YR 6/1) silt loam; moderate, medium, subangular blocky structure; firm, compact and brittle; nearly continuous clay films; light-gray silt in pockets and in polygonal cracks; few, fine, and medium, brown and black concretions; strongly acid; gradual, smooth boundary.

B′x2—34 to 42 inches, mottled gray (10YR 6/1) and yellowish-brown (10YR 5/8) silt loam; moderate, medium, subangular blocky structure; firm, compact and brittle; patchy clay films; many light-gray silt coats on ped faces; strongly acid; gradual, smooth boundary.

IIB′x3—42 to 60 inches, yellowish-brown (10YR 5/6) silt loam; common, medium, distinct, strong-brown (7.5YR 5/6) and gray (10YR 6/1) mottles; moderate, medium, subangular blocky structure; firm, compact and brittle; cracks filled with gray silt material;

patchy clay films; few black coatings and concretions; strongly acid.

The Ap horizon is dark gray, grayish brown, brown, or yellowish brown and 6 to 7 inches thick. The B2 horizon has a matrix of brownish yellow, yellowish brown or light yellowish brown. It is mottled with shades of gray and brown. Texture of the B2 horizon is silt loam or silty clay loam. The A'2 horizon is silt loam that has a gray or light brownish-gray matrix with brownish mottles or it is mottled with shades of gray and brown. The A'2 horizon has lower clay content than the B2 or Bx horizons. The Bx horizon is mottled in shades of brown, gray, and yellow or has a matrix of yellowish brown or brownish yellow mottled with shades of brown, gray, and yellow. The Bx horizon is a silt loam or silty clay loam. The IIBx horizon has colors similar to those of the Bx horizon, but texture is clay loam, silty clay loam, loam, and silt loam. Depth to the Bx horizon ranges from 15 to 26 inches. Brown and black concretions are few to common. Reaction is strongly acid or very strongly acid in all horizons.

Bude soils are associated with Falkner, Frizzell, Henry, and Providence soils. They differ from Falkner and Frizzell soils in having a fragipan. They are not so well drained as Providence soils but are better drained than Henry soils.

Bude silt loam, 0 to 2 percent slopes (BuA).—This soil is somewhat poorly drained and has a fragipan. It is mainly on stream terraces and broad ridgetops. This soil has the profile described as representative for the series.

Included with this soil in mapping are small areas of Falkner and Providence soils.

Permeability is moderate in the upper part of the subsoil and slow in the fragipan. The available water capacity is high. Runoff is slow, and wetness is a severe limitation. Water ponds on low areas. When the soil is used for cultivated crops, surface drainage is needed. The soil crusts and packs if left bare, and a plowpan forms in places. Reaction is strongly acid or very strongly acid.

Most of the acreage is cultivated or used for pasture, but small areas are wooded. Cotton, corn, soybeans, small grain, pasture plants, pine trees (fig. 3), and adapted hardwoods are suited. Row crops can be grown continuously under proper management that includes drainage by V-ditches and W-ditches and row arrangement. Capability unit IIIw–1; woodland group 2w8.

Bude silt loam, 2 to 5 percent slopes (BuB).—This soil is somewhat poorly drained and has a fragipan. It is on broad ridgetops and stream terraces. The surface layer is brown silt loam about 6 inches thick. The upper part of the subsoil is yellowish-brown silt loam about 5 inches thick. Below this is brownish-yellow silt loam that has grayish and brownish mottles to a depth of about 22 inches. Below this, and to a depth of about 60 inches, is a thick, compact fragipan. This fragipan is mottled with shades of gray, brown, and yellow. On its upper part it is silt loam, but it grades to clay loam with depth.

Included with this soil in mapping are small areas of Falkner and Providence soils.

Permeability is moderate in the upper part of the subsoil and slow in the fragipan. The available water capacity is medium. Runoff is slow, and wetness is a severe limitation. This soil becomes saturated during periods of rainfall, and surface drainage is needed when it is used for row crops. Good tilth can be maintained by the use of crop residue. The soil crusts and packs if left bare, and a plowpan forms in places. Reaction is strongly acid and very strongly acid.

Most of the acreage is cultivated or used for pasture, but a small acreage is wooded. Cotton, corn, soybeans, small grain, pasture plants, and adapted pine and hardwood trees are suited. Management for row crops should include row arrangement, use of crop residue, and drainage by V-ditches and W-ditches for the removal of surface water. Capability unit IIIw–1; woodland group 2w8.

Cahaba Series

The Cahaba series consists of well-drained soils that formed in loamy material. Slopes are 12 to 30 percent.

In a representative profile the surface layer is brown sandy loam about 4 inches thick. The subsoil is yellowish-red loam or sandy loam to a depth of about 42 inches. This is underlain by yellowish-red loamy sand to a depth of about 60 inches.

Representative profile of Cahaba sandy loam in an area of Ruston and Cahaba sandy loams, 17 to 30 percent slopes, in a pasture 2 miles north of Pontotoc, three-fourths of a mile east of Mississippi Highway No. 345, and three-fourths of a mile west of Mississippi Highway No. 9, SE¼NE¼ sec. 21, T. 9 S., R. 3 E.:

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

B21t—4 to 14 inches, yellowish-red (5YR 4/6) loam; moderate, medium, subangular blocky structure; friable, slightly plastic; few, thin, patchy clay films and bridging of sand grains; few fine roots; very strongly acid; gradual, smooth boundary.

B22t—14 to 42 inches, yellowish-red (5YR 4/6) sandy loam; weak, medium, subangular blocky structure; friable; clay bridging of sand grains; few fine roots; very strongly acid; gradual, smooth boundary.

C—42 to 60 inches, yellowish-red (5YR 4/6) loamy sand; very weak, fine, subangular blocky structure; very friable to loose; clay bridging of sand grains; very strongly acid.

The Ap horizon is grayish brown, brown, yellowish brown, or reddish brown. The Bt horizon is yellowish-red or red sandy clay loam, loam, sandy loam, or silt loam. Clay content in the upper part of the Bt horizon is 20 to 30 percent, and content of sand coarser than very fine sand is more than 15 percent. The C horizon is strong-brown, yellowish-red, or red loamy sand.

Cahaba soils are associated with Atwood, Ora, and Ruston soils. They differ from Atwood, Ora, and Ruston soils in having a solum less than 60 inches thick. They differ from Atwood soils in having a lower base status and more than 15 percent sand that is coarser than the very fine sand in the upper Bt horizon. In contrast with Ora soils, they do not have a fragipan.

Cascilla Series

The Cascilla series consists of well-drained soils on stream flood plains. These soils formed in loamy material having a high content of silt. Slopes are 0 to 2 percent.

In a representative profile the surface layer is about 5 inches of brown silt loam and about 3 inches of dark yellowish-brown silt loam. The subsoil is dark yellowish-brown silt loam to a depth of about 17 inches. Below this is brown silt loam mottled with shades of brown to a depth of about 35 inches. This is underlain by silt loam mottled with shades of brown and gray to a depth of about 60 inches.

Representative profile of Cascilla silt loam in a cultivated field 14 miles southwest of Pontotoc, 50 yards

Figure 3.—**Loblolly pine on Bude silt loam, 0 to 2 percent slopes.**

south of county road, and 20 yards west of east fork of Kittahutty Creek, NW¼NE¼ sec. 9, T. 11 S., R. 1 E.:

Ap1—0 to 5 inches, brown (10YR 5/3) silt loam; weak, fine, granular structure; friable; contains crop residue; few fine roots; strongly acid; abrupt, smooth boundary.

Ap2—5 to 8 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, fine, granular structure; friable; few fine roots; strongly acid; gradual, smooth boundary.

B21—8 to 17 inches, dark yellowish-brown (10YR 4/4) silt loam; common, fine, faint, pale-brown and brown mottles; weak, medium, subangular blocky structure; friable; few fine roots; strongly acid; gradual, smooth boundary.

B22—17 to 22 inches, brown (10YR 4/3) silt loam; a few, fine, faint, pale-brown and dark-brown mottles; weak, medium, subangular blocky structure; friable; few fine roots; strongly acid; gradual, smooth boundary.

B23—22 to 35 inches, brown (10YR 4/3) silt loam; few, medium, distinct, pale-brown (10YR 6/3) and dark-brown (7.5YR 4/4) mottles; weak, medium, subangular blocky structure; friable; few fine roots; strongly acid; gradual, smooth boundary.

B24—35 to 60 inches, mottled light brownish-gray (10YR 6/2), pale-brown (10YR 6/3), yellowish-brown (10YR 5/4), and dark-brown (7.5 YR 4/4) silt loam; weak, medium, subangular blocky structure; friable; few brown and black concretions and stains; few fine roots; strongly acid.

The Ap horizon is grayish brown, brown, or dark yellowish brown. The upper B2 horizon is brown, yellowish brown,

dark yellowish brown, light yellowish brown, and pale brown. The lower B2 horizon has a matrix color of brown or yellowish brown with mottles or is mottled with shades of gray and brown. Clay content of the B2 horizon is 18 to 24 percent, and silt content is 55 to 75 percent. Brown and black concretions range from few to common.

Cascilla soils are associated with Arkabutla, Rosebloom, and Urbo soils. They are beter drained than Arkabutla, Rosebloom, and Urbo soils and have no mottles having a chroma of 2 or less within a depth of 24 inches. In contrast with Urbo soils, they do not have a clayey B horizon.

Cascilla silt loam (Ca).—This soil is well drained and is on natural levees. Slopes are 0 to 2 percent.

Permeability is moderate, and available water capacity is high to very high. Runoff is slow. This soil is subject to overflow of short duration. It crusts and packs if left bare. A plowpan can form. Reaction is strongly acid.

Included in mapping are small areas of Arkabutla and Urbo soils.

Most of the acreage is cultivated or used for pasture. A small acreage is wooded. Cotton, corn, soybeans, small grain, truck crops, pasture plants, loblolly pine, and adapted hardwood trees are well suited. Row crops can be grown continuously under good management that includes drainage of surface water and row arrangement. Capability unit IIw–2; woodland group 1o7.

Catalpa Series

The Catalpa series consists of moderately well drained soils. These soils formed in neutral to mildly alkaline clayey alluvium on stream flood plains. Slopes range from 0 to 2 percent.

In a representative profile the surface layer is very dark grayish-brown silty clay loam about 7 inches thick. The subsurface layer is very dark grayish-brown silty clay; it is about 17 inches thick and is mottled with olive brown in the lower part. The upper part of the subsoil is dark grayish-brown silty clay that has olive-brown mottles and reaches to a depth of about 32 inches. The lower part of the subsoil is silty clay that is mottled with shades of gray and brown and reaches to a depth of about 60 inches.

Representative profile of Catalpa silty clay loam in a cultivated field 13 miles southeast of Pontotoc on Mississippi Highway No. 41, and 1 mile north of field road, in center of NE¼ sec. 35, T. 11 S., R. 4 E.:

Ap—0 to 7 inches, very dark grayish-brown (10YR 3/2) silty clay loam; weak, fine, granular and subangular blocky structure; friable, slightly plastic; few fine roots; neutral; abrupt, smooth boundary.

A11—7 to 15 inches, very dark grayish-brown (2.5Y 3/2) silty clay; strong, medium, subangular blocky structure; friable, plastic; few fine roots; neutral; gradual, wavy boundary.

A12—15 to 24 inches, very dark grayish-brown (2.5Y 3/2) silty clay; a few, medium, faint, olive-brown (2.5Y 4/4) mottles; strong, medium, subangular blocky structure; firm, plastic; few fine roots; mildly alkaline; gradual, wavy boundary.

B21—24 to 32 inches, dark grayish-brown (2.5Y 4/2) silty clay; common, medium, faint, olive-brown (2.5Y 4/4) mottles; strong, medium, subangular blocky structure; firm, plastic; few fine roots; mildly alkaline; gradual, wavy boundary.

B22—32 to 60 inches, mottled dark grayish-brown (2.5Y 4/2), olive-brown (2.5Y 4/4), and dark-gray (10YR 4/4) silty clay; strong, medium, subangular blocky structure; firm, plastic; mildly alkaline.

The Ap horizon is very dark grayish brown, very dark gray, or very dark brown. The A1 horizon has matrix colors similar to those of the Ap horizon, but in some places the mottles are in shades of yellow and brown in the lower part. Texture ranges from silty clay loam to clay. The upper B2 horizon is dark grayish brown to olive gray that is mottled with olive brown. The lower B2 horizon has similar colors or is mottled in shades of brown and gray. The B2 horizon is silty clay, clay, silty clay loam, or clay loam. Reaction ranges from neutral to mildly alkaline throughout the profile.

Catalpa soils are associated with Commerce, Leeper, Marietta, and Robinsonville soils. They have a more clayey B horizon and a darker, thicker A horizon than Commerce, Marietta, and Robinsonville soils. They also have a darker and thicker A horizon than Leeper soils.

Catalpa silty clay loam (Cc).—This soil is moderately well drained and is on flood plains generally adjacent to the hill mass. Slopes are 0 to 2 percent.

Permeability is slow, and the available water capacity is high. Runoff is slow, and water ponds in some areas. This soil can be tilled only within a narrow range of moisture content. When it is wet it becomes cloddy if tilled. When it dries it shrinks and cracks. Planting is sometimes delayed in spring because of wetness. Reaction is neutral to mildly alkaline.

Included in mapping are small areas of Commerce, Leeper, and Marietta soils.

Most of the acreage is cultivated. Small areas are in pasture, and some are wooded. Cotton, corn, soybeans, pasture plants, and adapted hardwood trees are suited. Row crops can be grown continuously under proper management that includes drainage by V-ditches and W-ditches, row arrangement, and return of crop residue. Capability unit IIw–1; woodland group 1w5.

Chewacla Series

The Chewacla series consists of somewhat poorly drained soils that formed in loamy material on stream flood plains. Slopes are 0 to 2 percent.

In a representative profile the surface layer is brown loam about 6 inches thick. The upper part of the subsoil is yellowish-brown silt loam, mottled with gray and about 5 inches thick. Underlying this is yellowish-brown silty clay loam that is mottled with gray and reaches to a depth of about 16 inches. Below this is silty clay loam that is mottled with yellowish brown, dark yellowish brown, and gray and extends to a depth of about 60 inches.

Representative profile of Chewacla loam in the SW¼SE¼ sec. 34, T. 9 S., R. 4 E.:

Ap—0 to 6 inches, brown (10YR 4/3) loam; weak, fine, granular structure; friable; few fine roots; strongly acid; abrupt, smooth boundary.

B21—6 to 11 inches, yellowish-brown (10YR 5/6) silt loam; few, medium, distinct, gray (10YR 6/1) mottles; weak, medium, subangular blocky structure; friable; few fine roots; strongly acid; clear, smooth boundary.

B22—11 to 16 inches, yellowish-brown (10YR 5/4) silty clay loam; common, medium, distinct, gray (10YR 6/1) mottles; weak, medium, subangular blocky structure; firm, slightly plastic; few, soft, black and brown concretions; few fine roots; strongly acid; clear, smooth boundary.

B23—16 to 30 inches, mottled yellowish-brown (10YR 5/6), dark yellowish-brown (10YR 4/4), and gray (10YR 6/1) silty clay loam; weak, medium, subangular

blocky structure; firm, slightly plastic; few, soft, black and brown concretions; few fine roots; strongly acid; gradual, smooth boundary.

B24—30 to 60 inches, mottled yellowish-brown (10YR 5/6), dark yellowish-brown (10YR 4/4), and gray (10YR 6/1) silty clay loam; weak, medium, subangular blocky structure; firm, slightly plastic; few, soft, black and brown concretions; strongly acid.

The Ap horizon is brown, yellowish-brown, and grayish-brown loam, sandy loam, or silt loam. The upper part of the B2 horizon is brown or yellowish-brown loam, sandy clay loam, silty clay loam, or silt loam mottled in shades of gray. The lower part of the B2 horizon is mottled yellowish-brown, dark yellowish-brown, brown, and gray loam, clay loam, sandy clay loam, or silty clay loam. Clay content at a depth of 10 to 40 inches ranges from 18 to 35 percent.

Chewacla soils are associated with Commerce and Robinsonville soils. They differ from Commerce soils in having more sand at a depth of 10 to 40 inches and in being more acid. They are not so well drained as Robinsonville soils but are grayer.

Chewacla loam (Ce).—This is somewhat poorly drained soil on flood plains. Slopes are 0 to 2 percent. This soil has the profile described as representative for the series.

Permeability is moderate, and available water capacity is high to very high. Runoff is slow, and water ponds in some areas. This soil is subject to occasional overflow of short duration. If this soil is left bare it crusts and packs, and a plowpan forms unless the depth of plowing is varied. Reaction is strongly acid.

Included with this soil in mapping are small areas of Commerce, Mantachie, and Marietta soils.

Most of the acreage is cultivated or used for pasture. A small acreage is wooded. Cotton, corn, soybeans, truck crops, pasture plants, pines, and adapted hardwood trees are suited. Row crops can be grown continuously under management that includes drainage by V- and W-ditches, row arrangement, and return of crop residue. Capability unit IIw–6; woodland group 1w9.

Chewacla soils (Ch).—This mapping unit is on flood plains. It consists of soils that occur together on the landscape without any regularity in pattern or relative proportion. The Chewacla soil is dominant. Some soils are wetter than the Chewacla soil, but all are similar in use, management, and behavior. The texture of the surface layer is loam, sandy loam, or silt loam. Slopes are 0 to 2 percent.

The Chewacla soil has a yellowish-brown surface layer about 6 inches thick. The upper 4 inches of the subsoil is brown loam. It grades to mottled brown, yellowish-brown, and gray sandy clay loam.

This Chewacla soil is strongly acid. It crusts and packs if left bare. A plowpan forms readily unless the depth of plowing is varied. Permeability is moderate. The available water capacity is high or very high. Runoff is slow, and water ponds on some areas. Overflow of short duration is a hazard. Wetness delays cultivation on the small tracts where water ponds.

Most of the acreage is cultivated or used for pasture. Some small areas are wooded. Cotton, corn, soybeans, truck crops, pasture plants, pine trees, and adapted hardwoods are suited. Row crops can be grown continuously under good management that includes drainage by V- and W-type ditches, row arrangement, and return of crop residue. Capability unit IIw–6; woodland suitability group 1w9.

Commerce Series

The Commerce series consists of somewhat poorly drained soils that formed in loamy material high in content of silt. These soils are on stream flood plains. Slopes are 0 to 2 percent.

In a representative profile the surface layer is brown silt loam in the upper 4 inches and dark grayish-brown silt loam mottled with shades of gray in the lower 6 inches. The upper part of the subsoil is dark grayish-brown silt loam that is mottled with shades of gray and brown and extends to a depth of about 18 inches. The lower part of the subsoil is silty clay loam that is mottled with shades of gray, brown, and yellow and reaches to a depth of about 65 inches.

Representative profile of Commerce silt loam in a cultivated field 9 miles east of Pontotoc on Mississippi Highway No. 6, 2 miles south on county road, three-fourths of a mile east on county road, and one-fourth mile north on field road, SW¼SE¼ sec. 13, T. 10 S., R. 4 E.:

Ap1—0 to 4 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; few fine roots; neutral; gradual, smooth boundary.

Ap2—4 to 10 inches, dark grayish-brown (10YR 4/2) silt loam; common, medium, faint, gray (10YR 5/1) mottles and few, medium, faint, light brownish-gray (10YR 6/2) mottles; moderate, medium, subangular blocky structure; friable, slightly plastic; few fine roots; neutral; clear, wavy boundary.

B21—10 to 18 inches, dark grayish-brown (10YR 4/2) silt loam; many, medium, faint, light brownish-gray (10YR 6/2) mottles and few, medium and fine, distinct, yellowish-brown (10YR 5/4) mottles; moderate, medium, subangular blocky structure; friable, slightly plastic; few fine roots; neutral; clear, wavy boundary.

B22—18 to 28 inches, mottled light-gray (10YR 6/2) and yellowish-brown (10YR 5/6) silty clay loam; weak, coarse, prismatic structure parting to moderate, medium, subangular blocky structure; firm, slightly plastic; neutral; gradual, wavy boundary.

B23—28 to 40 inches mottled light-gray (10YR 7/1), yellowish-brown (10YR 5/6), and dark yellowish-brown (10YR 4/4) silty clay loam; weak, coarse, prismatic structure parting to moderate, medium, subangular blocky structure; firm, slightly plastic; neutral; gradual, wavy boundary.

B24—40 to 55 inches, mottled light-gray (10YR 6/1) and yellowish-brown (10YR 5/8) silty clay loam; moderate, medium, subangular blocky structure; firm, slightly plastic; few, fine, dark-brown or black concretions and stains; neutral; gradual, smooth boundary.

B3—55 to 65 inches, mottled gray (10YR 5/1), yellowish-brown (10YR 5/6), and brownish-yellow (10YR 6/6) silty clay loam; moderate, medium, subangular blocky structure; firm, slightly plastic; few, fine, dark-brown and black concretions and stains; few, fine and medium, white, soft and hard calcium carbonate concretions; mildly alkaline.

The Ap horizon is grayish brown, brown, and yellowish brown. The B21 horizon is brown or dark grayish brown that has few to common grayish mottles. Texture is silt loam or silty clay loam. The B22, B23, and B24 horizons have grayish matrix colors or are mottled in shades of gray, brown and yellow. Texture is silt loam or silty clay loam. There are a few, fine to medium, white concretions in places. Content of clay at depths of 10 to 40 inches ranges from 25 to 32 percent, and of fine sand or coarser sand, less than 15 percent. Reaction is neutral to mildly alkaline throughout the profile.

Commerce soils are associated with Catalpa, Chewacla, Marietta, and Robinsonville soils. They are less clayey at depths of 10 to 40 inches than Catalpa soils. They differ

from the Chewacla soils in having less than 15 percent fine sand or coarser sand at depths of 10 to 40 inches. They are not so well drained as Marietta and Robinsonville soils, but are grayer in the upper part of the subsoil and contain more sand.

Commerce silt loam (Co).—This nearly level soil is somewhat poorly drained and is on flood plains, generally between natural stream terraces and the hill mass. Slopes are 0 to 2 percent.

Permeability is moderately slow, and available water capacity is very high. Runoff is slow, and water tends to pond in some areas. This soil is subject to occasional overflow of short duration. If it is left bare, it crusts and packs. A plowpan forms unless the depth of plowing is varied. Reaction is neutral to mildly alkaline.

Included with this soil in mapping are small areas of Chewacla, Mantachie, and Marietta soils. Most of the acreage is cultivated or used for pasture. A small acreage is wooded. Cotton, corn, soybeans, small grain, pasture plants, and adapted hardwood trees are suited. Row crops can be grown continuously on this soil under good management practices that include drainage by V-ditches and W-ditches (fig. 4), row arrangement, and return of crop residue. Capability unit IIw–4; woodland group 1w5.

Falaya Series

The Falaya series consists of somewhat poorly drained soils. These soils formed in loamy material, high in content of silt, on stream flood plains. Slopes are 0 to 2 percent.

In a representative profile the surface layer is brown silt loam about 5 inches thick. This is underlain by silt loam mottled in shades of gray and brown to a depth of about 18 inches. Below this is gray silt loam that has brownish mottles and extends to a depth of about 60 inches.

Representative profile of Falaya silt loam in a pasture 3 miles west of Randolph, NE¼SE¼ sec. 32, T. 10 S., R. 1 E.:

Ap—0 to 5 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; few fine roots; strongly acid; abrupt, smooth boundary.

B21—5 to 18 inches, mottled brown (10YR 4/3), yellowish-brown (10YR 5/6), and light brownish-gray (10YR 6/2) silt loam; weak, fine, granular structure; friable; few, soft, black concretions; few fine roots; strongly acid; gradual, smooth boundary.

B22g—18 to 60 inches, gray (10YR 6/1) silt loam; many, medium, distinct, brown (10YR 4/3), dark yellowish-brown (10YR 4/4), and yellowish-brown (10YR 5/6) mottles; weak, medium, subangular blocky structure; friable; common, soft, black and brown concretions, few fine roots; strongly acid.

The Ap horizon is grayish brown and brown. The B21 horizon is mottled brown, yellowish brown, and light brownish gray or is brown and has common to many grayish mottles. The B22 horizon is gray silt loam that has few to many brown, dark yellowish-brown, and yellowish-brown mottles. Soft black or brown concretions are few to many.

Falaya soils are associated with Rosebloom and Urbo soils. They have less clay at depths of 10 to 40 inches than Rosebloom and Urbo soils. They are browner and better drained than Rosebloom soils.

Falaya soils (Fa).—These soils are on stream flood plains and have slopes of 0 to 2 percent. They are dominantly Falaya silt loam. The other soils in the mapping unit are similar to the Falaya soils in use, management, and behavior. They have a surface layer that varies in texture. The soils of this mapping unit occur together in no regular pattern or position on the landscape.

Permeability is moderate, and available water capacity is very high. The Falaya soils crust and pack if left bare, and a plowpan forms unless the depth of plowing is varied. Reaction of the Falaya soils is strongly acid. Some areas of this mapping unit are subject to frequent overflow of short duration. Also, there are low areas where water ponds and delays cultivation.

Most of the acreage is used for row crops and pasture. A small acreage is wooded. Cotton, corn, soybeans, truck crops, pasture plants, and adapted pine and hardwood trees are suited. Row crops can be grown continuously on this soil under good management practices that include drainage by V-ditches and W-ditches, row arrangement, and return of crop residue. Capability unit IIw–5; woodland group 1w9.

Falkner Series

The Falkner series consists of somewhat poorly drained soils on uplands. These soils formed in loamy materials high in content of silt over clayey material. Slopes are 0 to 8 percent.

In a representative profile the surface layer is brown silt loam about 6 inches thick. The upper part of the subsoil is yellowish-brown silt loam mottled with gray. It is about 4 inches thick and is underlain by silty clay loam mottled with yellowish brown, gray, strong brown, and brown. This part of the subsoil extends to a depth of about 33 inches. Below this depth and down to a depth of 76 inches is gray silty clay mottled with shades of brown.

Representative profile of Falkner silt loam, 0 to 2 percent slopes, in a pasture 1¼ mile east of Springville and one-fourth mile north of Mississippi Highway No. 9, NE¼SW¼ sec. 3, T. 10 S., R. 2 E.:

Ap—0 to 6 inches, brown (10YR 5/3) silt loam; few, fine, faint, yellowish-brown mottles; weak, fine, granular structure; friable; few fine roots; very strongly acid; abrupt, smooth boundary.

B21t—6 to 10 inches, yellowish-brown (10YR 5/6) silt loam; common, fine, distinct, gray mottles; moderate, medium, subangular blocky structure; friable; few fine roots; few patchy clay films; very strongly acid; gradual, smooth boundary.

B22t—10 to 16 inches, mottled yellowish-brown (10YR 5/6), brown (10YR 5/3), and gray (10YR 6/1) silty clay loam; moderate, medium, subangular blocky structure; firm, slightly plastic; few fine roots; few patchy clay films; extremely acid; gradual, smooth boundary.

B23t—16 to 24 inches, mottled gray (10YR 6/1) and yellowish-brown (10YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; firm, slightly plastic; few fine roots; patchy clay films on most ped faces; extremely acid; gradual, smooth boundary.

B24t—24 to 33 inches, mottled gray (10YR 6/1), strong-brown (7.5YR 5/6), and yellowish-brown (10YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; firm, slightly plastic; few fine roots; nearly continuous clay films; extremely acid; gradual, smooth boundary.

IIB25t—33 to 49 inches, gray (10YR 6/1) silty clay; common, medium, distinct, strong-brown (7.5YR 5/6) and yel-

Figure 4.—**Stabilized drainage ditchbank on Commerce silt loam.**

lowish-brown (10YR 5/6) mottles; moderate, medium, prismatic structure that parts to strong, medium, subangular blocky; firm, slightly plastic; few fine roots; nearly continuous clay films; extremely acid; gradual, smooth boundary.

IIB26t—49 to 62 inches, gray (10YR 6/1) silty clay; few, medium, distinct, strong-brown and yellowish-brown mottles; prismatic in place but readily breaks into strong, medium, subangular blocky structure; firm, plastic; few fine roots; nearly continuous clay films; extremely acid; gradual, smooth boundary.

IIB27t—62 to 72 inches, mottled light brownish-gray (2.5Y 6/2), strong-brown (7.5YR 5/6), yellowish-brown (10YR 5/6), and gray (10YR 6/1) silty clay; strong, medium, subangular blocky structure; firm, plastic; nearly continuous clay films; extremely acid; clear, smooth boundary.

IIB28t—72 to 76 inches, gray (10YR 6/1) silty clay; many, coarse, distinct, strong-brown (7.5YR 5/8) and yellowish-brown (10YR 5/6) mottles; strong, medium, subangular blocky structure; firm, plastic; nearly continuous clay films; extremely acid.

The Ap horizon is grayish brown, dark brown, brown, yellowish brown, or dark yellowish brown and is 2 to 8 inches thick. The B2t horizon is yellowish brown with common to many grayish and brownish mottles. The upper part of the B2t horizon is mottled with shades of brown, yellow, and gray, or it is gray and has brownish mottles. Texture is silt loam, silty clay, silty clay loam, and clay loam. The IIB2t horizon is gray silty clay and clay mottled with shades of brown, or is mottled with shades ot gray, red, and brown. Reaction is very strongly acid or extremely acid throughout the profile.

Falkner soils are associated with Adaton, Bude, Mayhew, and Tippah soils. They are better drained and are less gray in the upper part of the B horizon than Adaton and Mayhew soils. They are not so red in the upper part of the Bt horizon as Tippah soils. In contrast with Bude soils, they do not have a fragipan.

Falkner silt loam, 0 to 2 percent slopes (FkA).—This soil is somewhat poorly drained and occurs on broad ridgetops. It has the profile described as representative for the series.

Permeability is slow, and available water capacity is high to very high. Runoff is slow, and the hazard of ponding is severe. This soil crusts and packs if left bare, and a plowpan forms readily unless the depth of plowing is varied. Reaction is very strongly acid to extremely acid.

Included with this soil in mapping are small areas of Adaton, Bude, Frizzell, Mayhew, and Wilcox soils.

Most of the acreage is cultivated or used for pasture. A small acreage is wooded. Cotton, corn, soybeans, pasture plants, and adapted pine and hardwood trees are suited. Wetness is a hazard. Row crops can be grown continuously under good management that includes proper row arrangement and drainage by V-ditches and W-ditches. Capability unit IIIw–1; woodland group 2w8.

Falkner silt loam, 2 to 5 percent slopes (FkB).—This is a somewhat poorly drained soil on uplands. It has a brown silt loam surface layer about 8 inches thick. The upper part of the subsoil is yellowish-brown silt loam about 6 inches thick. The lower part is mottled yellowish-brown, brown, and gray silt loam that extends to a depth of about 42 inches. This is underlain by mottled gray silty clay extending to a depth of about 42 inches.

Permeability is slow, and the available water capability is high to very high. Runoff is slow, and wetness is a severe hazard. This soil crusts and packs if left bare, and a plowpan forms readily unless the depth of plowing is varied. Reaction is very strongly acid to extremely acid.

Included with this soil in mapping are small areas of Bude, Frizzell, Providence, Mayhew, and Wilcox soils.

Most of the acreage is cultivated or used for pasture. A small acreage is wooded. Cotton, soybeans, pasture plants, and adapted pine and hardwood trees are suited. Row crops can be grown continuously under good management that includes row arrangement, drainage by V-ditches and W-ditches, and returning crop residue. Capability unit IIIw–1; woodland group 2w8.

Falkner silt loam, 5 to 8 percent slopes (FkC).—This soil is somewhat poorly drained. It is on the tops and sides of ridges. It has a brown silt loam surface layer about 6 inches thick. The upper part of the subsoil is yellowish brown silty clay loam that is mottled with gray and reaches to a depth of about 32 inches. The lower part is gray silty clay.

Permeability is slow, and the available water capacity is high to very high. Runoff is rapid, and where this soil is cultivated, the hazard of erosion is severe. The soil crusts and packs if left bare, and a plowpan forms readily unless the depth of plowing is varied. Reaction is very strongly acid to extremely acid.

Included with this soil in mapping are small areas of Mayhew, Providence, Tippah, and Wilcox soils.

Most of the acreage is cultivated or used for pasture. A small acreage is wooded. Cotton, soybeans, pasture plants, and adapted pine and hardwood trees are suited. Management should include use of terraces, contour farming, vegetated waterways, and the return of crop residue. If row crops are grown, a good cropping system is one that consists of close-growing crops and row crops. Capability unit IIIe–3; woodland group 2w8.

Falkner silt loam, 5 to 8 percent slopes, eroded (FkC2).—This soil is somewhat poorly drained. It occurs on the top and sides of ridges. The surface layer is dark-brown silt loam about 2 inches thick. The subsurface layer is mottled brown, dark yellowish-brown, and yellowish-brown silt loam about 4 inches thick. The upper part of the subsoil, to a depth of about 22 inches, is yellowish-brown silt loam and silty clay loam mottled with gray. Below this is silty clay loam that is mottled with brown and gray and reaches to a depth of about 32 inches. This is underlain by silty clay mottled with shades of gray, brown, and red. In most places the original surface layer has been removed by erosion. Rills are numerous, and shallow gullies are common. In some areas there are a few deep gullies. In cultivated areas the subsoil is mixed with the surface layer in many places.

Included with this soil in mapping are small areas of Mayhew, Tippah, Wilcox, and Providence (heavy substratum) soils.

Permeability is slow, and the available water capacity is high to very high. Runoff is rapid, and where this soil is cultivated, the hazard of erosion is severe. The soil crusts and packs if left bare, and a plowpan forms readily unless the depth of plowing is varied. Reaction is very strongly acid to extremely acid.

Most of the acreage is cultivated or used for pasture. A small acreage is wooded. Cotton, soybeans, pasture plants, and adapted pine and hardwood trees are suited. Management practices should include terraces, contour farming, vegetated outlets, and return of crop residue. A cropping system should include close-growing crops and row crops. Capability unit IIIe–3; woodland group 2w8.

Frizzell Series

The Frizzell series consists of moderately well drained soils. These soils formed in loamy material high in content of silt on uplands and stream terraces. Slopes are 0 to 5 percent.

In a representative profile the surface layer is pale-brown silt loam about 8 inches thick. The upper part of the subsoil is light yellowish-brown silt loam mottled with shades of gray and brown and reaching to a depth of about 22 inches. Below this is silt loam mottled with shades of yellow, gray, and brown and extending to a depth of about 44 inches. This is underlain by mottled gray and yellowish-brown silt loam.

Representative profile of Frizzell silt loam, 0 to 2 percent slopes, in a cultivated field half a mile southwest of Ecru, and one-eighth mile west of Wise's Store, NE¼SE¼ sec. 36, T. 8 S., R. 2 E.:

Ap—0 to 8 inches, pale-brown (10YR 6/3) silt loam; weak, fine, granular structure; friable; few fine roots; many dark-brown (10YR 3/3) mottles; very strongly acid; abrupt, smooth boundary.

A21&B11—8 to 15 inches, light yellowish-brown (10YR 6/4) silt loam; common, fine, faint and distinct, light brownish-gray and yellowish-brown mottles; weak, fine, subangular blocky structure; friable; few dark-brown (10YR 3/3) root stains; few rootholes and wormholes filled with gray (10YR 6/1) silty material; sand grains are bridged with clay; few fine roots; very strongly acid; gradual, smooth boundary.

A22&B12—15 to 22 inches, light yellowish-brown (2.5Y 6/4) silt loam; common, medium, faint and distinct mottles of yellowish brown (10YR 5/6), light brownish gray (10YR 6/2), and dark yellowish brown (10YR 4/4); weak, medium, subangular blocky structure; slightly compact but friable; few fine roots; gray

material extends into the lower part of the horizon; strongly acid; gradual, wavy boundary.

B21t&A23—22 to 30 inches, mottled yellowish-brown (10YR 5/4) and light-gray (10YR 7/1) silt loam; weak to moderate subangular blocky structure; slightly compact, friable; few patchy clay films; gray tongues extend from the A22 and B12 horizon; few voids; few black concretions; very strongly acid; gradual, smooth boundary.

B22t—30 to 40 inches, mottled light-gray (10YR 7/1), grayish-brown (10YR 5/2), light yellowish-brown (10YR 6/4), and yellowish-brown (10YR 5/6) silt loam; weak, coarse, prismatic structure that parts to moderate, medium, subangular blocky structure; friable, slightly compact and brittle; few fine voids; few patchy clay films; very strongly acid; gradual smooth boundary.

B23t—40 to 44 inches, mottled light-gray (10YR 6/1), yellowish-brown (10YR 5/6), and light yellowish-brown (10YR 6/4) silt loam; moderate, medium, subangular blocky structure; friable, slightly compact and brittle; few fine voids; few, fine, brown and black concretions; few patchy clay films; very strongly acid; gradual, smooth boundary.

B3—44 to 60 inches, mottled gray (10YR 5/1) and yellowish-brown (10YR 5/8) silt loam; slightly compact, friable; few patchy clay films; few voids; few black concretions and stains; very strongly acid.

The Ap horizon is pale-brown or brown silt loam mottled with yellowish brown, gray, or dark brown. It is 6 to 8 inches thick. The A2 and B1 horizon is light yellowish-brown, yellowish-brown, brown, or pale brown silt loam, very fine sandy loam, or loam. It has common to many mottles in shades of brown and gray. The A2 part consists of streaks and tongues of material reaching into B1 material. The B21t and A2 horizon is mottled in shades of brown and gray. The A2 part is gray, light gray, or brownish gray and consists of tongues and streaks. Texture of the B21t and A2 horizon is silt loam. The B2t horizon is similar to the B21t and A2 horizon in color and texture but lacks the tongues. The B3 horizon has a gray or light-gray matrix and is mottled in shades of brown. The texture is silt loam, silty clay loam, or loam. Reaction is strongly acid or very strongly acid in all horizons.

Frizzell soils are associated with Bude, Henry, Mashulaville, and Providence soils. They are better drained than Bude, Henry, and Mashulaville soils. In contrast with Bude, Henry, Mashulaville, and Providence soils, they do not have a fragipan. They have less sand in the subsoil than Mashulaville soils. They are coarser textured in the upper part of the B horizon than Providence soils.

Frizzell silt loam, 0 to 2 percent slopes (FlA).—This soil is moderately well drained and is on broad ridgetops and stream terraces. It has the profile described as representative for the series.

Permeability is slow, and available water capacity is very high. Runoff is slow, and wetness is a severe limitation. The soil becomes saturated after heavy rains. It will crust and pack if left bare, and a plowpan forms unless the depth of plowing is varied. Reaction is strongly acid or very strongly acid.

Included with this soil in mapping are small areas of Falkner, Henry, Mashulaville, Ora, and Providence soils.

Most of the acreage is cultivated or used for pasture. Small areas are wooded. Cotton, soybeans, pasture plants, and adapted pine and hardwood trees are suited. Row crops can be grown continuously on this soil under good management practices that include drainage by V-ditches and W-ditches, row arrangement, and returning crop residue. Capability unit IIIw–2; woodland group 2w8.

Frizzell silt loam, 2 to 5 percent slopes (FlB).—This soil is moderately well drained and is on broad ridgetops and stream terraces. The surface layer is brown silt loam about 6 inches thick. The upper part of the subsoil is yellowish-brown silt loam that has grayish mottles. The lower part is silt loam that has brown, yellowish-brown, and gray mottles.

Permeability is slow, and available water capacity is very high. Runoff is slow, and wetness is a severe limitation. This soil crusts and packs if left bare, and a plowpan forms unless the depth of plowing is varied. Reaction is strongly acid or very strongly acid.

Included with this soil in mapping are small areas of Bude, Falkner, Ora, and Providence soils.

Most of the acreage is cultivated or used for pasture. A small acreage is wooded. Cotton, soybeans, pasture plants, and adapted pine and hardwood trees are suited. Row crops can be grown continuously under good management that includes drainage by V-ditches and W-ditches, row arrangement, and return of crop residue. Capability unit IIIw–2; woodland group 2w8.

Gullied Land

Gullied land is a land type so severely eroded that the surface is a network of gullies. Most of the gullies are 2 to 15 feet deep, but a few are deeper. The soil materials are loamy and clayey.

Gullied land-Oktibbeha complex, 5 to 20 percent slopes (GoE).—This complex is on side slopes and consists of Gullied land and Oktibbeha soils. Because of the small size of the areas occupied by individual soils, it was impractical to map them separately.

This unit is about 73 percent Gullied land and about 20 percent Oktibbeha soils. The remaining 7 percent is Kipling soils. The pattern and extent of the soils are uniform. Each mapped area contains both Gullied land and Oktibbeha soils.

The Gullied land soil material ranges from silty clay loam to silty clay and from strongly acid to moderately alkaline. Runoff is very rapid, and available water capacity is low.

The Oktibbeha soil has a yellowish-brown silty clay loam surface layer about 2 inches thick. The upper part of the subsoil is yellowish-red silty clay about 12 inches thick. The lower part of the subsoil, about 24 inches thick, is silty clay mottled in shades of red, brown, and gray. The substratum is mottled brown and gray alkaline clay. Reaction is strongly acid or very strongly acid. Permeability is very slow, and available water capacity is high. Runoff is very rapid, and the hazard of erosion is severe. This soil shrinks and cracks when dry.

Most of the acreage is in pasture or trees. Loblolly and shortleaf pines are suited to Oktibbeha soils but are poorly suited to Gullied land. Capability unit VIIe–4; not assigned to a woodland group.

Henry Series

The Henry series consists of poorly drained soils that have a fragipan. These soils formed in loamy material, high in content of silt, on uplands and stream terraces. Slopes are 0 to 2 percent.

In a representative profile the surface layer is gray silt loam that has brownish mottles and is about 6 inches

thick. The subsurface layer is gray silt loam that is about 13 inches thick and is mottled with yellowish brown and dark brown. A thick, compact and brittle, gray fragipan that has brown mottles is at a depth of about 19 inches. The upper part of this fragipan is silt loam. The lower part is silty clay loam that extends to a depth of 70 inches or more.

Representative profile of Henry silt loam in a pasture 1½ miles south of Robbs, SW¼NE¼ sec. 33, T. 11 S., R. 1 E.:

Ap—0 to 6 inches, gray (10YR 5/1) silt loam; many, fine, distinct, brown and yellowish-brown mottles; weak, fine, granular structure; friable; common fine roots; few, fine and medium, dark yellowish-brown root stains; strongly acid; abrupt, smooth boundary.

A21g—6 to 12 inches, gray (10YR 6/1) silt loam; common, fine, distinct, yellowish-brown and dark-brown mottles; structureless; friable; few fine roots; strongly acid; clear, smooth boundary.

A22g—12 to 19 inches, gray (10YR 6/1) silt loam; common, fine and medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, medium and fine, subangular blocky structure; friable; few fine roots; strongly acid; gradual, smooth boundary.

Bx1—19 to 29 inches, gray (10YR 6/1) silt loam; common, fine and medium, distinct, yellowish-brown (10YR 5/6) mottles and a few, fine, distinct, brown mottles; weak, coarse, prismatic structure that parts to weak and moderate, medium and fine, subangular blocky structure; firm, compact and brittle; few, fine, black concretions and few, medium, black stains; few patchy clay films; few fine voids; strongly acid; gradual, irregular boundary.

Bx2—29 to 41 inches, gray (10YR 6/1) silt loam; common, fine and medium, distinct, light yellowish-brown (10YR 6/4) mottles and a few, fine, distinct, yellowish-brown mottles; weak prismatic structure that parts to weak, medium and fine, subangular blocky structure; firm, compact and brittle; thin light-gray silt coatings around many ped faces; patchy clay films; few fine voids; few, fine, brown and black concretions; strongly acid; gradual, wavy boundary.

Bx3—41 to 51 inches, gray (10YR 6/1) silty clay loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak prismatic structure that parts to moderate, medium and fine, subangular blocky structure; firm, compact and brittle, slightly plastic; patchy clay films; few fine roots; strongly acid; gradual, wavy boundary.

Bx4—51 to 60 inches, gray (10YR 6/1) silty clay loam; common, medium, distinct, yellowish-brown (10YR 5/6) and brown (10YR 4/3) mottles; moderate, medium, subangular blocky structure; firm, compact and brittle, slightly plastic; few brown and black concretions; few, fine, light-gray silt coatings; few fine roots; patchy clay films on peds; strongly acid; gradual, smooth boundary.

Bx5—60 to 70 inches, gray (10YR 6/1) silty clay loam; many, medium and coarse, distinct, yellowish-brown (10YR 5/8) and brown (10YR 4/3) mottles; moderate, medium, subangular blocky structure; firm, slightly plastic; few, fine, light-gray silt coatings; patchy clay films; strongly acid.

The Ap horizon is gray or grayish brown, and brown or yellowish-brown mottles range from few to many. The A2 horizon is gray, light brownish gray, or grayish brown, and has few to many dark-brown and yellowish-brown mottles. The fragipan is gray and has few to many brown, light yellowish-brown, and yellowish-brown mottles. Texture is silt loam and silty clay loam. Black and brown concretions range from few to many. Reaction is strongly acid or very strongly acid throughout the profile.

Henry soils are associated with Bude and Frizzell soils, but are grayer and not so well drained. They have less clay above the fragipan than Bude soils. In contrast with Frizzell soils, they do not have a fragipan.

Henry silt loam (Hn).—This soil is poorly drained. Slopes are 0 to 2 percent.

Permeability is slow. Available water capacity is medium because the fragipan limits the available water and penetration of roots. Runoff is slow, and where the soil is cultivated there is a hazard of ponding. A perched water table causes these soils to be wet following rainy periods. This soil crusts and packs if it is bare. Reaction is strongly acid to very strongly acid.

Included with this soil in mapping are small areas of Arkabutla, Bude, Falkner, and Rosebloom soils.

Most of the acreage is cultivated or used for pasture. Small areas are wooded. Cotton, corn, small grain, soybeans, pasture plants, and adapted pine and hardwood trees are suited. Where this soil is used for row crops, management practices should include V-ditches and W-ditches, row arrangement, and return of crop residue. Capability unit IIIw-3; woodland group 3w9.

Iuka Series

The Iuka series consists of moderately well drained soils that formed in loamy materials on stream flood plains. Slopes are 0 to 2 percent.

In a representative profile the surface layer is brown sandy loam about 5 inches thick. The underlying material is dark-brown sandy loam to a depth of about 14 inches, sandy loam mottled with shades of brown and gray to a depth of about 33 inches, and sandy clay loam mottled with shades of brown and gray to a depth of about 50 inches.

Representative profile of Iuka sandy loam in an area of Iuka and Ochlokonee soils in a cultivated field 50 yards south of Chiwapa Creek Channel, SW¼SE¼ sec. 21, T. 10 S., R. 4 E.:

Ap—0 to 5 inches, brown (10YR 4/3) sandy loam; weak, fine, granular structure; very friable; very fine roots; very strongly acid; abrupt, smooth boundary.

C1—5 to 14 inches, dark-brown (10YR 3/3) sandy loam; structureless; very friable; few fine roots; thin bedding planes; very strongly acid; clear, smooth boundary.

C2—14 to 18 inches, mottled dark-brown (10YR 3/3) and yellowish-brown (10YR 5/4) sandy loam; structureless; very friable; few fine roots; thin bedding planes; very strongly acid; clear, smooth boundary.

C3—18 to 24 inches, mottled yellowish-brown (10YR 5/6), dark yellowish-brown (10YR 3/4), and grayish-brown (10YR 5/2) sandy loam; structureless; very friable; few fine roots; very strongly acid; clear, smooth boundary.

C4—24 to 33 inches, mottled brown (10YR 5/3), yellowish-brown (10YR 5/4), and grayish-brown (10YR 5/2) sandy loam; structureless; friable, slightly plastic; very strongly acid; clear, smooth boundary.

C5—33 to 44 inches, strong-brown (7.5YR 5/6) sandy clay loam; few, medium, distinct, grayish-brown (10YR 5/2) mottles; structureless; friable, slightly plastic; very strongly acid; clear, smooth boundary.

C6—44 to 50 inches, mottled strong-brown (7.5YR 5/6), yellowish-brown (10YR 5/6), and gray (10YR 6/1) sandy clay loam; structureless; friable, slightly plastic; very strongly acid.

The Ap horizon is grayish brown, brown, or yellowish brown. The upper part of the C horizon is dark brown or yellowish brown or is mottled in shades of brown. Texture is sandy loam, loam, or silt loam. Grayish mottles are at a depth of 15 to 18 inches. The lower part of the C horizon is sandy loam, loam, sandy clay loam, or silt loam mottled in

shades of brown, yellow, and gray. Reaction is strongly acid or very strongly acid throughout the profile.

Iuka soils are associated with Mantachie and Ochlockonee soils. They are better drained than Mantachie soils and contain clay between depths of 10 and 40 inches. They are not so well drained as Ochlockonee soils, which lack grayish mottles in the upper 20 inches of the profile.

Iuka and Ochlockonee soils (Io).—These soils are on natural levees of flood plains and have slopes of 0 to 2 percent. They occur in no regular pattern. Some areas consist of either Iuka or Ochlockonee soils, but most areas contain both soils. Together these soils make up about 79 percent of the unit. Iuka soils are dominant. Included in mapping are Chewacla and Mantachie soils.

The Iuka soil has the profile described as representative for the series. Permeability of this soil is moderate, and available water capacity is medium. Runoff is slow. Reaction is strongly acid or very strongly acid.

The Ochlockonee soil has the profile described as representative for the series. Permeability of this soil is moderately rapid, and available water capacity is low to medium. Runoff is slow. Reaction is strongly acid to very strongly acid. This soil is subject to overflow of short duration.

Most of the acreage is cultivated or used for pasture. Small areas are wooded. Suitable crops are cotton, corn, soybeans, pasture plants, and adapted pine and hardwood trees. Row crops can be grown continuously under good management that includes drainage by V-ditches and W-ditches, row arrangement, and return of crop residue. Capability unit IIw–2; woodland group 1w8.

Kipling Series

The Kipling series consists of somewhat poorly drained soils on uplands. These soils formed in clayey material. Slopes are 2 to 12 percent.

In a representative profile the surface layer is dark yellowish-brown silt loam that is mottled with pale brown and is about 5 inches thick. The upper part of the subsoil is yellowish-brown silty clay loam that is about 6 inches thick and has yellowish-red and pale-brown mottles. The lower part of the subsoil, to a depth of about 33 inches, is silty clay mottled with shades of gray, brown, and red. Below this is yellowish-brown silty clay mottled with gray.

Representative profile of Kipling silt loam, 5 to 8 percent slopes, in a wooded area one-third mile north of Pontotoc-Chickasaw County line and half a mile west of Mississippi Highway No. 41, SE¼SE¼ sec. 34, T. 11 S., R. 4 E.:

Ap—0 to 5 inches, dark yellowish-brown (10YR 4/4) silt loam; common, medium, distinct, pale-brown (10YR 6/3) mottles; weak, fine, granular structure; friable; strongly acid; abrupt, smooth boundary.

B21t—5 to 11 inches, yellowish-brown (10YR 5/4) silty clay loam; common, fine, distinct and faint, yellowish-red and pale-brown mottles; moderate, medium and fine, subangular and angular blocky structure; friable; patchy clay films; few fine roots; strongly acid; clear, wavy boundary.

B22t—11 to 17 inches, mottled yellowish-brown (10YR 5/4), light brownish-gray (10YR 6/2), and yellowish-red (5YR 4/6) silty clay; moderate, medium and fine, subangular and angular blocky structure; friable; patchy clay films; few fine roots; strongly acid; clear, wavy boundary.

B23t—17 to 24 inches, mottled gray (10YR 6/1), yellowish-red (5YR 4/6), and strong-brown (7.5YR 5/8) silty clay; strong, medium, angular blocky structure; firm; continuous clay films, few fine roots; strongly acid; clear, smooth boundary.

B24t—24 to 33 inches, mottled gray (10YR 6/1) and yellowish-brown (10YR 5/8) silty clay; moderate, medium, prismatic structure that parts to strong, medium and coarse, angular blocky structure; firm, plastic; few fine roots; continuous clay films; few slickensides that do not intersect; strongly acid; clear, smooth boundary.

B25t—33 to 60 inches, yellowish-brown (10YR 5/8) silty clay; common, medium, distinct, gray (10YR 6/1) mottles; strong, medium, angular blocky structure; firm, plastic; few fine roots; continuous clay films; few slickensides that do not intersect; strongly acid.

The Ap horizon is dark grayish-brown, dark-brown, brown, or dark yellowish-brown silt loam, silty clay loam, loam, or very fine sandy loam. It is 2 to 5 inches thick. The upper part of the Bt horizon is yellowish-brown or olive-brown silty clay loam or silty clay that has a few to common grayish and reddish mottles. The lower part is silty clay and clay mottled in shades of brown, yellow, red, and gray. Clay content at a depth of 10 to 40 inches ranges from 35 to 58 percent.

Kipling soils are associated with Boswell and Oktibbeha soils. They are less red than those soils and have gray mottles in the upper part of the Bt horizon.

Kipling silt loam, 2 to 5 percent slopes (KlB).—This soil is somewhat poorly drained and is on ridgetops. The surface layer is dark yellowish-brown silt loam about 5 inches thick. The upper part of the subsoil is yellowish-brown silty clay loam that has grayish mottles. It grades to mottled clay at a depth of about 11 inches.

Permeability is slow to very slow, and available water capacity is high to very high. Runoff is slow, and erosion is slight, but where the soil is cultivated, the hazard of erosion is moderate. This soil cracks when dry and seals over when wet. Reaction is strongly acid.

Included with this soil in mapping are small areas of Boswell and Ora soils.

Most of the acreage is cultivated or used for pasture. A small acreage is wooded. Cotton, corn, soybeans, pasture plants, and loblolly pine are well suited. Management should include terraces, contour farming, vegetated waterways, and return of crop residue. If this soil is used for row crops, the cropping system should include close-growing crops. Capability unit IIIe–5; woodland group 3c8.

Kipling silt loam, 5 to 8 percent slopes (KlC).—This soil is somewhat poorly drained. It is on ridgetops and side slopes. This soil has the profile described as representative for the series.

Permeability is slow to very slow, and available water capacity is high to very high. Runoff is rapid. Where this soil is cultivated, the hazard of erosion is severe. The soil cracks when dry and seals over when wet. Reaction is strongly acid.

Included with this soil in mapping are small areas of Boswell, Oktibbeha, and Ora soils.

Most of the acreage is wooded. A small acreage is in pasture and row crops. Cotton, soybeans, pasture plants, and loblolly pine are suited. Management should include terraces, contour farming, vegetated waterways, and return of crop residue. If this soil is used for row crops, a good cropping system is one that includes close-growing

crops and row crops. Capability unit IVe–3; woodland group 3c8.

Kipling silt loam, 8 to 12 percent slopes, eroded (KlD2).—This soil is somewhat poorly drained and is on side slopes. It has many rills and an occasional shallow gully. The surface layer is thin, dark yellowish-brown silt loam about 3 inches thick. The upper part of the subsoil is yellowish-brown silty clay loam mottled with gray. It grades to mottled silty clay at a depth of about 12 inches.

Permeability is slow to very slow, and available water capacity is high to very high. Runoff is rapid, and the hazard of erosion is severe. This soil cracks when dry and seals over when wet. Reaction is strongly acid.

Most of the acreage is wooded, but a small acreage is in pasture. Pasture plants and loblolly pine are suited. A permanent cover of vegetation helps to protect against erosion and reduce runoff. Capability unit VIe–2; woodland group 3c8.

Kipling soils, 8 to 12 percent slopes, severely eroded (KnD3).—These are strongly sloping soils. They are mainly Kipling soils or similar soils that have either a mildly alkaline surface layer and subsoil or a redder subsoil than Kipling soils. Texture of the surface layer ranges from silty clay loam to silt loam. These soils occur together without regular pattern or position on the landscape.

Areas of these soils contain many rills, frequent shallow gullies, and an occasional deep gully. The Kipling soils have a yellowish-brown silt loam surface layer about 2 inches thick. Their subsoil is yellowish-brown silty clay that has grayish mottles.

Permeability of Kipling soils is slow to very slow. Their available water capacity is high to very high. Runoff is rapid, and the hazard of erosion is severe. Reaction is strongly acid.

Most of the acreage is in pasture or is wooded. Pasture plants and loblolly pine are suited; row crops are not suited. These soils need permanent plant cover that protects them from further erosion. Capability unit VIe–3; woodland group 3c8.

Leeper Series

The Leeper series consists of somewhat poorly drained soils on stream flood plains. These soils formed in nonacid clayey alluvial material. Slopes are 0 to 2 percent.

In a representative profile the surface layer is olive-brown silty clay loam about 7 inches thick. The upper part of the subsoil is dark grayish-brown silty clay loam that is mottled with shades of brown and is about 7 inches thick. The lower part of the subsoil is gray silty clay loam that is mottled with brown and extends to a depth of about 29 inches. Below this, to a depth of about 60 inches, is gray silty clay and clay that has brownish mottles.

Representative profile of Leeper silty clay loam in a cultivated field 50 feet south of county road and 1¼ miles north of Furrs, NE¼SE¼ sec. 34, T. 9 S., R. 4 E.:

Ap—0 to 7 inches, olive-brown (2.5Y 4/4) silty clay loam; weak, fine, granular structure; friable, slightly plastic; few fine roots; neutral; abrupt, wavy boundary.

B1—7 to 14 inches, dark grayish-brown (10YR 4/2) silty clay loam; common, medium, distinct, dark-brown (10YR 3/3) and light olive-brown (2.5Y 5/4) mottles; moderate, medium, subangular blocky structure; friable, slightly plastic; few fine roots; neutral; clear, wavy boundary.

B21g—14 to 29 inches, gray (10YR 5/1) silty clay loam; many, medium, distinct, yellowish-brown (10YR 5/6), dark yellowish-brown (10YR 4/4), and dark-brown (10YR 3/3) mottles; moderate, medium, subangular blocky structure; friable, slightly plastic; few black concretions; few fine roots; slightly acid; gradual, smooth boundary.

B22g—29 to 49 inches, gray (10YR 6/1) silty clay; many, medium, distinct, brown (7.5YR 4/4), yellowish-brown (10YR 5/4), and dark-brown (10YR 4/3) mottles; moderate, medium, subangular blocky structure; friable, plastic; few black concretions; slightly acid; gradual, smooth boundary.

B23g—49 to 60 inches, gray (10YR 6/1) clay; many, medium, distinct, brown (7.5YR 4/4), yellowish-brown (10YR 5/6), and dark yellowish-brown (10YR 4/4) mottles; moderate, medium, subangular blocky structure; friable, plastic; common black concretions; slightly acid.

The Ap horizon is dark yellowish brown, brown, dark brown, olive brown, grayish brown, or dark grayish brown. The B21 horizon is dark grayish brown or gray, mottled with shades of brown and yellow. Its texture is silty clay loam, silty clay, or clay. The lower part of the B2 horizon is gray to grayish-brown silty clay or clay mottled with shades of brown. Clay content at a depth of 10 to 40 inches ranges from 35 to 55 percent. Reaction ranges from slightly acid to neutral in all horizons.

Leeper soils are associated with Catalpa and Marietta soils. They do not have the very dark grayish-brown A horizon of Catalpa soils. They differ from Marietta soils in having more than 35 percent clay at depths of 10 to 40 inches. The mineralogy of Leeper soils is dominated by montmorillonite clay, but Catalpa and Marietta soils have mixed mineralogy.

Leeper silty clay loam (Le).—This soil is somewhat poorly drained and is on flood plains. Slopes are 0 to 2 percent.

Permeability is very slow, and available water capacity is high to very high. Runoff is slow, and there is a slight hazard of ponding in low areas. These soils are difficult to till because of the high content of clay. They crack when dry and seal over when wet and are subject to occasional flooding of short duration. Reaction is slightly acid to neutral.

Included with this soil in mapping are small areas of Catalpa, Commerce, and Marietta soils.

Most of the acreage is used for row crops or pasture. A small acreage is wooded. Cotton, corn, soybeans, pasture plants, and adapted hardwood trees are suited. If row crops are grown, management should include V-ditches and W-ditches, row arrangement, and return of crop residue. Row crops can be grown continuously under good management. Capability unit IIw–1; woodland group 1w6.

Mantachie Series

The Mantachie series consists of somewhat poorly drained soils on stream flood plains. These soils formed in loamy material. Slopes are 0 to 2 percent.

In a representative profile the surface layer is brown sandy loam mottled with light brownish gray and dark yellowish brown. It is about 6 inches thick. Below this is

brown sandy loam about 5 inches thick that has light brownish-gray and dark yellowish-brown mottles. Below this layer, to a depth of about 20 inches, is clay loam mottled with shades of brown and gray. This is underlain, to a depth of 60 inches, by gray clay loam that has brownish mottles.

Representative profile of Mantachie sandy loam in a cultivated field one-eighth mile east of Tallabinella Creek and 1 mile northeast of Troy, NW¼NW¼ sec. 15, T. 11 S., R. 4 E.:

Ap—0 to 6 inches, brown (10YR 4/3) sandy loam; a few, fine, distinct and faint, light brownish-gray and dark yellowish-brown mottles; weak, fine, granular structure; very friable; few fine roots; very strongly acid; abrupt, smooth boundary.

B21—6 to 11 inches, brown (10YR 4/3) sandy loam; a few, medium, distinct, light brownish-gray (10YR 6/2) and faint, dark yellowish-brown (10YR 4/4) mottles; weak, medium, subangular blocky structure; very friable; few fine roots; very strongly acid; gradual, smooth boundary.

B22g—11 to 20 inches, mottled gray (10YR 6/1), brown (10YR 5/3), yellowish-brown (10YR 5/6), and dark yellowish-brown (10YR 4/4) clay loam; weak, medium, subangular blocky structure; friable, slightly plastic; few black and brown concretions; few fine roots; very strongly acid; gradual, smooth boundary.

B23g—20 to 34 inches, gray (10YR 6/1) clay loam; common, medium, distinct, brown (10YR 5/3) and yellowish-brown (10YR 5/6) mottles; weak, medium, subangular blocky structure; firm, slightly plastic; few fine roots; very strongly acid; gradual, smooth boundary.

B24g—34 to 60 inches, gray (10YR 5/1) clay loam; common, medium, distinct, strong-brown (7.5YR 5/6), yellowish-brown (10YR 5/6), and brown (10YR 5/3) mottles; weak, medium, subangular blocky structure; firm, slightly plastic; very strongly acid.

The Ap horizon or A1 horizon, when present, is brown, yellowish brown, or grayish brown. The upper part of the B horizon is brown or yellowish brown that has few to many grayish or brownish mottles or is mottled in shades of brown, yellow, and gray. The lower part of the B horizon is gray with common or many mottles in shades of brown and yellow. The B horizon is clay loam, sand clay loam, loam, sandy loam, or silty clay loam. Clay content at a depth of 10 to 40 inches ranges from 18 to 25 percent, and silt content is 35 to 60 percent. Black and brown concretions range from few to common.

Mantachie soils are associated with Iuka, Marietta, and Ochlockonee soils. They are not so well drained as Iuka, Marietta, and Ocholockonee soils. They are more clayey at a depth of 10 to 40 inches than Iuka and Ochlockonee soils. They are more acid than the Marietta soils, which are slightly acid to neutral.

Mantachie sandy loam (Mc).—This soil is somewhat poorly drained and is on flood plains. Slopes are 0 to 2 percent.

Permeability is moderate, and available water capacity is medium to high. Runoff is slow, and there is a slight hazard of ponding in low areas. This soil is subject to overflow of short duration. It crusts and packs when left bare, and a plowpan forms unless the depth of plowing is varied. Reaction is very strongly acid.

Included with this soil in mapping are small areas of Chewacla, Commerce, Iuka, and Ochlockonee soils.

Most of the acreage is used for row crops or pasture. A small acreage is wooded. Corn, soybeans, truck crops, pasture plants, and loblolly pine and adapted hardwood trees are suited. Row crops can be grown continuously under good management, such as drainage by V-ditches and W-ditches, row arrangement, and return of crop residue. Capability unit IIw–6; woodland group 1w9.

Marietta Series

The Marietta series consists of moderately well drained soils that formed in loamy material on stream flood plains. Slopes are 0 to 2 percent.

In a representative profile the surface layer is brown loam about 6 inches thick. The upper part of the subsoil, to a depth of about 20 inches is clay loam mottled with shades of gray and brown. Below this, to a depth of about 60 inches, is loam mottled with shades of gray and brown.

Representative profile of Marietta loam in a cultivated field 1 mile north of Plymouth and one-fourth mile east of Mississippi Highway No. 342, SW¼SE¼ sec. 9, T. 10 S., R. 4 E.:

Ap—0 to 6 inches, brown (10YR 4/3) loam; few, fine, distinct, light brownish-gray, pale-brown, and yellowish-brown mottles; weak, fine, granular structure; friable, slightly plastic; few fine roots; slightly acid; abrupt, smooth boundary.

B1—6 to 12 inches, mottled brown (10YR 4/3), yellowish-brown (10YR 5/4), and gray (10YR 6/1) clay loam; moderate, medium, subangular blocky structure; friable, plastic; few fine roots; slightly acid; gradual, smooth boundary.

B21g—12 to 20 inches, mottled dark-gray (10YR 4/1), strong-brown (7.5YR 5/6), and light brownish-gray (10YR 6/2) clay loam; moderate, medium, subangular blocky structure; firm, plastic; few fine roots; slightly acid; gradual, smooth boundary.

B22g—20 to 32 inches, grayish-brown (2.5Y 5/2) loam; many, medium, distinct, dark yellowish-brown (10YR 4/4) and brown (7.5YR 4/4) mottles; moderate, medium, subangular blocky structure; firm, plastic; few black and brown concretions; few fine roots; slightly acid; gradual, smooth boundary.

B23g—32 to 50 inches, mottled gray (10YR 6/1), strong-brown (7.5YR 5/6), and dark yellowish-brown (10YR 4/4) loam; moderate, medium, subangular blocky structure; firm to friable, slightly plastic; few black and brown concretions; slightly acid; gradual, smooth boundary.

B3g—50 to 60 inches, gray (10YR 6/1) loam; many, medium, distinct, strong-brown (7.5YR 5/6) and brown (10YR 5/3) mottles; moderate, medium, subangular blocky structure; friable, slightly plastic; slightly acid.

The Ap horizon is dark grayish brown, brown, dark brown, or dark yellowish brown mottled in shades of gray and brown. The B horizon is mottled in shades of brown and gray. Some profiles have grayish matrix colors in the lower part of the B horizon. Texture is clay loam, loam, sandy clay loam, or silty clay loam that has a high content of sand. Reaction ranges from slightly acid to neutral.

Clay content at a depth of 10 to 40 inches is 18 to 30 percent. Content of sand coarser than very fine sand is more than 15 percent.

Marietta soils are associated with Catalpa, Commerce, Leeper, Mantachie, and Robinsonville soils. They are better drained than Commerce, Leeper, and Mantachie soils and have less clay in the B horizon than Catalpa and Leeper soils. They have more clay in the B horizon and are not so well drained as Robinsonville soils.

Marietta loam (Me).—This soil is moderately well drained and is on flood plains. Slopes are 0 to 2 percent.

Permeability is moderate, and the available water capacity is medium to high. Runoff is slow, and the hazards of ponding and overflow are slight where this soil is cultivated. This soil crusts and packs if left bare, and a plow-

pan forms unless the depth of plowing is varied. Planting is sometimes delayed in spring because of wetness. This soil is subject to overflow of short duration. Reaction is slightly acid or neutral.

Included with this soil in mapping are small areas of Chewacla, Commerce, and Mantachie soils.

Most of the acreage is cultivated or used for pasture. A small acreage is wooded. Cotton, corn, soybeans, pasture plants (fig. 5), and adapted hardwood trees are suited. Row crops can be grown continuously under good management that includes V-ditches and W-ditches, row arrangement, and return of crop residue. Capability unit IIw-4; woodland group 1w5.

Mashulaville Series

The Mashulaville series consists of poorly drained soils that have a fragipan. These soils formed in loamy material on broad ridgetops and stream terraces. Slopes range from 0 to 2 percent.

In a representative profile the surface layer is dark grayish-brown silt loam about 6 inches thick. The upper part of the subsurface layer is dark grayish-brown silt loam that has grayish and brownish mottles to a depth of about 12 inches. The lower part is gray loam mottled with shades of brown. A thick, compact fragipan of gray loam and clay loam mottled with shades of red, brown, and gray is at a depth of about 23 to 62 inches.

Representative profile of Mashulaville silt loam in an idle field 2 miles southeast of Endville and 100 feet east of county road, SE¼NE¼ sec. 15, T. 9 S., R. 4 E.:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; very friable; few fine roots; strongly acid; abrupt, smooth boundary.

A21g—6 to 12 inches, dark grayish-brown (10YR 4/2) silt loam; common, medium, faint, light brownish-gray (10YR 6/2) and grayish-brown (10YR 5/2) mottles; weak, fine, granular and subangular blocky structure; friable; few, fine, soft, brown and black concretions; few fine roots; strongly acid; clear, smooth boundary.

A22g—12 to 23 inches, gray (10YR 6/1) loam; common, fine and medium, distinct, light yellowish-brown (10YR 6/4) mottles; weak, fine, granular and moderate, medium, subangular blocky structure; friable; few, fine, soft, brown and black concretions; few fine roots; very strongly acid; clear, smooth boundary.

Bx1—23 to 30 inches, gray (10YR 5/1) clay loam; common, fine and medium, distinct, light yellowish-brown (10YR 6/4) mottles and faint light brownish-gray (2.5Y 6/2) mottles; moderate, medium, subangular blocky structure; firm, compact and brittle; few patchy clay films, few fine voids; few, fine, soft, brown and black concretions; very strongly acid; clear, smooth boundary.

Bx2—30 to 47 inches, gray (10YR 5/1) clay loam; common, medium, distinct, yellowish-brown (10YR 5/8) and light yellowish-brown (10YR 6/4) mottles; moderate, medium, subangular blocky structure; firm, compact and brittle; patchy clay films; few fine voids; few, soft, brown and black concretions; very strongly acid; gradual, smooth boundary.

Figure 5.—Cows grazing on Marietta loam; Oktibeha-Ruston association, hilly, in the background.

Bx3—47 to 62 inches, gray (10YR 5/1) loam; common, medium, distinct, yellowish-brown (10YR 5/8) and yellowish-red (5YR 5/6) mottles; moderate, medium, subangular blocky structure; firm, compact and brittle; few patchy clay films; few fine voids; few, soft, brown and black concretions; strongly acid.

The Ap horizon is dark grayish brown, grayish brown, or gray. The A2 horizon is gray or dark grayish brown and has few to many mottles in shades of brown and gray. The A horizon is sandy loam, loam, or silt loam. The Bx horizon is gray to grayish brown and has few to many mottles in shades of brown, yellow, and red. Texture is loam or clay loam. Clay content between the Ap horizon and the top of the fragipan ranges from 10 to 18 percent. Depth to the fragipan ranges from 18 to 24 inches. Reaction is strongly acid or very strongly acid throughout the profile.

Mashulaville soils are associated with Frizzell and Ora soils. They are not so well drained as Frizzell and Ora soils. In contrast with Frizzell soils, they have a fragipan and less silt. They contain less clay than Ora soils.

Mashulaville silt loam (Mh).—This soil is poorly drained. Slopes are 0 to 2 percent.

Permeability is slow, and available water capacity is medium. Runoff is slow, and where the soil is cultivated, there is a severe hazard of ponding. This soil has a perched water table following rainy periods. Reaction is strongly acid and very strongly acid.

Included with this soil in mapping are small areas of Frizzell and Ora soils.

Most of the acreage is used for pasture or is wooded. Soybeans, pasture plants, loblolly pine, and adapted species of hardwoods are suited. If this soil is used for row crops, management should include drainage by V-ditches and W-ditches, row arrangement, and return of crop residue. Without adequate water disposal, this soil is best suited as woodland. Capability unit IVw-1; woodland group 3w9.

Mayhew Series

The Mayhew series consists of poorly drained soils on uplands. These soils formed in clayey material. Slopes are 0 to 12 percent.

In a representative profile the upper part of the surface layer is dark grayish-brown silty clay loam that is mottled with gray and is about 4 inches thick. The lower part is mottled gray, brown, and dark-brown silty clay loam about 3 inches thick. The upper part of the subsoil is gray silty clay loam that has yellowish-brown mottles and reaches to a depth of about 22 inches. Below this is light brownish-gray silty clay that has brownish mottles and extends to a depth of about 65 inches. This is underlain by mottled gray and brown silty clay.

Representative profile of Mayhew silty clay loam, 0 to 2 percent slopes, in a pasture 1 mile north of Springville and one-fourth mile east of county road, SE¼SW¼ sec. 33, T. 9 S., R. 2 E.:

Ap—0 to 4 inches, dark grayish-brown (10YR 4/2) silty clay loam; common, medium, faint, gray (10YR 6/1) mottles; weak, fine, granular and subangular blocky structure; friable; common fine roots; strongly acid; abrupt, smooth boundary.

A1—4 to 7 inches, mottled gray (10YR 6/1), dark-brown (10YR 3/3), and brown (10YR 4/3) silty clay loam; weak, fine, subangular blocky structure; friable; few fine roots; very strongly acid; clear, wavy boundary.

B21tg—7 to 22 inches, gray (10YR 6/1) silty clay loam; many, medium, distinct, yellowish-brown (10YR 5/4) mottles; moderate, medium, subangular blocky structure; firm, slightly plastic and sticky; few fine roots; few patchy clay films; very strongly acid; gradual, wavy boundary.

B22tg—22 to 40 inches, light brownish-gray (2.5Y 6/2) silty clay; few, medium, distinct, yellowish-brown (10YR 5/6) mottles; strong, medium, subangular and angular blocky structure; firm, plastic and sticky; pressure faces or clay films on peds; very strongly acid; gradual, wavy boundary.

B23tg—40 to 65 inches, light brownish-gray (2.5Y 6/2) silty clay; few, fine, faint, light olive-brown mottles; strong, medium, subangular and angular blocky structure; firm, plastic and sticky; pressure faces or clay films on peds; few slickensides that do not intersect; very strongly acid; gradual, wavy boundary.

B3g—65 to 80 inches, mottled gray (10YR 6/1), yellowish-brown (10YR 5/6), and dark yellowish-brown (10YR 4/4) silty clay; strong, coarse, angular blocky structure; firm, plastic and sticky; common coarse slickensides; many soft shale fragments; very strongly acid.

The Ap horizon is gray, grayish brown, dark grayish brown, brown, dark brown, or olive brown and is 2 to 8 inches thick. The Bt horizon is gray, light brownish gray, or grayish brown and has few to many mottles in shades of brown and yellow. Texture is silty clay loam or silty clay. Clay content of the upper Bt horizon ranges from 35 to 60 percent. Reaction is strongly acid or very strongly acid throughout the profile.

Mayhew soils are associated with Adaton, Falkner, and Wilcox soils. They have more clay in the Bt horizon than Adaton and Falkner soils but are not so well drained as Falkner and Wilcox soils.

Mayhew silty clay loam, 0 to 2 percent slopes (MsA).—This soil is poorly drained and occurs on broad ridgetops. It has the profile described as representative for the series.

Permeability is very slow, and available water capacity is high to very high. Runoff is slow, and there is a severe hazard of ponding. This soil shrinks and cracks and becomes cloddy when dry. It seals over when wet. Reaction is strongly acid and very strongly acid.

Included with this soil in mapping are small areas of Falkner and Wilcox soils.

Most of the acreage is used for row crops and pasture. A small acreage is wooded. Soybeans, pasture plants, and adapted pine and hardwood trees are suited. Management for row crops should include drainage by V-ditches and W-ditches, row arrangement, and return of crop residue. Without adequate water disposal, this soil is best suited to perennial vegetation. Capability unit IIIw-4; woodland group 2w9.

Mayhew silty clay loam, 2 to 5 percent slopes (MsB).—This soil is poorly drained and occurs on ridgetops. The surface layer is grayish-brown silty clay loam about 8 inches thick. The subsoil is gray or light brownish-gray silty clay.

Permeability is very slow, and available water capacity is high to very high. Runoff is slow, and where the soil is cultivated, the erosion hazard is moderate. This soil cracks when dry and seals over when wet. Cultivation is often delayed in spring because of wetness. Reaction is strongly acid and very strongly acid.

Included with this soil in mapping are small areas of Falkner and Wilcox soils.

Most of the acreage is used for row crops and pasture. A small acreage is wooded. Soybeans, pasture plants, and adapted pine and hardwood trees are suited. Man-

agement for row crops should include terraces, contour farming, vegetated waterways, close-growing crops, and return of crop residue. Capability unit IIIe–4; woodland group 2w9.

Mayhew silty clay loam, 5 to 12 percent slopes (MsD).—This soil is poorly drained and occurs on side slopes. The surface layer is grayish-brown silty clay loam about 4 inches thick. The subsoil is light brownish-gray silty clay.

Permeability is very slow, and available water capacity is high to very high. Runoff is moderately rapid, and where the soil is cultivated, the hazard of erosion is very severe. This soil shrinks and cracks when dry. Reaction is strongly acid and very strongly acid.

Included with this soil in mapping are small areas of Falkner, Tippah, and Wilcox soils.

Most of the acreage is used for pasture. Pasture plants and adapted pine and hardwood trees are suited. To help prevent erosion, perennial vegetation should be grown on this soil as much of the time as possible. This soil is not suitable for row crops. Capability unit VIe–4; woodland group 2w9.

Mayhew silty clay loam, 8 to 12 percent slopes, eroded (MsD2).—This soil is poorly drained and occurs on hillsides that have a few shallow gullies and rills. The surface layer is grayish-brown silty clay loam about 2 inches thick, and the subsoil is light brownish-gray silty clay.

Permeability is very slow, and available water capacity is high to very high. Runoff is rapid, and the hazard of erosion is very severe. Reaction is strongly acid and very strongly acid.

Included with this soil in mapping are small areas of Tippah and Wilcox soils.

Most of the acreage is used for pasture. Small areas are wooded. Pasture plants and adapted pine and hardwood trees are suited. Perennial vegetation should be grown on this soil as much of the time as possible to help prevent erosion. This soil is not suited to row crops. Capability unit VIe–4; woodland group 2w9.

Ochlockonee Series

The Ochlockonee series consists of well-drained soils that formed in loamy alluvium on stream flood plains. Slopes range from 0 to 2 percent.

In a representative profile, the surface layer is brown sandy loam about 5 inches thick. This is underlain by brown to yellowish-brown sandy loam mottled with shades of brown to a depth of about 31 inches. Below this is sandy loam that is mottled with shades of brown and gray and reaches to a depth of about 46 inches. The next layer is mottled gray, brownish-gray, and yellowish-brown loam.

Representative profile of Ochlockonee sandy loam in a cultivated field 75 yards north of Mississippi Highway No. 342, NE¼NW¼ sec. 19, T. 10 S., R. 4 E.:

Ap—0 to 5 inches, brown (10YR 4/3) sandy loam; weak, fine, granular structure; very friable; few fine roots; strongly acid; abrupt, smooth boundary.

C1—5 to 10 inches, brown (10YR 4/3) sandy loam; structureless; very friable; few fine roots; thin bedding planes; strongly acid; clear, smooth boundary.

C2—10 to 16 inches, yellowish-brown (10YR 5/4) sandy loam; a few, fine, faint, pale-brown and dark-brown mottles; structureless; very friable; few fine roots; thin bedding planes; very strongly acid; clear, smooth boundary.

C3—16 to 31 inches, brown (10YR 4/3) sandy loam; a few fine, faint, pale-brown and strong-brown mottles; structureless; very friable; thin bedding planes; very strongly acid; clear, smooth boundary.

C4—31 to 37 inches, mottled brown (10YR 5/3), yellowish-brown (10YR 5/4), strong-brown (7.5YR 5/6), and light brownish-gray (10YR 6/2) sandy loam; structureless; very friable; few fine roots; very strongly acid; clear, smooth boundary.

C5—37 to 46 inches, mottled brown (10YR 4/3), dark yellowish-brown (10YR 4/4), light brownish-gray (10YR 6/2), and strong-brown (7.5YR 5/6) sandy loam; weak, medium, subangular blocky structure; very friable; very strongly acid; clear, smooth boundary.

C6—46 to 60 inches, mottled gray (10YR 6/1), light brownish-gray (10YR 6/2), yellowish-brown (10YR 5/6), and brown (10YR 4/3) loam; weak, medium, subangular blocky structure; friable; common black and brown concretions; very strongly acid.

The Ap horizon is brown, pale brown, yellowish brown or light yellowish brown. The A1 horizon, when present, is grayish-brown or dark grayish-brown sandy loam, loam, or silt loam. The upper part of the C horizon is brown or yellowish brown and has brownish mottles. Texture is sandy loam, loam, or silt loam that has a high content of sand. The lower part of the C horizon is mottled with shades of brown and gray at a depth below 30 inches. Texture is sandy loam, loam, sandy clay loam, or silt loam that has a high content of sand. Clay content at a depth of 10 to 40 inches is 10 to 18 percent. Reaction is strongly acid or very strongly acid throughout the profile.

Ochlockonee soils are in an undifferentiated soil group with Iuka soils. They are also associated with Mantachie soils. They are better drained than Iuka and Mantachie soils and do not have gray mottles that are 2 or less in chroma within a depth of 20 inches.

Oktibbeha Series

The Oktibbeha series consists of moderately well drained to well drained soils on uplands. These soils formed in acid clayey material over alkaline material. Slopes are 5 to 45 percent.

In a representative profile the surface layer is dark-brown loam about 4 inches thick. The upper part of the subsoil is brown and yellowish-red silty clay that is mottled with shades of brown in the lower part. At a depth of about 21 inches and extending to about 38 inches there is silty clay loam mottled with shades of brown, red, and gray. The underlying material is alkaline silty clay loam that is mottled in shades of brown and reaches to a depth of about 55 inches.

Representative profile of Oktibbeha loam in a wooded area 2 miles east of Pontotoc and three-eighths of a mile north of TVA power line, SW¼NW¼ sec. 26, T. 9 S., R. 3 E.:

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

B21t—4 to 8 inches, brown (7.5YR 4/4) silty clay; moderate, medium, subangular blocky structure; friable, slightly plastic; patchy clay films; few fine roots; strongly acid; clear, smooth boundary.

B22t—8 to 16 inches, yellowish-red (5YR 4/6) silty clay; strong, fine and medium, subangular blocky structure; firm, plastic; near continuous clay films; few fine roots; strongly acid; gradual, smooth boundary.

B23t—16 to 21 inches, mottled yellowish-red (5YR 4/6), strong-brown (7.5YR 5/6) red (2.5YR 4/6), and yellowish-brown (10YR 5/4) silty clay; strong, fine

and medium, subangular blocky structure; firm, plastic; patchy clay films; few fine roots; strongly acid; gradual, smooth boundary.

B24t—21 to 28 inches, mottled yellowish-brown (10YR 5/6), yellowish-red (5YR 4/6), and light brownish-gray (10YR 6/2) silty clay loam; strong, medium, subangular blocky structure; firm, plastic; patchy clay films; strongly acid; gradual, smooth boundary.

B25t—28 to 38 inches, mottled yellowish-brown (10YR 5/6), light olive-brown (2.5Y 5/6), and light brownish-gray (10YR 6/2) silty clay loam; strong, fine and medium, subangular blocky structure; firm, plastic; patchy clay films; strongly acid; clear, smooth boundary.

11C—38 to 55 inches, mottled light olive-brown (2.5Y 5/4), gray (10YR 6/1), and yellowish-brown (10YR 5/6) silty clay loam; massive; friable; about 40 percent white soft calcium carbonate material; mildly alkaline.

The Ap horizon is dark grayish-brown, dark-brown, yellowish-brown, and brown silt loam, silty clay loam, loam, or very fine sandy loam. The upper part of the Bt horizon is yellowish-red, strong-brown, reddish-brown, or brown silty clay or clay. The lower part of the Bt horizon is silty clay, clay, or silty clay loam mottled with shades of red, brown, yellow, and gray. The IIC horizon is alkaline silty clay loam, clay loam, or clay mottled with shades of brown, yellow, and gray and has few to many, soft, white calcium carbonate concretions. The clay content of the upper 20 inches of the Bt horizon is 35 to 55 percent; silt content is 30 to 60 percent. Reaction in the A and B horizons is strongly acid or very strongly acid. Reaction is mildly acid to moderately alkaline in the C horizon.

Oktibbeha soils are associated with Atwood, Kipling, and Ruston soils and Gullied land. They are not so well drained as Atwood and Ruston soils and have more clay in the Bt horizon. They are better drained than Kipling soils.

Oktibbeha soils, 17 to 30 percent slopes, severely eroded (ObE3).—These soils occur on side slopes. They are dominantly Oktibbeha soils and similar soils that have either a mildly alkaline surface layer and subsoil or a subsoil mottled in shades of brown, red, and gray. There is no regular pattern in the distribution of these soils. In places there are many rills, frequent shallow gullies, and an occasional deep gully.

Oktibbeha soils have a dark-brown loam to silty clay surface layer about 2 inches thick, and the upper part of the subsoil is yellowish-red silty clay that grades to a mottled red, yellowish-red, yellowish-brown, and gray silty clay loam at a depth of about 20 inches. This is underlain by mottled brown, yellow, and gray alkaline clay loam.

Oktibbeha soils are strongly acid or very strongly acid in the surface layer and subsoil and mildly alkaline and moderately alkaline in the substratum. Permeability is slow to very slow, and available water capacity is high. Runoff is very rapid, and the hazard of erosion is very severe. These soils shrink and crack when dry and swell when wet.

Most of the acreage is wooded. Loblolly pine and eastern redcedar are suited. Steep slopes and the hazard of erosion make these soils best suited to trees. Capability unit VIIe–4; woodland group 3c8.

Oktibbeha-Ruston association, hilly (OKE).—This mapping unit occurs on rough, broken topography. Slopes are 17 to 45 percent. The landscape consists of long, narrow ridges that have long, wide, irregular side slopes dissected by narrow drainageways. The areas are larger than those of the soils that surround them.

Soils of this association occur together and have some regularity of pattern on the landscape. The composition is more variable than that of other mapping units in the survey area, but it is well enough controlled to permit interpretations for the expected uses of the soils.

This mapping unit is about 50 percent Oktibbeha soils, 35 percent Ruston soils, and 15 percent soils of minor extent.

The Oktibbeha soils have the profile described as representative for their series. They occur mainly on the lower half of the side slopes. Reaction is strongly acid or very strongly acid in the surface layer and subsoil. The substratum is mildly acid and moderately alkaline. Permeability is slow to very slow, and available water capacity is high. Oktibbeha soils shrink and crack when dry and swell when wet.

Ruston soils are well drained and occur mainly on the upper half of the side slopes. Soils of the Ruston series have a brown sandy loam surface layer about 5 inches thick and a yellowish-red loam subsoil extending to a depth of about 60 inches. Ruston soils are strongly acid or very strongly acid. Permeability is moderate, and the available water capacity is medium to high.

Runoff is rapid, and the erosion hazard is severe. Many areas have numerous shallow gullies and many deep gullies.

Most of the acreage is thickly wooded, but there are scattered areas of pasture. Steep slopes and the hazard of erosion make these soils best suited to trees. Loblolly pine trees are suited. Capability unit VIIe–2; Oktibbeha soil in woodland group 3c8; Ruston soil in group 3o1.

Ora Series

The Ora series consists of moderately well drained soils that have a fragipan. These soils formed in loamy material on uplands. Slopes are 2 to 12 percent.

In a representative profile the surface layer is dark yellowish-brown loam about 5 inches thick. The upper part of the subsoil is yellowish-red loam that has strong-brown mottles in the lower part. At a depth of about 22 inches there is a thick, compact fragipan. In the upper part this layer is strong-brown loam and in the lower part it is yellowish-red sandy clay loam mottled with shades of brown and gray.

Representative profile of Ora loam, 2 to 5 percent slopes, in a pasture 1¼ miles north of Furrs, NE¼SW¼ sec. 35, T. 9 S., R. 4 E.:

Ap—0 to 5 inches, dark yellowish-brown (10YR 4/4) loam; weak, fine, granular structure; friable; few fine roots; strongly acid; abrupt, smooth boundary.

B21t—5 to 15 inches, yellowish-red (5YR 4/6) loam; moderate, medium, subangular blocky structure; friable; few fine roots; few patchy clay films; strongly acid; gradual, smooth boundary.

B22t—15 to 22 inches, yellowish-red (5YR 4/6) loam; common, medium and coarse, faint, strong-brown (7.5YR 5/8) mottles; moderate, fine and medium, subangular blocky structure; friable; few fine roots; few patchy clay films; strongly acid; gradual, smooth boundary.

Bx1—22 to 31 inches, strong-brown (7.5YR 5/6) loam; a few, fine, faint, pale-brown and yellowish-red mottles; moderate, fine and medium, subangular blocky structure; firm, compact and brittle; few fine roots in

cracks; few patchy clay films; few voids; few light yellowish-brown silt coatings on ped faces; few gray cracks less than 1 inch in width extending into lower parts of the horizon; strongly acid; gradual, smooth boundary.

Bx2—31 to 42 inches, yellowish-red (5YR 4/6) sandy clay loam; common, medium, faint, strong-brown (7.5YR 5/6) mottles and common, medium, distinct, light brownish-gray (10YR 6/2) mottles; moderate, medium, subangular blocky structure; firm, compact and brittle; few patchy clay films; few voids; few gray polygonal cracks; strongly acid; gradual, smooth boundary.

Bx3—42 to 63 inches, yellowish-red (5YR 4/6) sandy clay loam; many, medium, distinct, yellowish-brown (10YR 5/6) and light brownish-gray (10YR 6/2) mottles; moderate, medium, subangular blocky structure; firm, compact and brittle; few voids; few patchy clay films; few gray polygonal cracks; strongly acid.

The Ap horizon is brown, dark yellowish brown, or reddish brown and 3 to 5 inches thick. The Bt horizon above the fragipan is yellowish red or reddish brown and has brownish mottles. Its texture is loam, sandy clay loam, or clay loam. The Bx horizon (fragipan) is strong brown, reddish brown, or yellowish red mottled with shades of gray, red, and brown. Its texture is loam, sandy clay loam, or fine sandy loam. Depth to the fragipan ranges from 18 to 25 inches. Content of clay in the upper part of the Bt horizon is 20 to 35 percent.

Ora soils are associated with Atwood, Boswell, Cahaba, Mashulaville, and Ruston soils. Ora soils have a fragipan, which Atwood, Boswell, Cahaba, and Ruston soils do not have. They are better drained than the poorly drained Mashulaville soils. They have less silt in the solum than Atwood soils and less clay in the B horizon than Boswell soils.

Ora loam, 2 to 5 percent slopes (OrB).—This soil is moderately well drained and has a fragipan. It occurs on ridgetops and stream terraces. It has the profile described as representative for the series.

Permeability is moderately slow, and the available water capacity is medium. Runoff is slow, and the erosion hazard is moderate. Reaction is strongly acid.

Included with this soil in mapping are small areas of Atwood, Boswell, Cahaba, Frizzell, and Ruston soils.

Most of the acreage is wooded or used for pasture. A small acreage is used for crops. Cotton, corn, soybeans, pasture plants, and loblolly and shortleaf pines are suited. If this soil is used for row crops, management should include terraces, contour tillage, and return of crop residue. Capability unit IIe–2; woodland group 3o7.

Ora loam, 2 to 5 percent slopes, eroded (OrB2).—This soil is moderately well drained and has a fragipan. It occurs on ridgetops and stream terraces. The surface layer is mixed brown and yellowish-red loam 4 inches thick. Erosion has removed much of the original surface layer, and the subsoil is exposed in many places. Rills and shallow gullies occur in most fields. The subsoil is yellowish-red loam. At a depth of about 20 inches is a fragipan of yellowish-red sandy clay loam mottled with shades of brown and gray.

Permeability is moderately slow, and available water capacity is medium. Runoff is medium, and where the soil is cultivated, the hazard of erosion is moderate. Reaction is strongly acid.

Included with this soil in mapping are small areas of Atwood, Boswell, Cahaba, and Ruston soils.

Most of the acreage is cultivated or used for pasture. A small acreage is wooded. Cotton, corn, soybeans, pasture plants, and loblolly and shortleaf pines are suited. Management for row crops should include terraces, contour tillage, and return of crop residue. Capability unit IIe–2; woodland group 3o7.

Ora loam, 5 to 8 percent slopes (OrC).—This soil is moderately well drained and has a fragipan. It occurs on ridgetops, side slopes, and stream terraces. The surface layer is brown loam about 4 inches thick over a yellowish-red loam subsoil about 16 inches thick. Below a depth of 20 inches is a sandy clay loam fragipan mottled with red, yellow, brown, and gray.

Permeability is moderately slow, and available water capacity is medium. Runoff is medium. Erosion is slight, but where the soil is cultivated, the hazard of erosion is severe. Reaction is strongly acid.

Included with this soil in mapping are small areas of Atwood, Boswell, Cahaba, and Ruston soils.

Most of the acreage is wooded. A small acreage is in pasture and cropland. Cotton, corn, soybeans, pasture plants, and loblolly and shortleaf pines are suited. Management for row crops should include terraces, contour tillage, vegetated waterways, close-growing crops, and return of crop residue. Capability unit IIIe–2; woodland group 3o7.

Ora loam, 5 to 8 percent slopes, eroded (OrC2).—This soil is moderately well drained and has a fragipan. It occurs on ridgetops, side slopes, and stream terraces. Erosion has removed much of the original surface layer, so the subsoil is exposed in many places. Rills and shallow gullies occur in most fields. The surface layer is reddish-brown loam about 3 inches thick. The subsoil is yellowish-red loam. At a depth of about 18 inches is a fragipan of yellowish-red loam mottled with shades of brown and gray.

Permeability is moderately slow, and available water capacity is medium. Runoff is medium, and where the soil is cultivated, the hazard of erosion is moderate. Reaction is strongly acid.

Included with this soil in mapping are small areas of Atwood, Boswell, Cahaba, and Ruston soils.

Most of the acreage is cultivated or used for pasture. A small acreage is wooded. Cotton, corn, soybeans, pasture plants, and loblolly and shortleaf pines are suited. Management for row crops should include terraces, contour tillage, vegetated waterways, close-growing crops, and return of crop residue. Capability unit IIIe–2; woodland group 3o7.

Ora loam, 8 to 12 percent slopes, eroded (OrD2).—This soil is moderately well drained and has a fragipan. It occurs mainly on side slopes. The surface layer is reddish-brown loam about 3 inches thick. The subsoil is yellowish-red loam about 20 inches thick over a yellowish-red loam fragipan that has gray and brownish mottles. Rills and an occasional shallow gully are in most fields.

Permeability is moderately slow, and available water capacity is medium. Runoff is rapid, and where the soil is cultivated, the hazard of erosion is very severe. Reaction is strongly acid.

Included with this soil in mapping are small areas of Atwood, Boswell, Cahaba, and Ruston soils.

Most of the acreage is used for pasture and woodland. Pasture plants and loblolly and shortleaf pines are suited. If this soil is used for row crops, management should include terraces, contour tillage, vegetated water-

ways, close-growing crops, and return of crop residue. Capability unit IVe–2; woodland group 3o7.

Providence Series

The Providence series consists of moderately well drained soils that have a fragipan and are on uplands. These soils formed in loamy material high in content of silt. Slopes are 2 to 30 percent.

In a representative profile the surface layer is brown silt loam about 6 inches thick. The subsoil above the fragipan is yellowish-red silt loam in the upper part and silty clay loam in the lower part. At a depth of about 19 inches is a firm, compact fragipan consisting of yellowish-red silt loam that has brownish mottles in the upper part. At a depth of about 27 inches is strong-brown loam mottled with shades of brown and gray. Red sandy clay loam mottled with shades of brown and gray is at depths below 55 inches.

Representative profile of Providence silt loam, 2 to 5 percent slopes, in a pasture one-fourth mile north of water tower in Toccopola, NW¼NE¼ sec. 31, T. 9 S., R. 1 E.:

Ap—0 to 6 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; few fine roots; strongly acid; abrupt, smooth boundary.

B21t—6 to 12 inches, yellowish-red (5YR 4/6) silt loam; moderate, medium, subangular blocky structure; friable; few patchy clay films; few fine roots; strongly acid; gradual, smooth boundary.

B22t—12 to 19 inches, yellowish-red (5YR 4/6) silty clay loam; moderate, medium, subangular blocky structure; friable, slightly plastic; nearly continuous clay films; few fine roots; strongly acid; clear, wavy boundary.

Bx1—19 to 27 inches, yellowish-red (5YR 4/6) silt loam; many, medium, distinct, yellowish-brown (10YR 5/6) mottles and few, fine, prominent, light brownish-gray mottles; moderate, medium, subangular blocky structure; firm, compact and brittle; few patchy clay films; few, soft, brownish-black concretions and stains; few fine voids; few fine roots; strongly acid; clear, wavy boundary.

IIBx2—27 to 40 inches, strong-brown (7.5YR 5/6) loam; common, medium, distinct, gray (10YR 6/1) and light brownish-gray (10YR 6/2) mottles; moderate, medium, subangular blocky structure; firm, compact and brittle; few patchy clay films; few fine voids; few, soft, brownish-black concretions and stains; few fine roots; strongly acid; gradual, smooth boundary.

IIBx3—40 to 55 inches, mottled yellowish-red (5YR 4/6), strong-brown (7.5YR 5/6), and gray (10YR 6/1) loam; moderate, medium, subangular blocky structure; firm, compact and brittle; few patchy clay films; few, medium, soft, brownish-black concretions and stains; few fine voids; few fine roots; strongly acid; gradual, smooth boundary.

IIBx4—55 to 60 inches, red (2.5YR 4/6) sandy clay loam; common, coarse, prominent, gray (10YR 6/1) mottles and coarse, distinct, yellowish-brown (10YR 5/6) mottles; moderate, medium, angular and subangular blocky structure; firm, compact and brittle; few patchy clay films; few fine voids; strongly acid.

The A horizon is grayish brown, brown, dark brown, yellowish brown, and in some severely eroded areas, reddish brown, and is 2 to 6 inches thick. The B2t horizon is yellowish red, yellowish brown, reddish brown, strong brown, or brown silt loam and silty clay loam. Depth to the fragipan is 16 to 30 inches. The Bx horizon is yellowish red, red, or strong brown mottled in shades of gray, red, and brown. The Bx horizon is silt loam or silty clay loam, and the IIBx horizon is loam or sandy clay loam. In some profiles the Bx horizon is underlain by clay or silty clay. Reaction ranges from strongly acid to very strongly acid throughout the profile.

The Providence soils are associated with Bude, Frizzell, Tippah, and Wilcox soils. They are better drained than the somewhat poorly drained Bude and Wilcox soils. They have a more clayey B horizon than Frizzell soils and a fragipan, which Frizzell and Tippah soils do not have.

Providence silt loam, 2 to 5 percent slopes (PrB).—This soil is moderately well drained and has a fragipan. It occurs on ridgetops. This soil has the profile described as representative for the series.

Permeability is moderately slow, and available water capacity is medium. Runoff is slow, and the hazard of erosion is moderate. This soil crusts and packs if left bare, and a plowpan forms unless the depth of plowing is varied. Reaction is strongly acid or very strongly acid.

Included with this soil in mapping are small areas of Atwood and Tippah soils.

Most of this acreage is used for row crops or pasture. A small acreage is wooded. Cotton, corn, soybeans, small grain, truck crops, pasture plants, loblolly and shortleaf pines, and adapted hardwood trees are suited. Row crops can be grown continuously under good management that includes terraces, contour tillage, vegetated waterways, and the return of crop residue. Capability unit IIe–2; woodland group 3o7.

Providence silt loam, 2 to 5 percent slopes, eroded (PrB2).—This soil is moderately well drained and has a fragipan. It occurs on ridgetops. The surface layer is yellowish-brown silt loam about 4 inches thick. The subsoil is yellowish-red silty clay loam to a depth of about 18 inches. Below this is a fragipan of strong-brown loam. This soil has many rills and an occasional shallow gully. In parts of some fields, the subsoil has been exposed by erosion.

Permeability is moderately slow, and available water capacity is medium. Runoff is medium, and the hazard of erosion is moderate where the soil is cultivated. Reaction is strongly acid or very strongly acid.

Included in mapping are small areas of Atwood and Tippah soils.

Most of the acreage is used for row crops or pasture. A small acreage is wooded. Cotton, corn, soybeans, small grain, pasture plants, loblolly and shortleaf pines, and adapted hardwood trees are suited. Row crops can be grown continuously under good management that includes terraces, contour tillage, vegetated waterways, and the return of crop residue. Capability unit IIe–2; woodland group 3o7.

Providence silt loam, 5 to 8 percent slopes, eroded (PrC2).—This soil is moderately well drained and has a fragipan. It occurs on ridgetops and side slopes. This mapping unit has many rills and an occasional shallow gully. The surface layer is reddish-brown silt loam about 3 inches thick. The subsoil is yellowish-red silty clay loam. The fragipan occurs at a depth of about 18 inches and is yellowish-red loam that has grayish mottles.

Permeability is moderately slow, and available water capacity is medium. Runoff is medium, and where the soil is cultivated, the hazard of erosion is severe. Reaction is strongly acid or very strongly acid.

Included with this soil in mapping are small areas of Providence, heavy substratum, and Tippah soils.

Most of the acreage is used for pasture and woodland. A few small areas are used for growing crops. Cotton, corn, soybeans, small grain, pasture plants (fig. 6), loblolly and shortleaf pines, and adapted hardwood trees are well suited. If this soil is used for row crops, management should include terraces, contour tillage, vegetated waterways, close-growing crops, and the return of crop residue. Capability unit IIIe–2; woodland group 3o7.

Providence silt loam, 8 to 12 percent slopes, severely eroded (PrD3).—This soil is moderately well drained and has a fragipan. It occurs on hillsides. The areas are dissected by rills, shallow gullies, and a few deep gullies. The surface layer is reddish-brown silt loam about 2 inches thick. The subsoil is yellowish-red silty clay loam that is underlain by a fragipan at a depth of about 16 inches.

Permeability is moderately slow, and available water capacity is medium. Runoff is rapid, and where the soil is cultivated, the hazard of erosion is severe. Reaction is strongly acid or very strongly acid.

Included with this soil in mapping are small areas of Atwood; Providence, heavy substratum; and Ruston soils.

Most of the acreage is wooded but a few small areas are used for pasture. This soil is best suited to pasture and woodland. Pasture plants, loblolly and shortleaf pines, and adapted hardwood trees are suited. Because of the severe hazard of erosion and steep slopes, permanent vegetation should be grown on this soil. Capability unit VIe–1; woodland group 3o7.

Providence silt loam, heavy substratum, 2 to 5 percent slopes (PsB).—This soil is moderately well drained and has a fragipan. It occurs on ridgetops. The surface layer is brown silt loam about 5 inches thick. The subsoil is yellowish-red silty clay loam underlain, at a depth of about 24 inches, by a silt loam fragipan mottled with red, yellow, gray, and brown. Below a depth of about 39 inches is clay mottled with red, brown, and gray.

Permeability is moderately slow, and available water capacity is moderate. Runoff is medium, and where the soil is cultivated, the hazard of erosion is moderate. The soil cursts and packs if left bare. Reaction is strongly acid or very strongly acid.

Included with this soil in mapping are small areas of Falkner, Providence, Tippah, and Wilcox soils.

Most of the acreage is used for row crops or pasture. A small acreage is wooded. Cotton, corn, soybeans, small grain, truck crops, pasture plants, loblolly and shortleaf pines, and adapted species of hardwoods are suited. Row crops can be grown continuously under good management that includes terraces, contour tillage, vegetated waterways, and the return of crop residue. Capability unit IIe–2; woodland group 3o7.

Providence silt loam, heavy substratum, 2 to 5 percent slopes, eroded (PsB2).—This soil is moderately well drained and has a fragipan. It occurs on ridgetops. The

Figure 6.—**Cattle grazing Coastal bermudagrass on Providence silt loam, 5 to 8 percent slopes, eroded. Pond in background furnishes water for livestock, fishing, and irrigation.**

surface layer is yellowish-brown silt loam about 4 inches thick. The subsoil is yellowish-red silty clay loam that is underlain, at a depth of about 20 inches, by a loam fragipan mottled with shades of red, brown, yellow, and gray. The fragipan is underlain by silty clay at a depth of about 40 inches.

Permeability is moderately slow, and available water capacity is medium. Runoff is medium, and where the soil is cultivated, the hazard of erosion is moderate. Reaction is strongly acid or very strongly acid.

Included with this soil in mapping are small areas of Falkner, Providence, Tippah, and Wilcox soils.

Most of the acreage is cultivated or used for pasture. A small acreage is wooded. Cotton, corn, soybeans, small grain, pasture plants, loblolly and shortleaf pines, and adapted hardwood species are suited. Row crops can be grown continuously with good management that includes terraces, contour tillage, vegetated waterways, and the return of crop residue. Capability unit IIe–2; woodland group 3o7.

Providence silt loam, heavy substratum, 5 to 8 percent slopes (PsC).—This soil is moderately well drained and has a fragipan. It occurs on ridgetops and side slopes. The surface layer is brown silt loam about 6 inches thick. The subsoil is yellowish-red silty clay loam. The fragipan is at a depth of about 18 inches and is yellowish-red loam mottled with gray. The fragipan is underlain by gray silty clay at a depth of about 40 inches.

Permeability is moderately slow, and available water capacity is medium. Runoff is medium, and the hazard of erosion is slight, but where the soil is cultivated, the erosion hazard is severe. This soil crusts and packs if left bare. Reaction is strongly acid or very strongly acid.

Include with this soil in mapping are small areas of Falkner, Providence, Tippah, and Wilcox soils.

Most of the acreage is used for growing crops or pasture. A small acreage is wooded. Cotton, corn, soybeans, small grain, pasture plants, loblolly and shortleaf pines, and adapted species of hardwoods are suited. If this soil is used for row crops, management should include terraces, vegetated waterways, contour tillage, close-growing crops, and the return of crop residue. Capability unit IIIe–2; woodland group 3o7.

Providence silt loam, heavy substratum, 5 to 8 percent slopes, eroded (PsC2).—This soil is moderately well drained and has a fragipan. It occurs on ridgetops and side slopes. Areas of this mapping unit contain many rills and few shallow gullies. The surface layer is mixed-brown and yellowish-brown silt loam about 4 inches thick. The subsoil is yellowish-red silty clay loam. The fragipan, at a depth of about 18 inches, is mottled red, brown, and gray silt loam. This is underlain by red, brown, and gray silty clay at a depth of about 37 inches.

Permeability is moderately slow, and available water capacity is medium. Runoff is medium, and where the soil is cultivated, the hazard of erosion is severe. The soil crusts and packs if left bare. Reaction is strongly acid or very strongly acid.

Included with this soil in mapping are small areas of Providence, Tippah, and Wilcox soils.

Most of the acreage is cultivated or used for pasture. A small acreage is wooded. Cotton, corn, soybeans, small grain, pasture plants, loblolly and shortleaf pines, and adapted hardwood species are suited. Where this soil is used for row crops, management should include terraces, vegetated waterways, contour tillage, close-growing crops, and the return of crop residue. Capability unit IIIe–2; woodland group 3o7.

Providence silt loam, heavy substratum, 8 to 12 percent slopes, eroded (PsD2).—This soil is moderately well drained and has a fragipan. It is strongly sloping and is cut by many rills and a few shallow gullies. The surface layer is yellowish-brown silt loam about 3 inches thick. The subsoil is yellowish-red silty clay loam. The fragipan is at a depth of about 18 inches; it is yellowish-red silt loam that has brownish and grayish mottles. Underlying the fragipan, at a depth of about 37 inches, is yellowish-red silty clay.

Permeability is moderately slow, and available water capacity is medium. Runoff is rapid, and where the soil is cultivated, the hazard of erosion is severe. Reaction is strongly acid or very strongly acid.

Included with this soil in mapping are small areas of Tippah and Wilcox soils.

Most of the acreage is used for pasture and woodland. A small acreage is used for growing crops. This soil is best suited to pasture and woodland. Pasture plants, loblolly and shortleaf pines, and adapted hardwood species are suited. If this soil is used for row crops, management should include terraces, contour tillage, vegetated waterways, close-growing crops, and the return of crop residue. Capability unit IVe–2; woodland group 3o7.

Providence-Gullied land complex, 17 to 30 percent slopes (PuE).—This mapping unit is on side slopes and in many areas is gullied. The unit consists of Providence soils and Gullied land in such intricate patterns it is impractical to map them separately. Providence soils make up about 40 percent of the complex, and Gullied land about 10 percent. The remaining 50 percent is made up of Atwood, Ruston, and other similar soils that have a thick loamy sand surface layer.

The moderately well drained Providence soils have a surface layer that is brown silt loam about 2 inches thick and a subsoil of yellowish-red silty clay loam. At a depth of about 18 inches there is a fragipan mottled in shades of red, yellow, brown, and gray.

Permeability is moderately slow, and available water capacity is medium. Runoff is rapid, and the hazard of erosion is very severe. Reaction is strongly acid or very strongly acid.

The Gullied land ranges from silt loam to silty clay loam in texture and is strongly acid and very strongly acid in reaction. Runoff is rapid, and available water capacity is low.

Most of this mapping unit is wooded, but a few small areas are used for pasture. Loblolly pine is suited. Capability unit VIIe–5; not assigned to a woodland group.

Robinsonville Series

The Robinsonville series consists of well-drained soils that formed in loamy material on flood plains. Slopes are 0 to 2 percent.

In a representative profile the surface layer is dark yellowish-brown sandy loam about 7 inches thick. Below

this is dark yellowish-brown sandy loam about 7 inches thick. The next layer is dark yellowish-brown sandy loam that is mottled with yellowish brown and reaches to a depth of about 20 inches. Below this is dark yellowish-brown loam mottled with shades of brown and yellow. At a depth of about 32 inches is mottled dark yellowish-brown, yellowish-brown, and light brownish-gray sandy loam. Below a depth of 50 inches is clay loam mottled with shades of brown and gray.

Representative profile of Robinsonville sandy loam in a cultivated field 1¼ miles southeast of Longview, in the NE corner of NW¼ sec. 33, T. 9 S., R 4 E.:

Ap—0 to 7 inches, dark yellowish-brown (10YR 4/4) sandy loam; weak, fine and medium, granular structure; very friable; few fine roots; slightly acid; abrupt, smooth boundary.

C1—7 to 14 inches, dark yellowish-brown (10YR 4/4) sandy loam; structureless; very friable; thin bedding planes; few fine roots; slightly acid; clear, smooth boundary.

C2—14 to 20 inches, dark yellowish-brown (10YR 4/4) sandy loam; common, medium, faint, yellowish-brown (10YR 5/4) mottles and a few, fine and medium, distinct, pale-brown mottles; structureless; very friable; thin bedding planes; few fine roots; slightly acid; gradual, smooth boundary.

C3—20 to 32 inches, dark yellowish-brown (10YR 4/4) loam; many, medium, faint, yellowish-brown (10YR 5/4), brownish-yellow (10YR 6/6), and light yellowish-brown (10YR 6/4) mottles; structureless; friable; few fine roots; few, fine, black concretions; slightly acid; gradual, smooth boundary.

C4—32 to 50 inches, mottled dark yellowish-brown (10YR 4/4), yellowish-brown (10YR 5/6), and light brownish-gray (10YR 6/2) sandy loam; structureless; friable; few fine roots; few, fine, dark-brown and black concretions; few, medium, dark-brown and black stains; slightly acid; gradual, smooth boundary.

C5—50 to 62 inches, mottled yellowish-brown (10YR 5/4), light brownish-gray (10YR 6/2), and dark-brown (7.5YR 4/4) clay loam; massive; friable; few, small, dark-brown and black concretions; few, medium, dark-brown and black stains; slightly acid.

The Ap horizon is dark yellowish-brown, yellowish-brown, and brown sandy loam, loam, and silt loam. The C horizon is yellowish-brown, dark yellowish-brown, and is mottled in shades of brown and gray. Below a depth of 20 inches there are few to many gray mottles in some profiles. The C horizon is sandy loam, loam, and silt loam. In some places clay loam is below a depth of 50 inches. Reaction ranges from slightly acid to mildly alkaline. At a depth of 10 to 40 inches the content of clay ranges from 5 to 18 percent, and content of sand that is coarser than very fine sand is more than 15 percent.

Robinsonville soils are associated with Catalpa, Chewacla, Commerce, and Marietta soils. They are better drained and have less clay than the associated soils. They do not have the developed B horizon and the thick, dark-colored A horizon of the Catalpa soils. They have less silt at a depth of 10 to 40 inches than Commerce soils.

Robinsonville sandy loam (Ro).—This is a well-drained soil along the channels of larger streams. Slopes are 0 to 2 percent.

Permeability is moderately rapid, and available water capacity is medium to high. Runoff is slow. This soil is subject to an occasional overflow of short duration. Reaction is slightly acid to mildly alkaline.

Included with this soil in mapping are small areas of Mantachie, Marietta, and Ochlockonee soils.

Most of the acreage is cultivated or used for pasture. A small acreage is wooded. Cotton, corn, soybeans, truck crops, pasture plants, and adapted hardwood species are well suited. Row crops can be grown continuously on this soil under management that includes drainage by V-ditches and W-ditches, row arrangement, and return of crop residue. Capability unit IIw–3; woodland group 1o4.

Rosebloom Series

The Rosebloom series consists of poorly drained soils on stream flood plains. These soils formed in loamy material that is high in content of silt. Slopes are 0 to 2 percent.

In a representative profile the surface layer is dark-gray and grayish-brown silt loam about 8 inches thick that is mottled with yellowish brown and brown in the lower part. The subsoil extends to a depth of 60 inches or more and is gray silt loam mottled with shades of brown, yellow, and gray.

Representative profile of Rosebloom silt loam in a pasture half a mile south of cotton gin and 120 yards east of paved county road, NW¼SE¼ sec. 36, T. 8 S., R. 1 E.:

Ap1—0 to 2 inches, dark-gray (10YR 4/1) silt loam; weak, fine, granular structure; very friable; common brown and yellowish-brown root stains; common fine roots; very strongly acid; abrupt, wavy boundary.

Ap2—2 to 8 inches, grayish-brown (10YR 5/2) silt loam; many, medium, distinct, dark yellowish-brown (10YR 3/4) and brown (10YR 4/3) mottles; weak, fine, granular structure; very friable; few fine roots; very strongly acid; abrupt, wavy boundary.

B21g—8 to 17 inches, gray (10YR 6/1) silt loam; many, medium, distinct, brown (10YR 4/3) and dark yellowish-brown (10YR 3/4) mottles; weak, fine and medium, subangular blocky structure; friable; few black concretions; few fine roots; very strongly acid; gradual, smooth boundary.

B22g—17 to 31 inches, gray (10YR 6/1) silt loam; common, medium, distinct, brown (10YR 4/3), yellowish-brown (10YR 5/4), and pale-brown (10YR 6/3) mottles; weak, medium, subangular blocky structure; friable; few black and brown concretion; few fine roots; very strongly acid; clear, smooth boundary.

B23g—31 to 38 inches, gray (10YR 5/1) silt loam; few, medium, distinct, yellowish-brown (10YR 5/6), brown (10YR 5/3), and pale-brown (10YR 6/3) mottles; moderate, medium, subangular blocky structure; friable; few black and brown concretions; few fine roots; very strongly acid; gradual, smooth boundary.

B24g—38 to 50 inches, gray (10YR 6/1) silt loam; common, medium, distinct, yellowish-brown (10YR 5/6), brownish-yellow (10YR 6/6), and brown (10YR 5/3) mottles; moderate, medium, subangular blocky structure; friable; few black and brown concretions; few fine roots; very strongly acid; gradual, smooth boundary.

B25g—50 to 60 inches, gray (10YR 6/1) silt loam; common, medium, distinct, yellowish-brown (10YR 5/6), brownish-yellow (10YR 6/6), and brown (10YR 5/3) mottles; moderate, medium, subangular blocky structure; friable; few black and brown concretions; very strongly acid.

The Ap horizon is gray to dark gray or grayish brown and has few to many mottles in shades of brown and yellow. The B horizon is gray and dark-gray silt loam to silty clay loam. Shades of brown and yellow mottles range from a few to many. Some profiles have black and brown concretions that range from few to many. The content of clay in the upper part of the B horizon is 18 to 30 percent, and content of sand coarser than very fine sand is less than 15 percent.

Rosebloom soils are associated with Arkabutla, Cascilla, Falaya, and Urbo soils. They are more poorly drained and

are grayer in the upper part of the B horizon than the associated soils. They have more clay in the B horizon than Falaya soils, but less than Urbo soils.

Rosebloom silt loam (Rs).—This soil is poorly drained. It occurs on stream flood plains in slack water areas. Slopes are 0 to 2 percent.

Permeability is slow, and the available water capacity is very high. Runoff is slow, and where the soil is cultivated, there is a severe hazard of ponding. Cultivation is often delayed in spring because of wetness and overflow. Reaction is very strongly acid.

Included with this soil in mapping are small areas of Arkabutla, Falaya, and Urbo soils.

Most of the acreage is cultivated or used for pasture. A few areas are wooded. Cotton, corn, soybeans, pasture plants, loblolly pine, and adapted hardwood species are suited. Row crops can be grown continuously under good management that includes drainage by V-ditches and W-ditches, row arrangement, close-growing crops, and return of crop residue. Capability unit IIIw-5; woodland group 2w9.

Ruston Series

The Ruston series consists of well-drained soils on uplands. These soils formed in loamy material on side slopes. Slopes are 12 to 30 percent.

In a representative profile the surface layer is brown sandy loam about 5 inches thick. The upper part of the subsoil is strong-brown and yellowish-red loam to a depth of about 20 inches. This grades to a yellowish-red sandy loam layer about 12 inches thick. Below this is a yellowish-red loamy sand layer about 9 inches thick. This is underlain by red and yellowish-red sandy loam and sandy clay loam that is mottled with red, brown, and yellow in the lower part.

Representative profile of Ruston sandy loam in an area of Ruston and Cahaba sandy loams in a pasture, three-fourths of a mile northwest of junction of county road and Mississippi Highway No. 9 near a cemetery, one-fourth mile north of house site, SW¼NE¼NE¼ sec. 10, T. 9 S., R. 3 E.:

Ap—0 to 5 inches, brown (10YR 5/3) sandy loam; weak, fine, granular structure; very friable; common fine roots; few dark grayish-brown worm casts; strongly acid; abrupt, smooth boundary.

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

B21t—9 to 15 inches, yellowish-red (5YR 4/6) loam; moderate, medium, subangular blocky structure; friable, slightly plastic; nearly continuous clay films; few fine roots; strongly acid; gradual, smooth boundary.

B22t—15 to 20 inches, yellowish-red (5YR 4/6) loam; moderate, medium, subangular blocky structure; friable, slightly plastic; few, thin, patchy clay films and clay bridging of sand grains; few fine roots; strongly acid; gradual, smooth boundary.

B23t—20 to 32 inches, yellowish-red (5YR 4/6) sandy loam; moderate, medium, subangular blocky structure; friable; clay bridging of sand grains; few fine roots; very strongly acid; clear, smooth boundary.

A′2—32 to 41 inches, yellowish-red (5YR 4/6) loamy sand; weak, fine, subangular blocky structure; loose; very strongly acid; clear, smooth boundary.

B′21t—41 to 47 inches, red (2.5YR 4/6) sandy clay loam; weak, medium, subangular blocky structure; friable; clay bridging of sand grains; very strongly acid; gradual, smooth boundary.

B′22t—47 to 60 inches, yellowish-red (5YR 4/6) sandy loam; common, medium, faint, red (2.5YR 4/6) and strong-brown (7.5YR 5/6) mottles and few, medium, distinct, brownish-yellow (10YR 6/6) mottles; weak, medium, subangular blocky structure; friable, slightly plastic; clay bridging of sand grains; very strongly acid.

The Ap horizon is brown, reddish brown, yellowish brown, or grayish brown and 4 to 5 inches thick. The B2t and B2t horizons are yellowish-red and red sandy clay loam, sandy loam, loam, or clay loam. The A′2 horizon is yellowish-red or strong-brown loamy sand to sandy loam mottled with shades of brown. Clay content of the upper 20 inches of the Bt horizon is 18 to 30 percent, and sand content coarser than very fine sand is more than 15 percent. Reaction is strongly acid or very strongly acid.

Ruston soils are associated with Atwood, Cahaba, Oktibbeha, and Ora soils. They have less silt in the upper part of the Bt horizon than Atwood soils. They have a thicker solum than Cahaba soils and less clay in the Bt horizon than Oktibbeha soils. In contrast with Ora soils, they do not have a fragipan.

Ruston and Cahaba sandy loams, 17 to 30 percent slopes (RuE).—This mapping unit consists of well-drained Ruston and Cahaba soils on uplands. These soils occur in no regular pattern. Some areas consist of either Ruston or Cahaba soils, but most areas contain both soils. Ruston soils make up about 39 percent of this unit, and Cahaba soils about 20 percent. The remaining 41 percent is made up of Atwood, Ora, and similar soils that have a thick surface layer of loamy sand.

The Ruston soil has a brown sandy loam surface layer about 4 inches thick and a yellowish-red loam subsoil reaching to a depth of more than 60 inches. Permeability is moderate, and available water capacity is medium to high. Runoff is rapid. Reaction is strongly acid or very strongly acid.

The Cahaba soil has the profile described as representative for the series. Permeability is moderate, and available water capacity is medium. Runoff is rapid. Reaction is very strongly acid.

Most of the acreage is wooded. Because of steep slopes and the severe hazard of erosion, these soils are best suited to trees and permanent vegetation. Loblolly and shortleaf pines are suited. Capability unit VIIe-1; woodland group 3o1.

Ruston and Cahaba sandy loams, 12 to 30 percent slopes, eroded (RuE2).—In this mapping unit are well-drained Ruston and Cahaba soils of the uplands. These soils have a surface layer that has been thinned by sheet erosion. They have many rills, frequent shallow gullies, and an occasional deep gully. Erosion generally is active. The soils occur in no regular pattern. Some areas consist of either Ruston or Cahaba soils, but most areas contain both soils. Ruston and Cahaba soils make up about 54 percent of this unit. The remaining 46 percent is made up of Atwood, Mantachie, Ochlockonee, Ora, and similar soils that have a thick loamy sand surface layer.

The Ruston soil has the profile described as representative for its series. Permeability is moderate, and available water capacity is medium to high. Runoff is rapid. Reaction is strongly acid or very strongly acid.

The Cahaba soil has a brown sandy loam surface layer about 4 inches thick. The subsoil is yellowish-red loam to a depth of about 40 inches. This is underlain by yellow-

ish-red loamy sand. Permeability is moderate, and available water capacity is medium. Runoff is rapid. Reaction is very strongly acid.

The soils in this mapping unit are mostly wooded. Because of steep slopes and the severe hazard of erosion, these soils are best suited to trees and permanent vegetation (fig. 7). Loblolly and shortleaf pines are suited. Capability unit VIIe–1; woodland group 3o1.

Tippah Series

The Tippah series consists of moderately well drained soils on uplands. These soils formed in a mantle of loamy material high in content of silt and in underlying clayey materials. Slopes range from 2 to 30 percent.

In a representative profile, the surface layer is yellowish-brown silt loam about 6 inches thick. The upper part of the subsoil is yellowish-red silty clay loam that has pale-brown and light brownish-gray mottles in the lower part. Below a depth of about 31 inches the subsoil is red silty clay loam and silty clay that is mottled with light brownish gray and gray. This is underlain at a depth of about 44 inches by mottled red, gray, and pale-brown clay.

Representative profile of Tippah silt loam, 2 to 5 percent slopes, in an idle field 13 miles west of Pontotoc on Mississippi Highway No. 6, half a mile south of rural road and 150 feet into the field, SW¼SW¼ sec. 18, T. 9 S., R. 1 E.:

Ap—0 to 6 inches, yellowish-brown (10YR 5/6) silt loam; weak, fine, granular structure; friable; few fine roots; strongly acid; abrupt, smooth boundary.

B21t—6 to 15 inches, yellowish-red (5YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; friable, slightly plastic; few fine roots; few patchy clay films; strongly acid; gradual, smooth boundary.

B22t—15 to 25 inches, yellowish-red (5YR 4/6) silty clay loam; few, fine, distinct, pale-brown mottles; moderate, medium, subangular blocky structure; friable; few fine roots; few patchy clay films; common, medium, soft, black and brown concretions and stains; strongly acid; gradual, smooth boundary.

B23t—25 to 31 inches, yellowish-red (5YR 4/6) silty clay loam; few, fine, prominent, light brownish-gray mottles; moderate, medium, subangular blocky structure; friable; few fine roots; continuous clay films; few, fine, soft, black concretions; strongly acid; clear, smooth boundary.

IIB24t—31 to 37 inches, red (2.5YR 4/6) silty clay loam; common, medium, prominent, light brownish-gray (10YR 6/2) and gray (10YR 6/1) mottles; moderate,

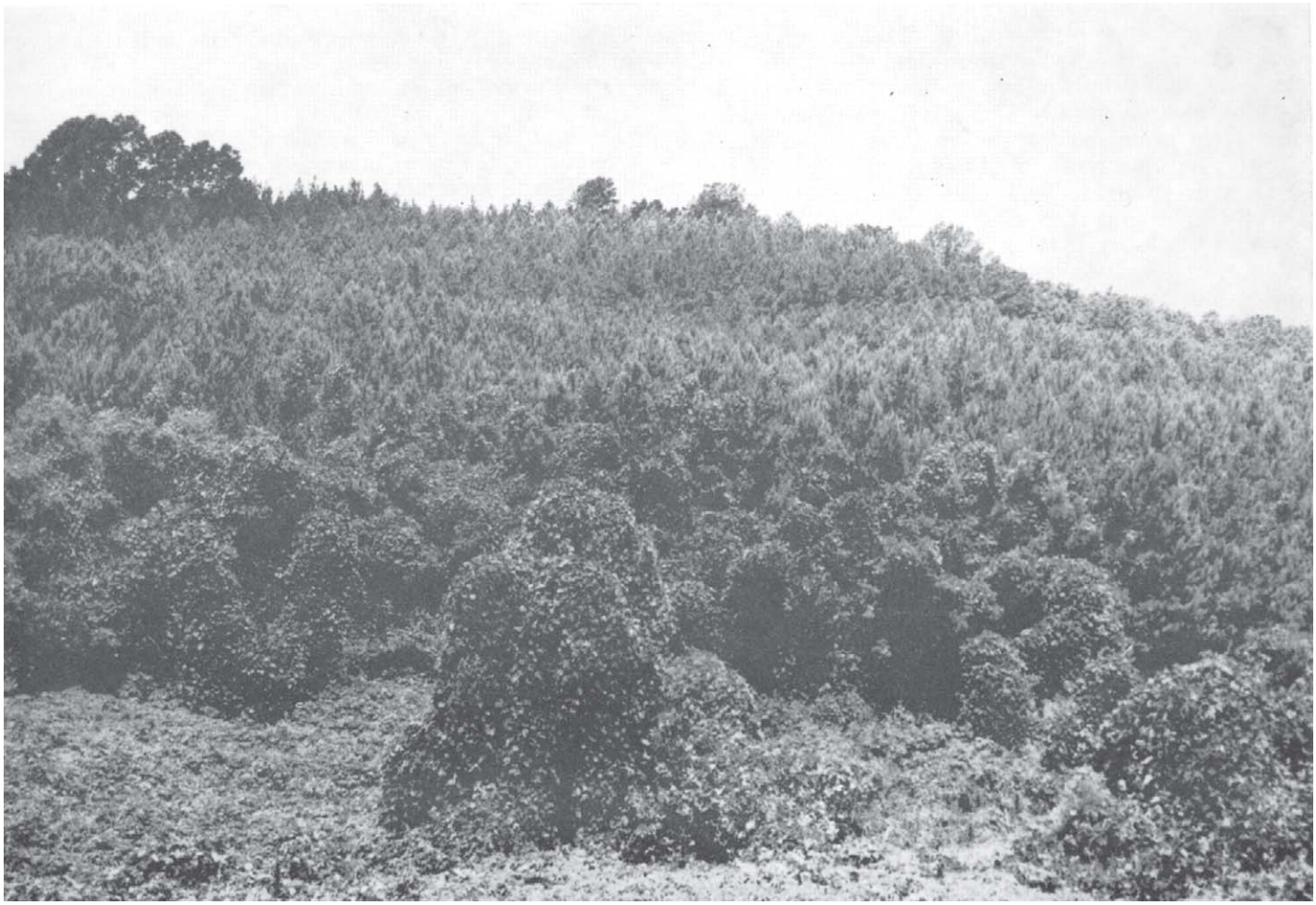

Figure 7.—**Loblolly pine and kudzu planted on Ruston and Cahaba sandy loams, 12 to 30 percent slopes, eroded.**

medium, subangular blocky structure; firm, plastic; continuous clay films; very strongly acid; gradual, smooth boundary.

IIB25t—37 to 44 inches, red (2.5YR 4/6) silty clay; common, fine, prominent, gray and light brownish-gray mottles; moderate, medium, subangular blocky structure; firm, plastic; continuous clay films; very strongly acid; clear, smooth boundary.

IIB26t—44 to 60 inches, mottled red (2.5YR 4/6), gray (10YR 6/1), and pale-brown (10YR 6/3) clay; moderate, medium, subangular blocky structure; firm, plastic; continuous clay films; very strongly acid.

The Ap horizon is dark yellowish brown, yellowish brown, brown, or grayish brown and 4 to 6 inches thick. The B2t horizon is yellowish red, strong brown, and yellowish brown mottled with shades of gray and brown. Texture is silt loam and silty clay loam. The IIB2t horizon is mottled in shades of red, brown, yellow, and gray or has a matrix that is red or yellowish red mottled with shades of gray and brown. Texture is silty clay loam, silty clay, or clay.

Silty clay or clay is at a depth of about 30 to 40 inches. The clay content increases with depth. Clay content of the upper 20 inches of the Bt horizon is from 20 to 30 percent, and content of sand coarser than very fine sand is less than 15 percent. Reaction ranges from strongly acid to very strongly acid throughout the profile.

Tippah soils are associated with Falkner, Providence, and Wilcox soils. They are better drained than Falkner soils and do not have gray mottles in the upper part of its Bt horizon. Unlike the Providence soils, they do not have a fragipan. They have less clay in the upper part of the Bt horizon than Wilcox soils.

Tippah silt loam, 2 to 5 percent slopes (TpB).—This soil is moderately well drained and occurs on ridgetops. It has the profile described as representative for the series. Permeability is slow, and available water capacity is high to very high. Runoff is slow, and the erosion hazard is moderate where the soil is cultivated. Reaction is strongly acid or very strongly acid. This soil crusts and packs if left bare.

Included in mapping are small areas of Falkner, Providence, and Wilcox soils.

Most areas of this soil are cultivated or used for pasture. A small acreage is wooded. Cotton, corn, soybeans, small grain, truck crops, pasture plants, loblolly and shortleaf pines, and adapted species of hardwoods are suited. Management for row crops should include terraces, contour tillage, and the return of crop residue. Capability unit IIe–2; woodland group 3o7.

Tippah silt loam, 5 to 8 percent slopes (TpC).—This soil is moderately well drained. It is on ridgetops and side slopes. The surface layer is brown silt loam about 6 inches thick, and the upper part of the subsoil is yellowish-red silty clay loam. This is underlain at a depth of about 30 inches by silty clay mottled with shades of red, yellow, brown, and gray. Permeability is slow, and available water capacity is high to very high. Runoff is medium, and the erosion hazard is severe where the soil is cultivated. Reaction is strongly acid and very strongly acid. This soil crusts and packs if left bare.

Included in mapping are small areas of Falkner, Providence, and Wilcox soils.

Most of the acreage is used for row crops or pasture. A small acreage is wooded. Cotton, corn, soybeans, small grain, pasture plants, loblolly and shortleaf pines, and adapted species of hardwoods are suited. Management for row crops should include terraces, contour tillage, vegetated waterways, close-growing crops, and the return of crop residue. Capability unit IIIe–3; woodland group 3o7.

Tippah-Providence-Wilcox association, hilly (TWE).—This mapping unit consists of somewhat poorly drained and moderately well drained soils on uplands. Slopes are 8 to 30 percent. The landscape consists of long, narrow ridges and long, wide, irregularly shaped side slopes dissected by many short drainageways. About half of the acreage is eroded. The composition of this unit is more variable than that of most other units in the survey area but has been controlled well enough to permit interpretations for the expected uses of the soils.

This mapping unit is about 40 percent Tippah soils, 25 percent Providence soils, and 15 percent Wilcox soils. The remaining 20 percent is composed of Cahaba, Ruston, and similar soils that have a thick loamy sand surface layer.

The moderately well drained Tippah soils are mostly on the lower two-thirds of the slopes. The surface layer is brown silt loam about 4 inches thick, and the subsoil is yellowish-red silty clay loam. Silty clay mottled with red, yellow, brown, and gray is at a depth of about 40 inches. Permeability is slow, and available water capacity is high to very high. Runoff is medium to rapid. Reaction is strongly acid and very strongly acid.

The moderately well drained Providence soils are on ridgetops and the upper third of the side slopes. The surface layer is brown silt loam about 4 inches thick, and the subsoil is yellowish-red silty clay loam. A compact fragipan is at a depth of about 20 inches. Permeability is moderately slow, and available water capacity is medium. Runoff is medium to rapid. Reaction is strongly acid and very strongly acid.

The somewhat poorly drained Wilcox soils are mostly on the lower third of the slopes. The surface layer is dark yellowish-brown silty clay loam about 6 inches thick. The subsoil, to a depth of about 11 inches, is yellowish-red silty clay. It is underlain by silty clay mottled with shades of red, yellow, brown, and gray. Permeability is very slow, and the available water capacity is high to very high. Runoff is medium to rapid. Reaction is strongly acid and very strongly acid.

Most of this mapping unit is wooded. Loblolly and shortleaf pines and adapted species of hardwoods are suited. Because of steep slopes and the erosion hazard, permanent vegetation should be maintained on these soils. Capability unit VIIe–3; Tippah and Providence soils in woodland group 3o7; Wilcox soil in group 3c2.

Urbo Series

The Urbo series consists of somewhat poorly drained soils that formed in clayey material on stream flood plains. Slopes are 0 to 2 percent.

In a representative profile the surface layer is dark grayish-brown and grayish-brown silty clay loam about 9 inches thick. The subsoil is grayish-brown silty clay that has dark yellowish-brown, strong-brown, dark grayish-brown, and yellowish-red mottles to a depth of more than 71 inches.

Representative profile of Urbo silty clay loam in a meadow 6 miles west of Pontotoc, on Mississippi High-

way No. 6, in Mud Creek flood plain, one-tenth of a mile north of highway, NW¼NW¼ sec. 28, T. 9 S., R. 2 E.:

Ap—0 to 5 inches, dark grayish-brown (10YR 4/2) silty clay loam; common, fine, faint, grayish-brown mottles; weak, fine, granular structure; friable, slightly plastic; few fine roots; few, fine, black concretions; strongly acid; abrupt, smooth boundary.

A1—5 to 9 inches, grayish-brown (2.5Y 5/2) silty clay loam; common, fine, faint, dark grayish-brown mottles; weak, fine and medium, subangular blocky structure; friable, plastic, slightly sticky; few fine roots; few, fine, black and brown concretions; very strongly acid; clear, smooth boundary.

B21g—9 to 18 inches, grayish-brown (2.5Y 5/2) silty clay; common, fine, faint, dark grayish-brown mottles; weak, medium, prismatic structure parting to moderate, fine and medium, angular and subangular blocky; firm, very plastic, sticky; few fine roots; few pressure faces on peds; common, fine, black and brown concretions; very strongly acid; clear, smooth boundary.

B22g—18 to 29 inches, grayish-brown (2.5Y 5/2) silty clay; common, fine, faint, dark grayish-brown mottles and few, fine, distinct, dark yellowish-brown mottles; weak, medium, prismatic structure parting to moderate, fine and medium, angular and subangular blocky; firm, very plastic, sticky; few fine roots; few pressure faces on peds; few, fine and medium, black and brown concretions; very strongly acid; clear, wavy boundary.

B23g—29 to 44 inches, grayish-brown (2.5Y 5/2) silty clay; common, fine, prominent, strong-brown and yellowish-red mottles; moderate, medium, prismatic structure parting to moderate, fine and medium, angular blocky; firm, very plastic, sticky; few fine roots; few thin pressure faces on peds; common, fine, red concretions and few, fine, black concretions; very strongly acid; gradual, wavy boundary.

B24g—44 to 71 inches, grayish-brown (2.5Y 5/2) silty clay; common, fine, distinct, strong-brown mottles; moderate, fine and medium, angular blocky; firm, very plastic, sticky; few fine roots; few pressure faces on peds; few slickensides that do not intersect; common, fine and medium, black and red concretions; very strongly acid.

The Ap horizon is brown to dark grayish brown. The upper part of the B2g horizon is grayish brown and has dark grayish-brown mottles or is mottled in shades of brown and gray. The lower part of the B2g horizon is grayish brown and has mottles with shades of brown, yellow, and red. Texture is silty clay loam and silty clay. Reaction ranges from strongly acid to very strongly acid throughout the profile. Content of clay at depths between 10 to 40 inches is 40 to 55 percent.

Urbo soils are associated with Arkabutla, Cascilla, Falaya, and Rosebloom soils. They have more clay between depths of 10 and 40 inches than the associated soils. They are not so well drained as Cascilla soils and are better drained than Rosebloom soils.

Urbo silty clay loam (Ur).—This soil is somewhat poorly drained and occurs on stream flood plains. Slopes are 0 to 2 percent.

Permeability is very slow, and available water capacity is high to very high. Runoff is slow, and there is a hazard from ponding and overflow of short duration where the soil is cultivated. This soil crusts and packs if left bare. Cultivation is often delayed because of wetness. Reaction is strongly acid and very strongly acid.

Included in mapping are small areas of Arkabutla, Mantachie, and Rosebloom soils.

Most of the acreage is cultivated or used for pasture. A small acreage is wooded. Cotton, corn, soybeans, pasture plants, loblolly pine, and adapted hardwood species are well suited. Row crops can be grown continuously under good management that includes V-ditches and W-ditches, row arrangement, and the return of crop residue. Capability unit IIw-5; woodland group 2w9.

Wilcox Series

The Wilcox series consists of somewhat poorly drained soils that formed in clayey material. Slopes are 2 to 30 percent.

In a representative profile the surface layer is dark yellowish-brown silty clay loam about 6 inches thick. The upper part of the subsoil is yellowish-red silty clay loam mottled with shades of gray and brown. At a depth of about 11 inches there is mottled red, gray, and brownish-gray silty clay. Below a depth of 16 inches and extending to a depth of about 44 inches is gray to grayish-brown silty clay mottled with shades of red, yellow, brown, and gray. This is underlain by silty clay mottled with shades of brown, yellow, and gray and containing about 30 percent soft shale.

Representative profile of Wilcox silty clay loam, 2 to 5 percent slopes, in a pasture 1 mile southwest of Springville on Mississippi Highway No. 9 and 50 feet south of the highway, SE¼SW¼ sec. 8, T. 10 S., R. 2 E.:

Ap—0 to 6 inches, dark yellowish-brown (10YR 4/4) silty clay loam; weak, fine, granular structure; friable, slightly plastic; many fine roots; strongly acid; abrupt, smooth boundary.

B21t—6 to 11 inches, yellowish-red (5YR 4/6) silty clay loam; many, fine, faint, strong-brown mottles and common, medium, distinct, yellowish-brown (10YR 5/4) and light brownish-gray (10YR 6/2) mottles; moderate, medium, subangular blocky structure; firm, slightly plastic; few fine roots; few patchy clay films; very strongly acid; gradual, smooth boundary.

B22t—11 to 16 inches, mottled red (2.5YR 4/6), gray (10YR 6/1), and light brownish-gray (10YR 6/2) silty clay; moderate, medium, subangular blocky structure; firm, plastic; few fine roots; few patchy clay films; very strongly acid; clear, wavy boundary.

B23tg—16 to 25 inches, gray (10YR 6/1) silty clay; common, fine, prominent, yellowish-red and strong-brown mottles; moderate, medium, angular and subangular blocky structure; firm, plastic; few fine roots; nearly continuous clay films; very strongly acid; gradual, wavy boundary.

B24tg—25 to 44 inches, grayish-brown (2.5Y 5/2) silty clay; common, fine, distinct, yellowish-brown and faint gray mottles; strong, medium, angular blocky structure; firm, plastic; nearly continuous clay films; a few slickensides that do not intersect; strongly acid; gradual, wavy boundary.

B25tg—44 to 50 inches, mottled grayish-brown (2.5Y 5/2), yellowish-brown (10YR 5/4), brownish-yellow (10YR 6/6), and gray (10YR 6/1) silty clay; strong, medium, angular blocky structure; firm, plastic; nearly continuous clay films; a few slickensides that do not intersect; very strongly acid; gradual, wavy boundary.

B3—50 to 60 inches, mottled grayish-brown (2.5Y 5/2), yellowish-brown (10YR 5/4), brownish-yellow (10YR 6/6), and gray (10YR 5/1) silty clay; strong, medium, angular blocky structure; firm, plastic; about 30 percent is soft shale; strongly acid.

The Ap horizon is dark yellowish brown, brown, dark brown, and dark grayish brown. Its texture is silt loam or silty clay loam. The upper part of the Bt horizon is yellowish red and has few to many gray, yellowish-brown, and light brownish-gray mottles, or it is mottled in shades of red, yellow, brown, and gray. Texture of this horizon is silty clay loam and silty clay. The lower part of the Bt horizon is

gray, light brownish-gray, or grayish-brown silty clay that has few to many brown, brownish-yellow, yellowish-brown, and grayish mottles. Soft shale is at depths between 30 to 55 inches. Content of clay in the upper 20 inches of the Bt horizon is from 40 to 50 percent, and silt content is 35 to 60 percent. Reaction is strongly acid or very strongly acid throughout the profile.

Wilcox soils are associated with Adaton, Mayhew, Providence, and Tippah soils. They have more clay in the upper 20 inches of the Bt horizon than Adaton, Providence, and Tippah soils. They are better drained and contain less gray in the upper part of the Bt horizon than Adaton and Mayhew soils. They do not have the fragipan of the Providence soils.

Wilcox silty clay loam, 2 to 5 percent slopes (WcB).—This is a somewhat poorly drained soil on ridgetops. It has the profile described as representative for the series.

Permeability is very slow, and available water capacity is high to very high. Runoff is slow, and the hazard of erosion is moderate where the soil is cultivated. This soil shrinks and cracks when dry and swells when wet. Reaction is strongly acid and very strongly acid.

Included in mapping are small areas of Falkner, Mayhew, and Tippah soils.

Most of the acreage is used for pasture. A small acreage is cultivated or wooded. Soybeans, pasture plants, and loblolly and shortleaf pines are suited. Management for row crops should include terraces, contour tillage, vegetated waterways, close-growing crops, and the return of crop residue. Capability unit IIIe–4; woodland group 3c2.

Wilcox silty clay loam, 5 to 8 percent slopes (WcC).—This is a somewhat poorly drained soil on ridgetops and hillsides. It has a brown silty clay loam surface layer about 6 inches thick. The subsoil is yellowish-red silty clay mottled with shades of red, brown, and gray at a depth of about 15 inches.

Permeability is very slow, and available water capacity is high to very high. Runoff is moderately rapid, and the hazard of erosion is severe where the soil is cultivated. This soil shrinks and cracks when dry and swells when wet. Reaction is strongly acid and very strongly acid.

Included in mapping are small areas of Falkner, Mayhew, and Tippah soils.

Most of the acreage is in pasture. A small acreage is cultivated or wooded. Pasture plants and loblolly and shortleaf pines are suited. Management for row crops should include terraces, contour tillage, vegetated waterways, close-growing crops, and the return of crop residue. Without adequate water disposal systems, this soil is best suited to pasture and woodland. Capability unit IVe–4; woodland group 3c2.

Use and Management of the Soils [2]

This section briefly describes the system of capability classification used by the Soil Conservation Service, discusses the use and management of the soils for crops and pasture, and gives the estimated yields of the principal crops for the county. In addition it discusses the use of soils for woodland, wildlife, town and country planning, and engineering.

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

Management for Crops and Pasture

Management practices that apply to most cropland soils in Pontotoc County are:

(1) Use of water-control measures, such as contouring, stripcropping, terraces, and grassed waterways on sloping land and adequate drainage on bottom land.
(2) Proper use of lime and fertilizer.
(3) Use of cropping systems that use crop residue to help control erosion, increase organic-matter content, improve soil tilth, increase water infiltration in the soil, and reduce soil crusting.
(4) Good tillage practices to prevent formation of a plowpan. Such practices are varying the depth of plowing, using chisel plows, and keeping tillage to a minimum.

Perennial grasses, such as Coastal bermudagrass, common lespedeza, and bahiagrass, are used for warm-season grazing and forage production. Tall fescue grass and winter legumes, such as white clover, wildwinter peas, and crimson clover, are used for winter grazing. Annual ryegrass, small grain, and millet provide special grazing for dairy cattle and beef calves.

The principle pasture management practices are:

(1) Use of adequate fertilizer and lime for high forage production.
(2) Proper rate of stocking to prevent overgrazing.
(3) Rotation grazing for more efficient use of forage.
(4) Growing grass-legume mixtures to improve the forage quality.
(5) Control of weeds to reduce competition for moisture and plant nutrients.

Capability grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The groups are made according to the limitations of the soils when used for field crops, the risk of damage when they are used, 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 requiring special management.

Those familiar with the capability classification 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 of groups of soils for range, for forest trees, or engineering.

In the capability system, all kinds of soil are grouped at three levels, the capability class, subclass, and unit. These levels are described in the following paragraphs.

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

Class I soils have few limitations that restrict their use.

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

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

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

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife.

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

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

Class VIII soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife, water supply, or to esthetic purposes.

Capability Subclasses are soil groups within one class; they are designated 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* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows 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 limitations. Class V can contain, at the most, only the subclasses indicated by *w*, *s*, and *c*, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, range, woodland, wildlife, or recreation.

Capability Units are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe–2 or IIIw–1. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the capability unit within each subclass.

The following outline gives the capability groups in Pontotoc County. The use and management of the soils for crops and pasture are described in the mapping unit descriptions.

Class I. Soils that have few limitations that restrict their use.

- Unit I. Well-drained loamy soils high in content of silt; on uplands; slopes are 0 to 2 percent.

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

- Subclass IIe. Soils that are subject to moderate erosion if they are not protected.
  - Unit IIe–1. Well-drained loamy soils high in content of silt; on uplands; slopes are 2 to 5 percent.
  - Unit IIe–2. Moderately well drained loamy soils that have a fragipan or clay layer; slopes are 2 to 5 percent.
- Subclass IIw. Soils that have moderate limitations because of excess water.
  - Unit IIw–1. Somewhat poorly drained and moderately well drained, slightly acid to mildly alkaline soils that have a clayey subsoil; on flood plains; slopes are 0 to 2 percent.
  - Unit IIw–2. Well drained and moderately well drained, loamy soils with 0 to 2 percent slopes; on flood plains.
  - Unit IIw–3. Well-drained, slightly acid to mildly alkaline, loamy soils; on flood plains; slopes are 0 to 2 percent.
  - Unit IIw–4. Moderately well drained and somewhat poorly drained, slightly acid to mildly alkaline, loamy soils on flood plains; slopes are 0 to 2 percent.
  - Unit IIw–5. Somewhat poorly drained soils that have a loamy subsoil high in content of silt or a clayey subsoil; on flood plains; slopes are 0 to 2 percent.
  - Unit IIw–6. Somewhat poorly drained soils that have a loamy subsoil; on flood plains; slopes are 0 to 2 percent.

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

- Subclass IIIe. Soils subject to severe erosion if they are cultivated and not protected.
  - Unit IIIe–1. Well-drained, severely eroded loamy soils high in content of silt; on uplands; slopes are 5 to 8 percent.
  - Unit IIIe–2. Moderately well drained loamy soils that have a fragipan; on uplands; slopes are 5 to 8 percent.
  - Unit IIIe–3. Moderately well drained and somewhat poorly drained soils that have a clayey subsoil; on uplands; slopes are 5 to 8 percent.
  - Unit IIIe–4. Somewhat poorly drained and poorly drained soils that have a clayey subsoil; on uplands; slopes are 2 to 5 percent.
  - Unit IIIe–5. Moderately well drained and somewhat poorly drained soils that have a clayey subsoil; on uplands; slopes are 2 to 5 percent.

Subclass IIIw. Soils that have severe limitations because of excess water.

Unit IIIw–1. Somewhat poorly drained soils that have a loamy subsoil high in content of silt underlain by a fragipan or clay layer; on uplands; slopes are 0 to 5 percent.

Unit IIIw–2. Moderately well drained soils that have a loamy subsoil high in content of silt; on uplands; slopes are 0 to 5 percent.

Unit IIIw–3. Poorly drained soils that have a loamy subsoil high in content of silt; on uplands and stream terraces; slopes are 0 to 2 percent.

Unit IIIw–4. Poorly drained soils that have a clayey subsoil; on uplands; slopes are 0 to 2 percent.

Unit IIIw–5. Poorly drained soils that have a loamy subsoil high in content of silt; on flood plains; slopes are 0 to 2 percent.

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

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

Unit IVe–1. Well-drained, severely eroded soils that have a loamy subsoil high in content of silt; slopes are 8 to 12 percent.

Unit IVe–2. Moderately well drained, eroded soils that have a loamy subsoil and a fragipan; slopes are 8 to 12 percent.

Unit IVe–3. Moderately well drained and somewhat poorly drained soils that have a clayey subsoil; slopes are 5 to 8 percent.

Unit IVe–4. Somewhat poorly drained soils that have a clayey subsoil; slopes are 5 to 8 percent.

Subclass IVw. Soils that have very severe limitations for cultivation because of excess water.

Unit IVw–1. Poorly drained soils that have a loamy subsoil and a fragipan; on uplands; slopes are 0 to 2 percent.

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

Subclass VIe. Soils very severely limited by risk of erosion if protective cover is not maintained.

Unit VIe–1. Moderately well drained, severely eroded soils that have a fragipan; slopes are 8 to 12 percent.

Unit VIe–2. Somewhat poorly drained, eroded soils that have a clayey subsoil; slopes are 8 to 12 percent.

Unit VIe–3. Somewhat poorly drained, severely eroded soils that have a clayey subsoil; slopes are 8 to 12 percent.

Unit VIe–4. Poorly drained soils that have a clayey subsoil; slopes are 5 to 12 percent.

Class VII. Soils that have very severe limitations that make them unsuited to cultivation and that restrict their use largely to grazing, woodland, or wildlife habitat.

Subclass VIIe. Soils very severely limited chiefly by risk of erosion if protective cover is not maintained.

Unit VIIe–1. Well-drained loamy soils that have slopes of 12 to 30 percent.

Unit VIIe–2. Moderately well drained to well drained soils that have a loamy and clayey subsoil; slopes are 17 to 45 percent.

Unit VIIe–3. Moderately well drained and somewhat poorly drained soils that have a fragipan and a clayey subsoil; slopes are 8 to 30 percent.

Unit VIIe–4. Moderately well drained to well drained, severely eroded soils that have a clayey subsoil and similar soils altered by very severe gully erosion; slopes are 5 to 30 percent.

Unit VIIe–5. Moderately well drained soils that have a fragipan and soils altered by severe gully erosion; slopes are 17 to 30 percent.

Estimated yields

The soils of Pontotoc County vary widely in productivity. Some soils consistently produce high yields of cultivated crops; others are better suited to less intensive use.

Table 2 gives estimated yields for commonly grown crops under high-level management of soils not irrigated. The yields obtained are based on estimates by agronomists, soil scientists, and others who have had much experience with crops and soils of this county. Data of yields obtained in experiments were adjusted to reflect the combined influence of slope and management. If such data were not available, estimates were made using available information for similar soils.

The following practices of high-level management were assumed in estimating the yields: (1) application of fertilizer and lime according to soil tests, (2) proper tillage and returning crop residue, (3) planting of recommended varieties, (4) use of the soil conserving sequences, and (5) other conservation practices used to improve production.

Estimates are not given for those soils that are not suited to a specific crop. They also are not given for crops not commonly grown in the county, or for crops grown only on a small acreage.

Woodland [3]

In this section the woodland interpretations, based on the soil survey of Pontotoc County, can be used by woodland owners, operators, foresters, and farmers.

This county has a total land area of 320,600 acres. Approximately 45 percent of this area, or 143,500 acres, is classified as commercial forest (7). In 1967 growing stock in Pontotoc County was 35.7 million cubic feet of pine and 46.9 million cubic feet of hardwood. Also, in 1967 sawtimber volume totaled 193.1 million board feet, of which 116.8 million board feet was pine and 76.3 million board feet was hardwood (7).

[3] THOMAS M. NORTON, forester, Soil Conservation Service, helped prepare this section.

TABLE 2.—*Estimated average acre yields of principal crops under a high level of management*

[Dashes indicate that the crop is not commonly grown on the soil or that data are not available for making an estimate]

Soil	Cotton (lint)	Corn	Soybeans	Pasture			
				Common bermudagrass and legume	Bahiagrass and legume	Tall fescue and legume	Dallisgrass and legume
	Lb.	*Bu.*	*Bu.*	*A.U.M.*[1]	*A.U.M.*	*A.U.M.*	*A.U.M.*
Adaton silt loam	----	----	25	6.0	7.5	8.5	7.0
Arkabutla silt loam	675	90	35	10.0	----	9.5	10.0
Atwood silt loam, 0 to 2 percent slopes	775	95	40	8.0	9.0	8.0	8.0
Atwood silt loam, 2 to 5 percent slopes	725	85	35	7.5	8.5	9.5	8.0
Atwood silt loam, 2 to 5 percent slopes, eroded	675	80	30	7.0	8.0	8.0	7.5
Atwood silt loam, 5 to 8 percent slopes, severely eroded	600	60	25	6.0	6.0	6.0	6.0
Atwood silt loam, 8 to 12 percent slopes, severely eroded	500	----	----	5.0	5.0	----	----
Boswell silt loam, 2 to 5 percent slopes, eroded	400	45	25	5.0	6.5	5.5	6.0
Boswell silt loam, 5 to 8 percent slopes, eroded	375	40	25	4.0	6.0	5.0	5.5
Bude silt loam, 0 to 2 percent slopes	600	85	25	7.5	8.0	8.0	7.0
Bude silt loam, 2 to 5 percent slopes	575	80	25	7.5	8.0	8.0	7.0
Cascilla silt loam	825	95	40	9.0	9.5	11.0	9.0
Catalpa silty clay loam	750	85	35	8.5	----	11.0	9.5
Chewacla loam	600	85	35	9.0	9.0	9.5	9.0
Chewacla soils	600	85	35	9.0	9.0	9.5	9.0
Commerce silt loam	800	90	40	9.0	----	10.0	9.0
Falaya soils	650	95	35	10.0	8.0	8.5	9.0
Falkner silt loam, 0 to 2 percent slopes	575	60	30	6.0	10.0	8.0	7.0
Falkner silt loam, 2 to 5 percent slopes	550	55	30	6.0	9.5	7.5	7.0
Falkner silt loam, 5 to 8 percent slopes	550	50	30	6.0	9.0	7.5	----
Falkner silt loam, 5 to 8 percent slopes, eroded	525	45	30	5.0	8.5	7.5	----
Frizzell silt loam, 0 to 2 percent slopes	430	55	30	6.0	7.0	5.0	7.0
Frizzell silt loam, 2 to 5 percent slopes	430	50	30	6.0	7.0	5.0	7.0
Gullied land-Oktibbeha complex, 5 to 20 percent slopes	----	----	----	----	----	----	----
Henry silt loam	425	45	25	5.5	6.0	6.0	----
Iuka and Ochlockonee soils	600	90	35	7.0	9.5	9.5	7.0
Kipling silt loam, 2 to 5 percent slopes	550	40	30	4.5	7.9	6.5	6.0
Kipling silt loam, 5 to 8 percent slopes	500	----	25	4.0	6.5	6.0	5.5
Kipling silt loam, 8 to 12 percent slopes, eroded	----	----	----	3.5	4.0	----	4.5
Kipling soils, 8 to 12 percent slopes, severely eroded	----	----	----	3.5	4.0	----	----
Leeper silty clay loam	700	75	40	8.0	----	11.0	9.5
Mantachie sandy loam	750	90	35	8.5	9.0	9.5	9.0
Marietta loam	750	90	35	8.5	10.5	12.0	9.0
Mashulaville silt loam	----	----	20	6.5	7.0	7.0	----
Mayhew silty clay loam, 0 to 2 percent slopes	----	----	30	7.0	8.0	8.0	----
Mayhew silty clay loam, 2 to 5 percent slopes	----	----	30	7.0	8.0	8.0	----
Mayhew silty clay loam, 5 to 12 percent slopes	----	----	----	6.0	7.0	7.0	----
Mayhew silty clay loam, 8 to 12 percent slopes, eroded	----	----	----	5.5	6.5	6.0	----
Oktibbeha soils, 17 to 30 percent slopes, severely eroded	----	----	----	----	----	----	----
Oktibbeha-Ruston association, hilly	----	----	----	----	----	----	----
Ora loam, 2 to 5 percent slopes	750	80	35	7.0	9.0	8.0	7.0
Ora loam, 2 to 5 percent slopes, eroded	750	80	35	7.0	9.0	8.0	7.0
Ora loam, 5 to 8 percent slopes	600	70	30	6.5	8.5	7.5	----
Ora loam, 5 to 8 percent slopes, eroded	600	70	30	6.5	8.5	7.5	----
Ora loam, 8 to 12 percent slopes, eroded	----	----	20	6.0	8.0	7.0	----
Providence silt loam, 2 to 5 percent slopes	650	80	35	7.0	9.0	9.0	7.0
Providence silt loam, 2 to 5 percent slopes, eroded	600	75	30	7.0	9.0	8.5	7.0
Providence silt loam, 5 to 8 percent slopes, eroded	575	65	25	6.5	8.5	7.5	5.5
Providence silt loam, 8 to 12 percent slopes, severely eroded	----	----	----	5.0	7.5	6.5	----
Providence silt loam, heavy substratum, 2 to 5 percent slopes	650	80	35	7.0	9.0	9.0	7.0
Providence silt loam, heavy substratum, 2 to 5 percent slopes, eroded	650	75	30	7.0	9.0	8.5	7.0
Providence silt loam, heavy substratum, 5 to 8 percent slopes	600	65	30	6.5	8.5	7.5	5.5
Providence silt loam, heavy substratum, 5 to 8 percent slopes, eroded	600	65	30	6.5	8.5	7.5	5.5
Providence silt loam, heavy substratum, 8 to 12 percent slopes, eroded	----	----	20	5.0	7.5	6.5	----
Providence-Gullied land complex, 17 to 30 percent slopes	----	----	----	----	----	----	----
Robinsonville sandy loam	800	90	35	8.5	10.0	9.0	7.0
Rosebloom silt loam	550	60	30	7.0	----	7.0	7.0
Ruston and Cahaba sandy loams, 17 to 30 percent slopes	----	----	----	----	----	----	----
Ruston and Cahaba sandy loams, 12 to 30 percent slopes, eroded	----	----	----	----	----	----	----

See footnote at end of table.

TABLE 2.—*Estimated average acre yields of principal crops under a high level of management*—Continued

Soil	Cotton (lint)	Corn	Soybeans	Pasture			
				Common bermudagrass and legume	Bahiagrass and legume	Tall fescue and legume	Dallisgrass and legume
	Lb.	*Bu.*	*Bu.*	*A.U.M.*[1]	*A.U.M.*	*A.U.M.*	*A.U.M.*
Tippah silt loam, 2 to 5 percent slopes	625	75	35	7. 0	8. 5	9. 0	7. 0
Tippah silt loam, 5 to 8 percent slopes	575	65	30	6. 5	8. 0	7. 5	5. 5
Tippah-Providence-Wilcox association, hilly	----	----	----	----	----	----	----
Urbo silty clay loam	750	95	40	8. 0	8. 0	8. 5	9. 0
Wilcox silty clay loam, 2 to 5 percent slopes	----	35	20	6. 5	8. 0	7. 5	----
Wilcox silty clay loam, 5 to 8 percent slopes	----	----	20	6. 0	7. 0	7. 0	----

[1] Animal-unit-months is the number of months in a year that one animal unit (one cow, steer, or horse; five hogs; seven sheep or goats) can graze 1 acre without damage to the pasture.

The annual forest fire record in Pontotoc County for the past 5 years averaged 79 fires and 671 acres burned. Forest fire protection is provided by the Mississippi Forestry Commission.

Stands of trees that cover a considerable area are classified as forest types according to the kinds and proportion of trees composing such stands. A forest type is usually given the species name(s) of the tree or trees which occur most frequently in the stand. Hardwood types in Pontotoc County make up about 81,600 acres, and softwood types, 62,300 acres. About 66,600 acres of the hardwood forest is in oak-hickory stands; 14,600 acres is in oak-gum-cypress stands; and the rest of the acreage is in a few isolated stands of elm-ash-cottonwood. The softwood forest types consist of about 32,500 acres of loblolly-shortleaf pine stands and 29,800 acres of oak-pine stands. The pine forest types are mainly of shortleaf pines that have been predominantly naturally seeded. Loblolly stands have nearly all been planted.

The sawtimber species occurring most frequently and having the widest distribution are shortleaf pine, hickory, red oak, sweetgum, white oak, and ash. Yellow-poplar, sycamore, elm, and blackgum are of minor importance. In 1966 softwood sawtimber net annual growth was 11.3 million board feet, and the cut was 1.8 million board feet. The net annual growth of hardwood sawtimber was 6.4 million board feet, and the cut was 5.7 million board feet.

In addition to furnishing raw wood, in limited amounts, to wood-using industries and providing employment for a limited number of workers, the woodlands of Pontotoc County provide habitat and food for wildlife and offer many people opportunity for sport and recreation.

Woodland groups

To assist owners of woodland and others in planning the management of woodland and setting priorities for treatment, the soils of Pontotoc County have been placed in woodland groups. Each group is made up of soils that have about the same suitability for wood crops, that require about the same management, and that have about the same potential productivity. Shown in table 3 are each of these groups and the map symbols of the soils in each group.

The ordination system and the group symbols for woodland groups are explained in the following paragraphs.

Each woodland group is identified by a three-part symbol, such as 1o4 or 1w5. The first element of the symbol indicates the woodland class. It expresses site quality by an Arabic numeral ranging from 1 to 4. Class 1 has highest potential productivity, and classes 2, 3, and 4 have progressively lower productivity. The class is based on the average site index of one or more indicator forest types of tree species. (No Class 4 in this county.)

The second element in the symbol indicates the suitability subclass. It expresses selected soil properties that impose moderate to severe hazards or limitations in woodland use or management. Subclasses are identified by one of the following lower case Arabic letters:

Subclass w (excessive wetness) indicates soils in which excessive water, either seasonally or year round, causes significant limitations for woodland use or management. These soils have restricted drainage, a high water table, or an overflow hazard that adversely affects either stand development or management.

Subclass d (restricted rooting depth) indicates soils having restrictions or limitations for woodland use or management that are caused by restricted rooting depth. Soils shallow to hard rock, hardpan, or other layers in the soil that restrict roots are examples. (None in this county)

Subclass c (clayey soils) identifies soils having restrictions or limitations for woodland use or management that are caused by the kind or amount of clay in the upper part of the soil profile.

Subclass r (relief or slope steepness) indicates the soils having restrictions or limitations for woodland use or management that are caused only by steep slopes. (None in this county)

Subclass o (slight or no limitations) 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 hazard or limitation and the general suitability of the soils for certain kinds of trees. The three management

TABLE 3.—*Woodland suitability groups*

Woodland groups and map symbols	Potential productivity		Species suitable for planting—	Major hazards and limitations		
	Tree species	Average site index [1]		Erosion hazard	Equipment limitations	Seedling mortality
Group 1o4: Well-drained soils on flood plains. Permeability is moderately rapid, and available water capacity is medium to high. Ro.	Green ash Eastern cottonwood Sweetgum	87 107 109	Green ash, eastern cottonwood, sweetgum.	Slight	Slight	Slight.
Group 1o7: Well-drained soils on flood plains. Permeability is moderate, and available water capacity is high to very high. Ca.	Green ash White ash Eastern cottonwood Cherrybark oak Nuttall oak Water oak Willow oak Loblolly pine Shortleaf pine Sweetgum	96 96 120 112 114 104 104 93 80 102	Green ash, eastern cottonwood, cherrybark oak, Nuttall oak, water oak, willow oak, loblolly pine, sweetgum.	Slight	Slight	Slight.
Group 1w5: Moderately well drained and somewhat poorly drained soils on flood plains. Permeability is moderate to slow, and available water capacity is medium to very high. Cc, Co, Me.	Green ash Eastern cottonwood Nuttall oak Water oak	80 119 90 109	Green ash, eastern cottonwood, Nuttall oak, water oak.	Slight	Moderate	Slight.
Group 1w6: Somewhat poorly drained soils on flood plains. Permeability is very slow, and available water capacity is high to very high. Le.	Green ash Eastern cottonwood Sweetgum	94 110 95	Green ash, eastern cottonwood, sweetgum.	Slight	Severe	Moderate to severe.
Group 1w8: Moderately well drained and well drained soils on flood plains. Permeability is moderate to moderately rapid, and available water capacity is medium to high. Io.	Green ash White ash Eastern cottonwood Cherrybark oak Nuttall oak Water oak Willow oak Loblolly pine Sweetgum	93 93 109 101 108 99 99 96 98	Green ash, eastern cottonwood, cherrybark oak, Nuttall oak, water oak, white oak, willow oak, loblolly pine, sweetgum.	Slight	Moderate	Moderate.
Group 1w9: Somewhat poorly drained soils on flood plains. Permeability is moderate, and the available water capacity is medium to very high. Ar, Ce, Ch, Fa, Mc.	Green ash Eastern cottonwood Cherrybark oak Water oak Willow oak Loblolly pine Sweetgum	88 92 101 94 96 98 100	Green ash, eastern cottonwood, cherrybark oak, loblolly pine, sweetgum.	Slight	Severe	Moderate to severe.
Group 2o7: Well-drained soils on uplands. Permeability is moderate, and the available water capacity is very high. AtA, AtB, AtB2, AtC3, AtD3.	Cherrybark oak Loblolly pine Sweetgum	[2] 90 [2] 86 [2] 85	Cherrybark oak,[3] loblolly pine, sweetgum.[3]	Slight	Slight	Slight.
Group 2w8: Somewhat poorly drained to moderately well drained soils on uplands and stream terraces. Permeability is slow, and the available water capacity is medium to very high. BuA, BuB, FkA, FkB, FkC, FkC2, FlA, FlB.	Cherrybark oak Water oak Loblolly pine Sweetgum	88 [2] 80 86 88	Cherrybark oak, water oak, loblolly pine, sweetgum.	Slight	Moderate	Slight.

See footnotes at end of table.

TABLE 3.—*Woodland suitability groups*—Continued

Woodland groups and map symbols	Potential productivity		Species suitable for planting—	Major hazards and limitations		
	Tree species	Average site index [1]		Erosion hazard	Equipment limitations	Seedling mortality
Group 2w9: Poorly drained and somewhat poorly drained soils on uplands and flood plains. Permeability is slow to very slow, and the available water capacity is high to very high. MsA, MsB, MsD, MsD2, Rs, Ur.	Green ash Eastern cottonwood Cherrybark oak Nuttall oak Water oak Willow oak Loblolly pine Shortleaf pine Sweetgum	90 [2] 100 87 [2] 95 99 80 86 74 89	Green ash, eastern cottonwood, cherrybark oak, Nuttall oak, water oak, willow oak, loblolly pine, sweetgum.	Slight	Severe	Moderate to severe.
Group 3o1: Well-drained soils on uplands. Permeability is moderate, and the available water capacity is medium to high. RuE, RuE2.	Loblolly pine Shortleaf pine	80 70	Loblolly pine, shortleaf pine.	Slight	Slight	Slight.
Group 3o7: Moderately well drained soils on uplands. Permeability is moderately slow to slow, and the available water capacity is medium to very high. OrB, OrB2, OrC, OrC2, OrD2, PrB, PrB2, PrC2, PrD3, PsB, PsB2, PsC, PsC2, PsD2, TpB, TpC, TWE.	Cherrybark oak Loblolly pine Shortleaf pine Sweetgum	[2] 95 84 64 90	Cherrybark oak,[3] loblolly pine, shortleaf pine, sweetgum.	Slight	Slight	Slight.
Group 3c2: Moderately well drained and somewhat poorly drained upland soils. Permeability is slow to very slow, and the available water capacity is high to very high. BoB2, BoC2, WcB, WcC.	Loblolly pine Shortleaf pine Eastern redcedar	82 69 45	Loblolly pine, shortleaf pine, eastern redcedar.	Slight	Moderate	Moderate.
Group 3c8: Somewhat poorly drained and moderately well drained soils on uplands. Permeability is slow to very slow, and the available water capacity is high to very high. KlB, KlC, KlD2, KnD3, ObE3, OKE.	Loblolly pine Shortleaf pine Eastern redcedar	76 66 45	Loblolly pine, eastern redcedar.	Slight	Moderate	Moderate.
Group 3w9: Poorly drained soils on uplands and stream terraces. Permeability is slow, and the available water capacity is medium to very high. Ad, Hn, Mh.	Cherrybark oak Nuttall oak Water oak Willow oak Loblolly pine Shortleaf pine Sweetgum	79 72 76 74 83 80 76	Cherrybark oak, water oak, loblolly pine, sweetgum.	Slight	Severe	Severe.
Not assigned to woodland group. GoE, PuE.	Too variable to rate		Loblolly pine, shortleaf pine. eastern redcedar.			

[1] Site index is the average height in feet of dominant and codominant trees 50 years of age for all species except cottonwood, which is 30 years.

[2] Estimated site index based on a similar soil or another species on the same soil.

[3] Not suited for hardwoods when severely eroded.

problems considered here are: (1) erosion hazard, (2) equipment limitations, and (3) seedling mortality.

The numeral 1 indicates soils that have no limitation or only slight limitations and are best suited to needleleaf trees.

The numeral 2 indicates soils that have one or more moderate limitations and are best suited to needleleaf trees.

The numeral 3 indicates soils that have one or more severe limitations and are best suited to needleleaf trees.

The numeral 4 indicates soils that have no limitations or only slight limitations and are best suited to broadleaf trees.

The numeral 5 indicates soils that have one or more moderate limitations and are best suited to broadleaf trees.

The numeral 6 indicates soils that have one or more severe limitations and are best suited to broadleaf trees.

The numeral 7 indicates soils that have no limitation or only slight limitations and are suited to either needleleaf or broadleaf trees.

The numeral 8 indicates soils that have one or more moderate limitations and are suited to either needleleaf or broadleaf trees.

The numeral 9 indicates soils that have one or more severe limitations and are suited to either needleleaf or broadleaf trees.

Potential productivity, expressed as site index, is shown in table 3. Site index is the average height in feet of dominant and codominant trees at 50 years of age of all species except cottonwood, which is at 30 years. Site indexes are recorded for the most important tree species that commonly occur on the soils of each woodland group. These site indexes are based on soil-woodland correlation studies and available research data.

Each woodland group has, in varying degree, certain hazards or limitations that affect its management. The main hazards or limitations that affect woodland management in Pontotoc County are erosion hazard, equipment limitations, and seedling mortality. These are expressed in the relative terms of *slight*, *moderate*, or *severe*.

Erosion hazard is the degree of potential soil erosion. Ratings are based on the risk of erosion expected on well-managed woodland. These ratings are further related to differences in soil stability, permeability, slope, surface runoff, water storage capacity, and disturbances of vegetation. The hazard is *slight* if expected soil losses are small; *moderate* if some soil losses are expected and care is needed during logging and other operations to reduce soil losses; *severe* if intensive treatment, special methods of operation, and special equipment are necessary for preventing excessive soil losses.

Equipment limitations were rated on the basis of the characteristics of the soil that limit or prohibit the use of equipment commonly used in woods operations, such as felling, bucking, skidding, loading, and hauling. Consideration is also given to special equipment used in spraying, tree planting, direct seeding, and firefighting. Ratings are based on such physical soil characteristics as texture, stability, plasticity, and abrasiveness and they further relate to slope, wetness, and presence or absence of stones, ledges, and other obstructions. *Slight* means there is little or no restriction in the kind of equipment or in the time of year it is used. *Moderate* means that use of the equipment is restricted seasonally because of wetness, flooding, poor drainage, or other hazards. *Severe* means that special equipment is needed.

Seedling mortality, or regeneration potential, refers to the failure of tree seedlings to survive and grow, primarily as a result of soil or topographic conditions. It is assumed that plant competition and rainfall are not limiting factors. The term "tree seedlings" includes (1) naturally occurring, (2) direct seeded, and (3) planted seedlings. In each of these three methods of regeneration it is assumed that the seedlings initially established are of species well suited to the soil and total site. A rating of *slight* indicates an expected loss of less than 25 percent of the planted seedlings; *moderate*, a loss of 25 to 50 percent of the seedlings; and *severe*, a loss of more than 50 percent of the seedlings. Special preparation of the site is needed before planting on soils rated severe and on most of the soils rated moderate.

Wildlife [4]

Wildlife species are associated with given types of plant communities which, in turn, are directly related to particular kinds of soil. It is through this three-way relationship of wildlife to plants to soils that interpretations for wildlife are prepared.

The soils of Pontotoc County produce a wide variety of plants that provide food, cover, and protection for many species of wildlife. Upland game animals, such as squirrel, rabbit, and quail, are found throughout the county. Fur-bearing animals, such as muskrat and mink, are found along some watercourses in the county. Raccoon are common in the county. Larger game animals, such as deer, are found in certain sections of the county, but in general the population is small. Game birds, such as turkey, mallard duck, wood duck, and black duck, do not occur in appreciable numbers.

Table 4 lists all of the soils mapped in the county. In this table each soil has been rated for eight components of wildlife habitat and for the three types of wildlife. Each component of wildlife habitat shown in table 4 is explained in the following paragraphs.

Grain and seed crops.—These are primarily farm crops planted to provide food for wildlife. The rating reflects the suitability of the soil as a site for growing such crops under good management. Examples of such crops are corn, dove proso millet, browntop millet, wheat, and oats.

Grasses and legumes.—These are plants that furnish food and cover for wildlife. The rating in table 4 reflects the suitability of the soil as a site for growing various grasses and legumes. Examples are fescue, clover, annual lespedeza, soybeans, ryegrass, lovegrass, and kudzu.

Wild herbaceous upland plants.—These plants are native or introduced perennials that furnish food

[4] JESSE MERCER, JR., biologist, Soil Conservation Service, helped prepare this section.

and cover to wildlife. The rating reflects the suitability of the soil as a site for growing these plants under natural conditions with little or no management. Examples are pokeweed, tickclover, ragweed, and partridgepea.

Hardwood trees and shrubs.—Hardwood trees, shrubs, and vines produce fruit, buds, nuts, and foliage used by wildlife for food and cover. Examples are oak, hickory, grape, dogwood, poplar, and multiflora rose. The rating shows suitability of the soil as a place to grow plants of this type. Management of the site is not taken into account in the rating but some may be needed and applied.

Needleleaf trees.—This group is made up primarily of pines. Cover is the main benefit provided to wildlife by this component, although pine seed is used as food to some extent. The rating reflects the suitability of the soil as a site producing these plants under natural conditions.

Wetland food and cover plants.—In this group are wild herbaceous plants and trees associated mainly with wetland areas. Examples are rushes, sedges, smartweed, cattails, and tupelo and cypress trees.

Shallow water developments.—Ratings in table 4 indicate suitability of the soil for development of shallow ponds or flooded areas. In most places a great amount of management is required to create or improve this component of the habitat.

The three major kinds of wildlife shown in table 4 are defined as follows:

Openland wildlife.—This consists of birds and mammals that are generally associated with the edges of open areas. Mourning dove, quail, red and gray foxes, cottontail rabbit, and many species of songbird are typical examples of this type of wildlife. Openland areas are also very important to woodland wildlife, and this interrelationship must be considered when planning a management program of any type.

Woodland wildlife.—These are the wildlife species found primarily in wooded communities. Examples are deer, bobcats, and squirrels.

Wetland wildlife.—Birds and mammals that are found primarily in wetland communities, such as swamps, marshes, or ponds, are in this group. Examples are beaver, muskrat, mink, raccoon, redwing blackbirds, and ducks.

In table 4, a rating of *well suited* means that favorable wildlife habitat is easily created or improved; that it can be maintained by either native or planted vegetation; that there are few or no limitations; and that satisfactory results can be expected. *Suited* means that good wildlife habitat can be created, improved, and maintained in most places; that there are moderate limitations; and that frequent attention may be necessary for good results. *Poorly suited* indicates that wildlife habitat can be created and maintained in some places, but there may be severe limitations, and maintenance and management are expensive. Results may be unpredictable. *Unsuited* means that it is usually impractical to create or maintain wildlife habitat that will produce satisfactory results.

475-002—73——4

The ratings given in table 4 are to be used as guidelines, not as a substitute for study of a specific site. A soil rated as good for grasses and legumes ordinarily is suitable for most species normally found in the county. Such a soil, however, may be unsuited to a specific grass or legume; for this reason analysis of the particular site chosen for development of wildlife habitat is needed.

Engineering Uses of the Soils [5]

Some soil properties are of special interest to engineers because they affect the construction and maintenance of roads, airports, pipelines, building foundations, facilities for water storage, erosion control structures, drainage systems, and sewage disposal systems. Among the properties most important to engineers are permeability, strength, consolidation characteristics, texture, plasticity, and soil reaction.

Information concerning these and related soil properties is given in tables 5, 6, and 7. The estimates and interpretations in these tables can be used to—

1. Make studies that will aid in selecting and developing industrial, commercial, residential, and recreational sites.
2. Make preliminary estimates of the engineering properties of soils in planning drainage systems, farm ponds, irrigation systems, terraces, waterways, and diversion terraces.
3. Make preliminary evaluations of soil conditions that will aid in selecting sites for highways, airports, pipelines, and cables and in planning detailed investigations at selected locations.
4. Locate probable sources of sand and other construction material.
5. Correlate performance of soil mapping units to develop information that will be useful in planning engineering practices and in designing and maintaining engineering structures.
6. Determine the suitability of soils for cross-country movement of vehicles and construction equipment.
7. Supplement other publications, such as maps, reports, and aerial photographs, that are used in preparation of engineering reports for a specific area.
8. Develop other preliminary estimates for construction purposes pertinent to the particular area.

The engineering interpretations reported here do not eliminate the need for sampling and testing at the site of specific engineering works involving heavy loads or excavations deeper than the depths reported (ordinarily about 5 feet). Even in these situations, however, the soil map is useful in planning more detailed field investigations and in indicating the kinds of problems that may be expected.

Some of the terms used by soil scientists have special meanings in soil science that may not be familiar to engineers. These terms are defined in the Glossary.

[5] Prepared by M. D. WILSON and K. G. BRAY, agricultural engineers, Soil Conservation Service.

TABLE 4.—*Suitability of the*

[Gullied land–Oktibbeha complex (GoE) has properties

Soil series and map symbol	Elements of wildlife habitat			
	Grain and seed crops	Grasses and legumes	Wild herbaceous upland plants	Hardwood trees and shrubs
Adaton: Ad	Poorly suited	Suited	Suited	Well suited
Arkabutla: Ar	Suited	Suited	Well suited	Well suited
Atwood:				
AtA, AtB, AtB2	Well suited	Well suited	Well suited	Well suited
AtC3, AtD3	Suited	Well suited	Well suited	Well suited
Boswell:				
BoB2	Well suited	Well suited	Well suited	Well suited
BoC2	Suited	Well suited	Well suited	Well suited
Bude:				
BuA	Suited	Suited	Well suited	Well suited
BuB	Suited	Suited	Well suited	Well suited
Cahaba	Poorly suited	Suited	Well suited	Well suited
Cascilla: Ca	Well suited	Well suited	Well suited	Well suited
Catalpa: Cc	Well suited	Well suited	Well suited	Well suited
Chewacla: Ce, Ch	Suited	Suited	Well suited	Well suited
Commerce: Co	Suited	Suited	Well suited	Well suited
Falaya: Fa	Suited	Suited	Well suited	Well suited
Falkner:				
FkA	Suited	Suited	Well suited	Well suited
FkB, FkC, FkC2	Suited	Suited	Well suited	Well suited
Frizzell: FlA, FlB	Well suited	Well suited	Well suited	Well suited
Henry: Hn	Poorly suited	Suited	Suited	Suited
Iuka: Io	Well suited	Well suited	Well suited	Well suited
Kipling:				
KlB, KlC	Suited	Suited	Well suited	Well suited
KlD2, KnD3	Suited	Suited	Well suited	Well suited
Leeper: Le	Well suited	Well suited	Well suited	Well suited
Mantachie: Mc	Well suited	Well suited	Well suited	Well suited
Marietta: Me	Well suited	Well suited	Well suited	Well suited
Mashulaville: Mh	Poorly suited	Suited	Suited	Well suited
Mayhew:				
MsA	Poorly suited	Suited	Suited	Well suited
MsB	Poorly suited	Suited	Suited	Well suited
MsD, MsD2	Poorly suited	Suited	Suited	Well suited
Ochlockonee	Well suited	Well suited	Well suited	Well suited
Oktibbeha: ObE3, OKE	Unsuited	Poorly suited	Well suited	Well suited
Ora:				
OrB, OrB2, OrC, OrC2	Suited	Well suited	Well suited	Well suited
OrD2	Suited	Well suited	Well suited	Well suited
Providence:				
PrB, PrB2, PrC2, PsB, PsB2, PsC, PsC2	Suited	Well suited	Well suited	Well suited
PrD3, PsD2	Suited	Well suited	Well suited	Well suited
Providence-Gullied land: PuE	Poorly suited	Suited	Well suited	Well suited
Robinsonville: Ro	Well suited	Well suited	Well suited	Well suited
Rosebloom: Rs	Poorly suited	Suited	Suited	Well suited
Ruston: RuE, RuE2	Poorly suited	Suited	Well suited	Well suited
Tippah:				
TpB	Well suited	Well suited	Well suited	Well suited
TpC	Suited	Well suited	Well suited	Well suited
TWE	Unsuited	Poorly suited	Well suited	Well suited
Urbo: Ur	Suited	Suited	Well suited	Well suited
Wilcox: WcB, WcC	Suited	Suited	Well suited	Well suited

soils for wildlife habitat

too variable to rate and is not included in this table]

Elements of wildlife habitat—Continued			Kinds of wildlife		
Needleleaf trees	Wetland food and cover	Shallow water developments	Openland	Woodland	Wetland
Suited	Well suited	Suited	Suited	Well suited	Well suited.
Suited	Suited	Suited	Suited	Well suited	Suited.
Suited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Suited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Well suited	Suited	Poorly suited	Suited	Well suited	Unsuited.
Well suited	Poorly suited	Unsuited	Suited	Well suited	Unsuited.
Suited	Suited	Suited	Suited	Suited	Suited.
Suited	Poorly suited	Unsuited	Suited	Suited	Poorly suited.
Well suited	Unsuited	Unsuited	Suited	Well suited	Unsuited.
Suited	Unsuited	Suited	Well suited	Well suited	Poorly suited.
Poorly suited	Poorly suited	Suited	Well suited	Suited	Suited.
Suited	Suited	Suited	Suited	Well suited	Suited.
Poorly suited	Suited	Suited	Well suited	Well suited	Suited.
Suited	Suited	Suited	Suited	Well suited	Suited.
Suited	Suited	Suited	Suited	Well suited	Suited.
Suited	Poorly suited	Unsuited	Suited	Well suited	Poorly suited.
Suited	Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.
Suited	Well suited	Suited	Suited	Suited	Suited.
Suited	Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.
Suited	Poorly suited	Unsuited	Suited	Well suited	Poorly suited.
Suited	Unsuited	Unsuited	Suited	Well suited	Unsuited.
Well suited	Poorly suited	Suited	Well suited	Well suited	Suited.
Suited	Suited	Suited	Well suited	Well suited	Suited.
Poorly suited	Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.
Suited	Well suited	Suited	Poorly suited	Well suited	Well suited.
Suited	Well suited	Suited	Poorly suited	Suited	Suited.
Suited	Well suited	Unsuited	Poorly suited	Suited	Unsuited.
Suited	Unsuited	Unsuited	Suited	Suited	Unsuited.
Suited	Unsuited	Poorly suited	Well suited	Well suited	Poorly suited.
Suited	Unsuited	Unsuited	Unsuited	Suited	Unsuited.
Suited	Poorly suited	Unsuited	Well suited	Well suited	Poorly suited.
Suited	Unsuited	Unsuited	Well suited	Well suited	Unsuited.
Suited	Poorly suited	Unsuited	Well suited	Well suited	Unsuited.
Suited	Unsuited	Unsuited	Suited	Well suited	Unsuited.
Suited	Unsuited	Unsuited	Unsuited	Well suited	Unsuited.
Poorly suited	Unsuited	Poorly suited	Well suited	Well suited	Poorly suited.
Suited	Well suited	Suited	Suited	Well suited	Well suited.
Well suited	Unsuited	Unsuited	Suited	Well suited	Unsuited.
Suited	Poorly suited	Suited	Well suited	Well suited	Poorly suited.
Suited	Poorly suited	Poorly suited	Well suited	Well suited	Poorly suited.
Suited	Unsuited	Unsuited	Poorly suited	Well suited	Unsuited.
Suited	Suited	Suited	Suited	Well suited	Suited.
Well suited	Poorly suited	Unsuited	Suited	Well suited	Unsuited.

TABLE 5.—*Engineering*

[Tests performed by Mississippi State Highway Department in accordance with

Soil name and location	Report number	Depth	Moisture-density [1]	
			Maximum dry density	Optimum moisture
		In.	*Lb./cu. ft.*	*Pct.*
Adaton silt loam:				
NW¼NW¼ sec. 7, T. 10 S., R. 3 E. (Modal)	519479	12–21	109. 7	15. 6
Atwood silt loam:				
SW¼NE¼ sec. 17, T. 10 S., R. 3 E. (Modal)	402257	18–31	105. 3	19. 5
Urbo silty clay loam:				
NW¼NW¼ sec. 28, T. 9 S., R. 2 E. (Modal)	519476	44–71	95. 6	22. 7

[1] Based on AASHO Designation: T 99–70, Method A (*1*).

[2] Mechanical analysis according to AASHO Designation: T 88–70 (*1*). Results by this procedure may differ somewhat from results obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the 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

TABLE 6.—*Estimated soil properties*

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 for referring to other series that appear in the first

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	Classification		
			USDA texture	Unified	AASHO
	In.	*In.*			
Adaton: Ad	(1)	0–7	Silt loam	ML or ML–CL	A–4
		7–16	Silt loam	CL	A–4
		16–28	Silt loam	CL	A–4
		28–61	Silty clay loam	CL or CH	A–7
Arkabutla: Ar	15	0–6	Silt loam	ML	A–6
		6–16	Silty clay loam	ML or CL	A–6 or A–7
		16–55	Silt loam	ML or CL	A–6
Atwood: AtA, AtB, AtB2, AtC3, AtD3	>60	0–6	Silt loam	ML or CL	A–4 or A–6
		6–45	Silty clay loam	CL	A–6 or A–7
		45–79	Clay loam	CL	A–6 or A–7
Boswell: BoB2, BoC2	18	0–5	Silt loam	ML or CL	A–4 or A–6
		5–59	Silty clay	CH	A–7
Bude: BuA, BuB	15	0–7	Silt loam	ML or ML–CL	A–4
		7–24	Silt loam	ML or CL	A–4 or A–6
		24–60	Silt loam (fragipan)	ML or CL	A–4 or A–6
Cahaba	>60	0–4	Sandy loam	SM	A–4 or A–2
Mapped only with Ruston soils.		4–14	Loam	CL	A–4 or A–6
		14–42	Sandy loam	SC or SM	A–2 or A–4
		42–60	Loamy sand	SM	A–2
Cascilla: Ca	30–60	0–17	Silt loam	ML or CL	A–4
		17–60	Silt loam	CL	A–4 or A–6
Catalpa: Cc	15	0–7	Silty clay loam	CH	A–7
		7–60	Silty clay	CH	A–7
Chewacla: Ce, Ch	15	0–6	Loam	ML	A–4
		6–11	Silt loam	ML or CL	A–4 or A–6
		11–60	Silty clay loam	CL	A–6 or A–7

See footnotes at end of table.

test data

standard procedures of the American Association of State Highway Officials (AASHO)]

Mechanical analysis [2]							Liquid limit	Plasticity index	Classification	
Percentage passing sieve—			Percentage smaller than—						AASHO	Unified [3]
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.				
							Pct.			
100	95	86	70	56	23	18	28	8	A-4 (8)	CL
100	97	88	86	70	42	36	49	32	A-7(18)	CL
100	98	95	89	74	53	44	56	33	A-7(16)	CH

2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analysis data used in this table are not suitable for naming textural classes for soils.

[3] SCS and BPR have agreed to consider that all soils having plasticity indexes within two points of A-line are to be given a borderline classification. An example of a borderline classification obtained by this use is ML-CL.

significant in engineering

in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the instructions column of this table. Symbol > means more than]

Percentage passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)				
				In./hr.	*In./in. of soil*		
100	100	90–100	85–100	0. 63–2. 00	0. 20–0. 22	4. 5–5. 5	Low.
100	100	90–100	85–100	0. 63–2. 00	0. 20–0. 22	4. 5–5. 5	Low to moderate.
100	100	90–100	85–100	0. 20–0. 63	0. 20–0. 22	4. 5–5. 5	Moderate.
100	100	95–100	85–100	0. 06–0. 20	0. 20–0. 22	4. 5–5. 5	Moderate.
100	100	95–100	95–100	0. 63–2. 00	0. 20–0. 22	4. 5–5. 5	Low.
100	100	95–100	95–100	0. 63–2. 00	0. 20–0. 22	4. 5–5. 5	Moderate.
100	100	95–100	95–100	0. 63–2. 00	0 20–0. 22	4. 5–5. 5	Moderate.
100	100	100	85–100	0. 63–2. 00	0. 20–0. 22	5. 1–6. 5	Low.
100	100	95–100	85–95	0. 63–2. 00	0. 20–0. 22	5. 1–6. 5	Moderate.
100	90–100	90–100	70–85	0. 63–2. 00	0. 14–0. 18	5. 1–6. 5	Moderate.
100	100	90–100	85–100	0. 63–2. 00	0. 20–0. 22	5. 1–5. 5	Low.
100	100	95–100	95–100	0. 06–0. 20	0. 18–0. 20	5. 1–5. 5	High.
100	100	95–100	85–100	0. 63–2. 00	0. 20–0. 22	4. 5–5. 5	Low.
100	100	95–100	85–100	0. 63–2. 00	0. 20–0. 22	4. 5–5. 5	Low.
100	100	95–100	80–90	0. 06–0. 20	0. 14–0. 17	4. 5–5. 5	Low.
100	95–100	89–90	30–40	0. 63–2. 00	0. 11–0. 15	4. 5–5. 0	Low.
100	100	85–95	60–75	0. 63–2. 00	0. 15–0. 19	4. 5–5. 0	Low.
100	95–100	85–95	30–40	0. 63–2. 00	0. 11–0. 15	4. 5–5. 0	Low.
100	100	60–80	15–25	6. 30–20. 00	0. 04–0. 09	4. 5–5. 0	Low.
100	100	95–100	90–100	0. 63–2. 00	0. 18–0. 22	5. 1–5. 5	Low.
100	100	95–100	90–100	0. 63–2. 00	0. 18–0. 22	5. 1–5. 5	Low.
100	100	95–100	90–100	0. 60–0. 20	0. 20–0. 22	6. 6 7. 8	High.
100	100	95–100	90–100	0. 06–0. 20	0. 18–0. 20	6. 6–7. 8	High.
100	100	85–95	60–75	0. 63–2. 00	0. 12–0. 15	5. 1–5. 5	Low.
100	100	85–100	70–90	0. 63–2. 00	0. 20–0. 22	5. 1–5. 5	Low.
100	100	95–100	70–85	0. 63–2. 00	0. 18–0. 20	5. 1–5. 5	Moderate.

TABLE 6.—*Estimated soil properties*

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	Classification		
			USDA texture	Unified	AASHO
	In.	*In.*			
Commerce: Co	12	0–18	Silt loam	ML	A–4
		18–65	Silty clay loam	CL	A–6 or A–7
Falaya: Fa	12	0–5	Silt loam	ML or ML–CL	A–4
		5–60	Silt loam	ML or ML–CL	A–4
Falkner: FkA, FkB, FkC, FkC2	15	0–10	Silt loam	ML or ML–CL	A–4
		10–33	Silty clay	CL	A–6
		33–76	Silty clay loam	CH	A–7
Frizzell: FlA, FlB	20	0–8	Silt loam	ML or ML–CL	A–4
		8–30	Silt loam	ML or ML–CL	A–4
		30–60	Silt loam	ML–CL	A–4 or A–6
*Gullied land: GoE. Properties too variable to rate. For the Oktibbeha part of GoE, see Oktibbeha series.					
Henry: Hn	(2)	0–6	Silt loam	ML	A–4
		6–19	Silt loam	ML	A–4
		19–41	Silt loam (fragipan)	ML or CL	A–4 or A–6
		41–70	Silty clay loam (fragipan)	CL	A–6
*Iuka: Io. For the Ochlockonee part of Io, see Ochlockonee series.	20	0–33	Sandy loam	SM	A–2 or A–4
		33–50	Sandy clay loam	SC or CL	A–4 or A–6
Kipling: KlB, KlC, KlD2, KnD3	15	0–5	Silt loam	ML or ML–CL	A–4 or A–6
		5–11	Silty clay loam	CH or CL	A–6 or A–7
		11–60	Silty clay	CH	A–7
Leeper: Le	12	0–29	Silty clay loam	CL	A–6
		29–49	Silty clay	CH	A–7
		49–60	Clay	CH	A–7
Mantachie: Mc	12	0–11	Sandy loam	SM	A–4 or A–2
		11–60	Clay loam	CL	A–4 or A–6
Marietta: Me	15	0–6	Loam	ML or ML–CL	A–4
		6–20	Clay loam	CL	A–6
		20–60	Loam	CL	A–6
Mashulaville: Mh	(2)	0–12	Silt loam	ML	A–4
		12–23	Loam	ML or CL	A–4 or A–6
		23–47	Clay loam (fragipan)	CL	A–6
		47–62	Loam (fragipan)	CL or ML	A–4 or A–6
Mayhew: MsA, MsB, MsD, MsD2	10	0–22	Silty clay loam	CL	A–6
		22–80	Silty clay	CL or CH	A–7

See footnotes at **end of table.**

significant in engineering—Continued

Percentage passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)				
				In./hr.	*In./in. of soil*		
100	100	95–100	85–95	0. 63–2. 00	0. 20–0. 22	6. 6–7. 8	Low.
100	100	95–100	85–100	0. 20–0. 63	0. 20–0. 22	6. 6–7. 8	Low to moderate.
100	100	90–100	95–100	0. 63–2. 00	0. 20–0. 22	5. 1–5. 5	Low.
100	100	90–100	95–100	0. 63–2. 00	0. 20–0. 22	5. 1–5. 5	Low.
100	100	95–100	90–100	0. 63–2. 00	0. 20–0. 22	4. 0–5. 0	Low.
100	100	95–100	85–95	0. 20–0. 63	0. 20–0. 22	4. 0–5. 0	Moderate.
100	100	90–100	85–95	0. 06–0. 20	0. 18–0. 20	4. 0–5. 0	High.
100	100	95–100	65–80	0. 63–2. 00	0. 20–0. 22	4. 5–5. 5	Low.
100	100	95–100	80–90	0. 06–0. 20	0. 20–0. 22	4. 5–5. 5	Low.
100	100	95–100	65–80	0. 06–0. 20	0. 20–0. 22	4. 5–5. 5	Moderate.
100	100	95–100	90–100	0. 63–2. 00	0. 20–0. 22	4. 5–5. 5	Low.
100	100	95–100	90–100	0. 20–0. 63	0. 20–0. 22	4. 5–5. 5	Low.
100	100	95–100	90–100	0. 06–0. 20	0. 12–0. 15	4. 5–5. 5	Low.
100	100	95–100	90–100	0. 06–0. 20	0. 12–0. 15	4. 5–5. 5	Low to moderate.
100	100	70–90	30–40	2. 00–6. 30	0. 11–0. 15	4. 5–5. 5	Low.
100	100	80–90	35–55	0. 63–2. 00	0. 14–0. 18	4. 5–5. 5	Low.
100	100	90–100	70–90	0. 63–2. 00	0. 20–0. 22	5. 1–5. 5	Moderate.
100	100	95–100	85–95	0. 20–0. 63	0. 20–0. 22	5. 1–5. 5	High.
100	100	95–100	90–95	0. 00–0. 20	0. 18–0. 20	5. 1–5. 5	Very high.
100	100	95–100	85–95	0. 06–0. 20	0. 20–0. 22	6. 1–7. 3	Moderate.
100	100	95–100	90–95	0. 06–0. 20	0. 18–0. 20	6. 1–7. 3	High.
100	100	90–100	75–95	0. 00–0. 06	0. 18–0. 20	6. 1–7. 3	High.
100	100	60–75	30–40	0. 63–2. 00	0. 11–0. 15	4. 5–5. 0	Low.
100	100	85–95	55–75	0. 63–2. 00	0. 17–0. 19	4. 5–5. 0	Low.
100	100	85–95	50–60	0. 63–2. 00	0. 15–0. 19	6. 1–7. 3	Low.
100	100	95–100	70–90	0. 63–2. 00	0. 14–0. 18	6. 1–7. 3	Moderate.
100	100	85–95	50–60	0. 63–2. 00	0. 15–0. 19	6. 1–7. 3	Moderate.
100	100	85–95	55–90	0. 63–2. 00	0. 20–0. 22	4. 5–5. 5	Low.
100	100	85–95	50–60	0. 63–2. 00	0. 12–0. 15	4. 5–5. 5	Low.
100	100	90–100	60–70	0. 06–0. 20	0. 12–0. 15	4. 5–5. 5	Low.
100	100	85–95	50–60	0. 06–0. 20	0. 12–0. 15	4. 5–5. 5	Low.
100	100	95–100	85–100	0. 00–0. 06	0. 20–0. 22	4. 5–5. 5	High.
100	100	95–100	95–100	0. 00–0. 06	0. 18–0. 20	4. 5–5. 5	High.

TABLE 6.—*Estimated soil properties*

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	Classification		
			USDA texture	Unified	AASHO
	In.	*In.*			
Ochlockonee	30–60	0–46	Sandy loam	SM	A–4
Mapped only in undifferentiated unit with Iuka soil.		46–60	Loam	CL or ML	A–4
*Oktibbeha: ObE3, OKE	24	0–4	Loam	CL	A–6
For Ruston part of OKE, see Ruston series.		4–21	Silty clay	CH	A–7
		21–38	Silty clay loam	CL or CH	A–6 or A–7
		38–55	Silty clay loam	CL or CH	A–6 or A–7
Ora: OrB, OrB2, OrC, OrC2, OrD2	24	0–5	Loam	ML or ML–CL	A–4
		5–22	Loam	CL	A–6
		22–31	Loam (fragipan)	ML or CL	A–4
		31–63	Sandy clay loam (fragipan)	CL or SC	A–6
Providence: PrB PrB2, PrC2, PrD3, PuE	24	0–12	Silt loam	ML or ML–CL	A–4
		12–19	Silty clay loam	CL	A–6 or A–7
		19–27	Silt loam (fragipan)	CL	A–6
		27–55	Loam (fragipan)	CL	A–6
		55–60	Sandy clay loam (fragipan)	SM or SC	A–2 or A–4
Providence, heavy substratum: PsB, PsB2, PsC, PsC2, PsD2.	24	0–5	Silt loam	ML or ML–CL	A–4
		5–24	Silty clay loam	CL	A–6 or A–7
		24–39	Silt loam (fragipan)	CL	A–6
		39–60	Clay	CH	A–7
Robinsonville: Ro	30–60	0–20	Sandy loam	SM or ML	A–4
		20–32	Loam	ML	A–4
		32–50	Sandy loam	SM or ML	A–4
		50–62	Clay loam	CL	A–6
Rosebloom: Rs	(1)	0–60	Silt loam	ML or CL	A–4 or A–6
*Ruston: RuE, RuE2	>60	0–5	Sandy loam	SM	A–2 or A–4
For Cahaba part of RuE and RuE2, see Cahaba series.		5–20	Loam	CL	A–4 or A–6
		20–32	Sandy loam	SM or SC	A–2 or A–4
		32–41	Loamy sand	SM	A–2
		41–60	Sandy clay loam or sandy loam.	SC, SM	A–4 or A–6
*Tippah: TpB, TpC, TWE	30	0–6	Silt loam	ML or ML–CL	A–4
For Providence or Wilcox part of TWE, see Providence or Wilcox series.		6–37	Silty clay loam	CL	A–4 or A–6
		37–60	Silty clay or clay	MH or CH	A–7
Urbo: Ur	12	0–9	Silty clay loam	CL	A–6
		9–71	Silty clay	CH or CL	A–7
Wilcox: WcB, WcC	15	0–11	Silty clay loam	CL or CH	A–6 or A–7
		11–60	Silty clay	CH	A–7

[1] Seasonally ponded.

significant in engineering—Continued

Percentage passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)				
				In./hr.	*In./in. of soil*		
100	100	95–100	36–50	2. 00–6. 30	0. 10–0. 15	4. 5–5. 5	Low.
100	100	85–95	60–75	2. 00–6. 30	0. 10–0. 15	4. 5–5. 5	Low.
100	100	85–95	60–75	0. 63–2. 00	0. 15–0. 20	4. 5–5. 5	Low.
100	100	95–100	90–95	0. 00–0. 20	0. 15–0. 20	4. 5–5. 5	High.
100	100	95–100	85–95	0. 00–0. 20	0. 15–0. 20	4. 5–5. 5	High.
100	100	95–100	85–95	0. 00–0. 20	0. 15–0. 20	7. 4–8. 4	High.
100	100	85–95	60–75	0. 63–2. 00	0. 15–0. 19	5. 1–5. 5	Low.
100	100	85–95	60–75	0. 63–2. 00	0. 15–0. 19	5. 1–5. 5	Low.
100	100	85–95	60–75	0. 20–0. 63	0. 10–0. 13	5. 1–5. 5	Low.
100	100	80–90	36–55	0. 20–0. 63	0. 10–0. 13	5. 1–5. 5	Low.
100	100	90–100	85–100	0. 63–2. 00	0. 20–0. 22	4. 5–5. 5	Low.
100	100	95–100	85–100	0. 63–2. 00	0. 20–0. 22	4. 5–5. 5	Moderate.
100	100	90–100	70–90	0. 20–0. 63	0. 12–0. 15	4. 5–5. 5	Low.
100	100	85–95	60–80	0. 20–0. 63	0. 10–0. 15	4. 5–5. 5	Low.
100	100	60–70	30–45	0. 20–0. 63	0. 15–0. 17	4. 5–5. 5	Low.
100	100	90–100	85–100	0. 63–2. 00	0. 20–0. 22	4. 5–5. 5	Low.
100	100	95–100	85–100	0. 63–2. 00	0. 20–0. 22	4. 5–5. 5	Moderate.
100	100	90–100	70–90	0. 20–0. 63	0. 12–0. 15	4. 5–5. 5	Low.
100	100	90–100	95–100	0. 20–0. 63	0. 10–0. 15	4. 5–5. 5	High.
100	100	85–95	35–55	2. 00–6. 30	0. 10–0. 15	6. 1–7. 8	Low.
100	100	85–95	60–75	2. 00–6. 30	0. 15–0. 20	6. 1–7. 8	Low.
100	100	85–95	35–55	2. 00–6. 30	0. 10–0. 15	6. 1–7. 8	Low.
100	100	90–100	70–80	2. 00–6. 30	0. 17–0. 15	6. 1–7. 8	Low.
100	100	85–100	85–95	0. 06–0. 20	0. 20–0. 22	4. 5–5. 0	Moderate.
100	100	60–70	30–40	0. 63–2. 00	0. 11–0. 15	4. 5–5. 5	Low.
100	100	85–95	60–75	0. 63–2. 00	0. 15–0. 19	4. 5–5. 5	Low.
100	100	60–75	30–40	0. 63–2. 00	0. 11–0. 15	4. 5–5. 0	Low.
100	100	50–75	15–25	6. 30–20. 00	0. 04–0. 09	4. 5–5. 5	Low.
100	100	75–95	36–50	0. 63–2. 00	0. 14–0. 18	4. 5–5. 5	Low.
100	100	95–100	95–100	0. 63–2. 00	0. 20–0. 22	4. 5–5. 5	Low.
100	100	95–100	85–95	0. 06–0. 20	0. 20–0. 22	4. 5–5. 5	Moderate.
100	100	95–100	85–95	0. 06–0. 20	0. 18–0. 20	4. 5–5. 5	High.
100	100	95–100	95–100	0. 06–0. 20	0. 20–0. 22	4. 5–5. 5	High.
100	100	95–100	85–98	0. 00–0. 06	0. 18–0. 20	4. 5–5. 5	High.
100	100	95–100	85–95	0. 06–0. 20	0. 20–0. 22	4. 5–5. 5	Moderate.
100	100	95–100	90–95	0. 00–0. 06	0. 18–0. 20	4. 5–5. 5	Very high.

[2] Perched water table.

475-002—73——5

TABLE 7.—*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 for referring to other series that

Soil series and map symbols	Suitability as source of—			Soil features affecting—
	Topsoil	Sand	Road fill	Highway location
Adaton: Ad	Fair: thin surface layer; wetness.	Not suitable: high content of fines.	Poor: wetness	Wetness
Arkabutla: Ar	Fair: thin surface layer; wetness.	Not suitable: high content of fines.	Fair: easily eroded; fair traffic-supporting capacity.	Flood plain; occasional to frequent floods.
Atwood: AtA, AtB, AtB2, AtC3, AtD3	Fair: thin surface layer.	Not suitable: high content of fines.	Fair: fair traffic-supporting capacity.	Fair traffic-supporting capacity.
Boswell: BoB2, BoC2	Poor: thin surface layer.	Not suitable: high content of fines.	Poor: poor traffic-supporting capacity; high shrink-swell potential.	High shrink-swell potential; poor traffic-supporting capacity.
Bude: BuA, BuB	Fair: thin surface layer.	Not suitable: high content of fines.	Poor: easily eroded; fair traffic-supporting capacity; wetness.	Wetness; fair traffic-supporting capacity.
Cahaba Mapped only with Ruston soils.	Good	Poor above a depth of about 40 inches; high content of fines.	Good	Steep topography
Cascilla: Ca	Good	Not suitable: high content of fines.	Fair: moderate erodibility; fair traffic-supporting capacity.	Fair traffic-supporting capacity; flood plain.
Catalpa: Cc	Poor: fine texture; thin surface layer.	Not suitable: high content of fines.	Poor: poor traffic-supporting capacity; high shrink-swell potential.	Flood plain; high shrink-swell potential.
Chewacla: Ce, Ch	Fair: wetness	Not suitable: high content of fines.	Fair: wetness	Flood plain; subject to flooding.
Commerce: Co	Fair: wetness	Not suitable: high content of fines.	Fair: fair traffic-supporting capacity.	Flood plain; subject to flooding.

interpretations

in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the instructions appear in the first column of this table]

Soil features affecting—Continued					
Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Waterways
Reservoir area	Embankment				
Slow permeability	Medium compressibility; medium resistance to piping and erosion.	Needs surface drainage; high water table.	Slow permeability; very high available water capacity.	Not needed; nearly level.	Very high available water capacity.
Moderate permeability; subject to flooding.	Poor to fair strength and stability.	Needs surface drainage; wetness	Moderate permeability; very high available water capacity.	Not needed; nearly level.	Very high available water capacity; grows good sod.
Moderate permeability.	Fair stability; medium compressibility.	Not generally needed.	Very high available water capacity.	Soil properties favorable.	Very high available water capacity.
Slow permeability	High compressibility; poor stability.	Not needed; slope	High available water capacity; slow permeability.	Soil properties favorable.	High available water capacity; plastic clays and silty clays.
Slow permeability	Fair strength and stability.	Needs surface drainage; wetness.	Medium available water capacity; slow permeability.	Not needed; wetness.	Medium available water capacity.
Excessive seepage in some areas.	Fair to good strength and stability.	Not generally needed; slope.	Moderate permeability; medium available water capacity.	Steep slopes	Medium available water capacity; grows good sod if fertilized.
Moderate permeability.	Fair stability; resists piping and erosion.	Not generally needed; well drained.	Moderate permeability; high to very high available water capacity.	Not needed; flood plain; nearly level.	High to very high available water capacity.
Slow seepage rate; will support deep water.	Cracks when dry; difficult to pack properly; slow permeability.	Needs surface drainage; high water table.	Soil cracks easily; high initial intake rate, decreases as soil becomes moist.	Flood plain; not needed; nearly level.	High available water capacity; grows good sod.
Moderate permeability.	Fair to good strength and stability.	Needs surface drainage; high water table.	Moderate permeability; high to very high available water capacity.	Flood plain; nearly level; not needed.	High to very high available water capacity.
Subject to excess seepage in some areas; moderately slow permeability.	Moderately slow permeability; fair to good strength and stability.	Needs surface drainage; high water table.	Moderately slow permeability; very high available water capacity.	Flood plain; nearly level; not needed.	Very high available water capacity; grows good sod.

TABLE 7.—*Engineering*

Soil series and map symbols	Suitability as source of—			Soil features affecting—
	Topsoil	Sand	Road fill	Highway location
Falaya: Fa	Fair: wetness	Not suitable: high content of fines.	Fair: easily eroded	Flood plain; subject to flooding; seasonal high water table; fair traffic-supporting capacity.
Falkner: FkA, FkB, FkC, FkC2	Fair: thin surface layer.	Not suitable: high content of fines.	Poor: poor traffic-supporting capacity; suitable material too thin.	Poor traffic-supporting capacity; high shrink-swell potential.
Frizzell: FlA, FlB	Fair: wetness	Not suitable: high content of fines.	Fair: wetness	Fair traffic-supporting capacity; wetness.
*Gullied land: GoE. Properties are too variable for rating. For the Oktibbeha part of GoE, see Oktibbeha series.				
Henry: Hn	Poor: wetness	Not suitable: high content of fines.	Poor: wetness	Wetness
*Iuka: Io. For Ochlockonee part of Io, see Ochlockonee series.	Fair: wetness	Not suitable: high content of fines.	Fair: wetness	Flood plain; subject to flooding.
Kipling: KlB, KlC, KlD2, KnD3	Poor: thin surface layer.	Not suitable: high content of fines.	Poor: very high shrink-swell potential.	Very high shrink-swell potential.
Leeper: Le	Poor: high content of fines in surface layer.	Not suitable: high content of fines.	Poor: high shrink-swell potential.	Flood plain; high shrink-swell potential.
Mantachie: Mc	Fair: wetness	Not suitable: high content of fines.	Fair to good: wetness.	Subject to flooding
Marietta: Me	Fair: thin surface layer; wetness.	Not suitable: high content of fines.	Fair to good: wetness.	Flood plain; subject to flooding.
Mashulaville: Mh	Poor: wetness	Not suitable: high content of fines.	Fair to poor: wetness.	Drainage impeded by fragipan.
Mayhew: MsA, MsB, MsD, MsD2	Fair: high clay content at 22 inches.	Not suitable: high content of fines.	Poor: high shrink-swell potential; poor traffic-supporting capacity; wetness.	Low traffic-supporting capacity; high shrink-swell potential.

interpretations—Continued

Soil features affecting—Continued					
Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Waterways
Reservoir area	Embankment				
Moderate permeability.	Fair strength and stability; easily eroded; moderate permeability.	Needs surface drainage; high water table.	Moderate permeability; very high available water capacity.	Flood plain; not needed; nearly level.	Very high available water capacity; grows good sod.
Slow seepage rate	Fair strength and stability; slow permeability.	Needs surface drainage; high water table.	Slow permeability; high to very high available water capacity.	Soil properties favorable.	High to very high available water capacity; grows fairly good sod.
Slow permeability	Medium compressibility; poor to fair resistance to piping.	Needs surface drainage; wetness.	Very high available water capacity; slow intake rate.	Soil properties favorable.	Very high available water capacity.
Slow permeability	Poor resistance to piping; fair stability and strength.	Needs surface drainage; wetness.	Slow permeability	Not needed; nearly level.	Medium available water capacity; fragipan layer at about 19 inches.
Moderate permeability; subject to flooding.	Resists piping; fair stability and strength.	Needs surface drainage; wetness.	Moderate permeability; medium to high available water capacity.	Flood plain; nearly level.	Medium to high available water capacity.
Will support deep water; slow seepage.	Cracks when dry; subject to seepage; difficult to pack properly.	Not needed; slope	Soil cracks easily; high initial intake rate, decreases as soil becomes moist.	Soil properties favorable.	Plastic clays; grows good sod; high to very high available water capacity.
Slow seepage; will support deep water.	Cracks when dry; difficult to pack properly.	Needs surface drainage; wetness.	Soil cracks easily; high initial intake rate, decreases as soil becomes moist.	Flood plain; not needed; nearly level.	Plastic clays; grows good sod; high to very high available water capacity.
Moderate seepage	Fair strength and stability.	Needs drainage; wetness.	Moderate permeability.	Flood plain; not needed; nearly level.	Medium to high available water capacity.
Subject to excess seepage in some areas.	Moderate permeability; fair to good strength and stability.	Needs surface drainage; wetness.	Moderate permeability.	Flood plain; not needed; nearly level.	Medium to high available water capacity; grows good sod.
Low seepage rate	Fair strength and stability; slow permeability.	Needs surface drainage; difficult due to fragipan; wetness.	Shallow rooting zone; slow permeability.	Soil properties favorable.	Medium available water capacity; grows good sod when fertilized.
Very slow permeability.	Fair strength and stability; high compressibility.	Needs surface drainage; wetness on MsA soil.	Very slow permeability; high to to very high available water capacity.	Soil properties favorable; slope affects MsD soil.	Plastic clay; grows good sod; high to very high available water capacity.

TABLE 7.—*Engineering*

Soil series and map symbols	Suitability as source of—			Soil features affecting—
	Topsoil	Sand	Road fill	Highway location
Ochlockonee. Mapped only with Iuka soils.	Good	Fair to poor: grain size; high content of fines.	Good	Flood plain; subject to flooding.
*Oktibbeha: ObE3, OKE. For Ruston part of OKE, see Ruston series.	Poor: suitable material too thin.	Not suitable: high content of fines.	Poor: high shrink-swell potential.	Plastic clays and silty clays; high shrink-swell potential; slope.
Ora: OrB, OrB2, OrC, OrC2, OrD2	Good	Generally poor: underlying material good in some areas.	Fair to good: wetness.	Fragipan: wetness
Providence: PrB, PrB2, PrC2, PrD3, PuE.	Good	Generally poor: high content of fines.	Fair: fair traffic-supporting capacity; wetness.	Fragipan; wetness
Providence, heavy substratum: PsB, PsB2, PsC, PsC2, PsD2.	Good	Not suitable: high content of fines.	Fair: fair traffic-supporting capacity; wetness; underlain by plastic clays.	Underlain by plastic clay; wetness.
Robinsonville: Ro	Good	Fair to poor: high content of fines.	Fair to good: traffic-supporting capacity.	Flood plain; subject to occasional flooding.
Rosebloom: Rs	Fair: depth of suitable material; wetness.	Not suitable: high content of fines.	Poor: wetness	Flood plain; subject to flooding; wetness.
*Ruston: RuE, RuE2. For Cahaba part of RuE and RuE2, see Cahaba series.	Good	Not suitable: high content of fines.	Good	Soil properties favorable; steep topography.
*Tippah: TpB, TpC, TWE. For Providence or Wilcox part of TWE, see Providence or Wilcox series.	Fair: thickness of suitable material.	Not suitable: high content of fines.	Poor: underlain by clay.	Underlain by plastic clays.
Urbo: Ur	Fair: thickness of suitable material; wetness.	Not suitable: high content of fines.	Fair to poor: poor traffic-supporting capacity; wetness; high shrink-swell potential.	Flood plain; subject to flooding; wetness.
Wilcox: WcB, WcC	Poor: thickness of suitable material.	Not suitable: high content of fines.	Poor: poor traffic-supporting capacity; very high shrink-swell potential.	Low traffic-supporting capacity; very high shrink-swell potential.

interpretations—Continued

Soil features affecting—Continued					
Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Waterways
Reservoir area	Embankment				
High seepage rate	Seepage likely; poor resistance to piping.	Not generally needed; well drained.	Moderately rapid permeability; low to medium available water capacity.	Flood plain; not needed; nearly level.	Low to medium available water capacity.
Slow seepage; will support deep water.	Cracks when dry; subject to seepage; difficult to pack properly.	Not needed; slope	Soil cracks easily; high initial intake rate, increases as soil becomes moist.	Slope	High available water capacity; grows good sod.
Excessive seepage in some areas below fragipan.	Fair to good strength and stability; moderately slow permeability.	Not needed; slope	Moderately slow permeability above fragipan; medium available water capacity.	Soil properties favorable; fragipan restricts root growth.	Medium available water capacity above fragipan.
Excessive seepage in some areas below fragipan.	Fair strength and stability; moderately slow permeability.	Not needed; slope	Moderately slow permeability; medium available water capacity.	Soil properties favorable; fragipan restricts root growth.	Medium available water capacity above fragipan.
Slow seepage rate	Fair strength and stability; slow permeability.	Not generally needed; slope.	Moderately slow permeability; medium available water capacity.	Soil properties favorable; fragipan restricts root growth.	Medium available water capacity above fragipan.
Reservoir area subject to excessive seepage in some areas.	Moderately rapid permeability; fair to good strength and stability.	Needs surface drainage; overflow.	Moderately rapid permeability.	Flood plain; not needed; nearly level.	High to medium available water capacity.
Slow seepage rate	Fair strength and stability; slow permeability.	Flood plain; needs surface drainage; wetness.	Slow permeability; very high available water capacity.	Flood plain; not needed; nearly level.	Very high available water capacity.
Excessive seepage in some areas.	Fair to good strength and stability; moderate permeability.	Not generally needed; slope.	Moderate permeability; medium to high available water capacity.	Steep slopes	Medium to high available water capacity; grows good sod.
Slow seepage rate	Low to fair strength and stability; slow seepage rate.	Not generally needed; slope.	Slow permeability	Soil properties favorable; slope affects TWE soil.	High to very high available water capacity.
Very slow permeability.	Medium to high compressibility; resists piping and erosion.	Surface drainage needed; wetness.	Very slow permeability.	Flood plain; not needed; nearly level.	High to very high available water capacity.
Very slow permeability.	Fair strength and stability; very high shrink-swell potential.	Not generally needed; slope.	Very slow permeability; high to very high available water capacity.	Soil properties favorable.	High to very high available water capacity.

Engineering classification

The two systems most commonly used in classifying soils for engineering are the systems approved by the American Association of State Highway Officials (AASHO) and the Unified system.

The AASHO system (*1*) is used to classify soils according to those properties that affect use in highway construction. In this system all soil material is classified in seven principal groups. The groups range from A–1, which consists of soils that have the highest bearing strength and are the best soils for subgrade, to A–7, which consists of soils that have the lowest strength when wet.

In the Unified system (*8*) soils are classified according to their texture and plasticity and their performance as engineering construction material. 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. GP and GW are clean gravels, and GM and GC are gravels that include, respectively, an appreciable amount of nonplastic and plastic fines. SP and SW are clean sands. SM and SC are sands that include fines of silt and clay. ML and CL are silts and clays that have a low liquid limit, and MH and CH are silts and clays that have a high liquid limit. Soils on the borderline between two classes are designated by symbols for both classes; for example, ML–CL.

Soil scientists use the USDA textural classification (*5*). In this, the texture of the soil is determined according to the proportion of soil particles smaller than 2 millimeters in diameter, that is, the proportion of sand, silt, and clay. Textural modifiers, such as gravelly, stony, shaly, and cobbly, are used as needed.

Table 5 shows the AASHO and Unified classifications of specified soils in the county, as determined by laboratory tests. Table 6 shows the estimated classification of all the soils in the county according to all three systems of classification.

Engineering test data

Soil samples taken from three profiles in Pontotoc County were tested in accordance with standard procedures to help evaluate the soils for engineering purposes. Table 5 shows the results of these tests made to determine particle-size distribution and other properties significant in soil engineering. Some terms used in table 5 are explained in the following paragraphs.

In a moisture density or compaction test, a sample of soil material is compacted several times at the same compactive force, each time at a higher moisture content. The dry density (unit weight) of the soil material increases until optimum moisture content is reached. After that, the dry density decreases with an increase of moisture content. The highest dry density obtained is termed the "maximum dry density." Moisture-density data are important in earthwork because, as a rule, optimum stability is obtained if the soil is compacted to about maximum stability when it is at approximately optimum moisture content.

Mechanical analysis shows the percentage, by weight, of soil particles that pass sieves of specified sizes. Sand and other coarser materials do not pass through the No. 200 sieve, but silt and clay do. In the AASHO system, silt is identified as material finer than 0.074 millimeter, yet coarser than 0.005 millimeter. Clay is material finer than 0.005 millimeter. The particle-size distribution of materials passing the No. 200 sieve was determined by the hydrometer method.

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 state. The plastic limit is the moisture content at which the soil passes from semisolid to plastic. As the moisture content is further increased, the material changes from a plastic to a liquid state. The liquid limit is the moisture content at which the material changes from plastic to liquid. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range in moisture content within which a soil material is plastic.

Estimated soil properties significant in engineering

In table 6 are estimates by major soil horizons, of important properties that affect the engineering use of the soils in Pontotoc County. These estimates are based on the results of laboratory tests, on observations made in the field, and on the behavior of soils used in engineering structures. Some of the columns require explanation.

The depth from the surface is that of the major horizons in the soil sample profile. The soil material in these horizons is classified according to the textural terms used by the United States Department of Agriculture, and according to the AASHO and the Unified systems. Also listed for the horizons are the estimated percentages of material that passes No. 4, 10, 40, and 200 sieves. The estimates are based on test data and on data from similar soils in other counties and information obtained from other parts of this soil survey. The amount of material passing through a No. 200 sieve shows the separation of the coarse-grained and the fine-grained soil.

Permeability of the horizons, in inches of water percolation per hour, was estimated for the soils in place. The permeability of each horizon of a soil is important in planning drainage or irrigation of a farm. Horizons that impede drainage and those that are very permeable can greatly affect the suitability of the soil material for foundations. Permeability depends mainly on the texture and the structure of the soil, but it is affected by other properties.

Available water capacity gives estimates of the approximate amount of capillary water in a soil that is wet to field capacity, or the difference between the amount of water at field capacity and the amount at the permanent wilting point of plants. The available water capacity is expressed in terms of inches of water per inch of soil depth.

The acid or alkaline reaction of the soil is expressed in pH. A pH of 7.0 is neutral; values lower than 7.0 are acid; and values higher than 7.0 are alkaline. Knowledge of reaction is useful in laying of pipelines, because it indicates, among other things, the likelihood of corrosion.

Shrink-swell potential is rated according to the expected volume change of the soil horizon resulting from the change in the content of moisture. It is estimated primarily on the basis of the amount and type of clay in the soil horizon and is rated as low, moderate, high, or very high. In general, soils classified CH or A–7 have a high shrink-swell potential. Clean sands and gravels (single-grained structure) and soils containing a small amount of nonplastic to slightly plastic fines have a low shrink-swell potential.

Engineering interpretations

In table 7 the soils of Pontotoc County are rated according to their suitability as sources of topsoil, sand, and road fill. Also named are features that affect the location of highways, the construction and maintenance of farm ponds, drainage systems, irrigation systems, terraces and diversions, and waterways. These interpretations are based on experience with the same kinds of soil in other counties and on information in other parts of this soil survey. In this county difficulties in highway construction are caused mainly by characteristics of the soil material and drainage. Bedrock is at so great a depth that it does not adversely affect the construction of highways.

The suitability of soils for topsoil is rated *good*, *fair*, or *poor*. Topsoil is soil material used to topdress slopes, roadbanks, lawns, gardens, and other areas. Important in rating suitability of soil material for use as topsoil are the productivity of the soil, the presence of coarse fragments, and the thickness of the material at its source.

The suitability of a soil as a source of sand is rated as *good*, *fair*, *poor*, or *not suitable*. Generally the soils are not suited as a source of sand. In some places such soils as the Cahaba, Ruston, and Ora series have soil material that is suitable for road subbase. The soils of Pontotoc County are not suited as a source of gravel, as none are a source.

Road fill is soil material used for building up road grades. It is the material that supports the base layer. The properties important in evaluating soil material for use as road fill are shrink-swell potential, traffic-supporting capacity, inherent erodibility, and the thickness of the material at its source. The soils are rated as *good*, *fair*, or *poor*. Cahaba soils are rated *good* because the shrink-swell potential is generally low, traffic-supporting capacity is good, inherent erodibility is less than severe, and the material is thicker than 6 feet at its source. Oktibbeha soils are rated *poor* because the shrink-swell potential is high, erodibility is severe, and the thickness of material is less than 4 feet at its source.

The chief soil-related limitations encountered in designing, constructing, and maintaining highways are caused by the characteristics of the soils or by poor drainage. Tables 5 and 6 contain information about these properties and evaluations of the various soils for use as construction material.

The Kipling, Oktibbeha, and Wilcox soils shrink when dry and swell when wet. When these soils are used as subgrade, the pavement cracks and warps because the soils expand and contract. The cracking and warping can be minimized if a thick layer of soil that has low volume change is used as a foundation course beneath the pavement. This course should extend through the shoulder of the road to provide internal drainage. Roadway designs in which the shoulders are wide and the slopes are less steep than normal tend to prevent excessive volume change in the material beneath the pavement. The substratum of Ruston, Cahaba, Providence, and Ora soils is a source of material that can be used satisfactorily for subcourses.

A high water table is an important consideration in planning and designing engineering works. In Pontotoc County all soils of the flood plains and such upland soils as Mashulaville have a high water table. Roads on these soils should be constructed on embankment sections or be provided with an adequate system of subsurface and surface drainage. In lowlands and other areas that are flooded, roads should be constructed on a continuous embankment that is several feet above the level of frequent floods.

A fragipan, or a compacted layer of silt and coarser textured material, restricts movement of water through the soil and presents design limitations. Ora, Providence, and Mashulaville soils have a fragipan. In nearly level areas, road ditches should extend below the fragipan. The pavement grade should be at least 4 feet above the top of the fragipan. In some cases it is necessary to excavate the fragipan and replace it with a more permeable material.

Extensive use has been made of farm ponds for supplying water for livestock, fish production, recreation, wildlife, and other on-farm uses. Dam-type ponds are established by constructing an embankment across a watercourse or natural basin. Farm pond reservoir areas are affected mainly by loss of water through seepage and the soil features that influence such seepage. The soil features of the subsoil and substratum are important in the construction of pond embankments. Soils such as those of the Adaton and Arkabutla series have fair slope stability where used in embankments. Slope stability is the resistance of the embankment to failure by sliding when water is impounded.

Tippah silt loam is a good soil for reservoirs, but it allows some seepage near the ground line when used in a levee or embankment because of high compressibility and high shrink-swell potential.

A complete drainage system is essential to most of the flood plain soils of Pontotoc County if they are to be used more efficiently. A great amount of work has been done to improve the drainage of agricultural land, but many additional improvements are needed. Some features affecting agricultural drainage are topography, depth to water table, permeability, susceptibility to flooding, and availability of outlets.

A terrace is an earthen embankment or ridge and a channel constructed across the slope for the purpose of collecting runoff and transporting it at nonerosive velocities to protect outlets.

A diversion is a graded or excavated channel that has a supporting ridge on the lower side, constructed across a slope at a controlled grade. The purpose of a diversion is to divert water that flows from areas where it is in

excess to sites where it can be used beneficially or disposed of safely.

Uniformity, length and steepness of slope, depth to fragipan or other unfavorable material, texture permeability, erosion hazard, and other properties of the soil material are considered when determining the suitability of a soil for terraces and diversions.

The effective use of irrigation water depends largely on the rate at which water moves into and through the soil and on the available water capacity of the soil.

Waterways are known as grassed waterways or outlets, and they must be vegetated to an adapted grass. Among the features considered are erodibility, available water capacity, slope, soil material, and suitability of the soil for the establishment, growth, and maintenance of plants. Waterways are used to direct water down gentle slopes into a ditch on level land. Grassed waterways are formed on soils to carry off excess water that is discharged from terraces, diversions, and other areas.

Town and Country Planning [6]

This section describes properties and characteristics of the soils of Pontotoc County for town and country planning. It was prepared for planners, builders, developers, landscape architects, present and potential landowners, and others interested in the increased use of land.

In selecting an area for town or country development, the suitability of the soils for each of the several activities or facilities must be evaluated. Some of the more common characteristics of soils that affect their use are texture, depth, acidity, slope, permeability, proximity of rock, depth to the water table, and location in relation to flooding. Based on these and other related properties, the soils of the county are rated for specific uses. These ratings and the nature and degree of limitation affecting these ratings are shown in table 8. Features affecting engineering practices are in table 7.

Several different uses of the soils are described in the following paragraphs, and characteristics influencing the rating of soil limitations for these purposes are given. This information can be used with table 8, the soil map at the back of this survey, and other information in this survey as a guide in selecting a site and planning its use. However, an intensive onsite investigation should be made of any area under consideration before completing final plans or beginning construction.

Table 8 shows the relative degrees of limitation of the soils from slight to severe. *Slight* indicates that there is little or no significant limitation, *moderate* means that the limitation is significant but can be overcome by planning and engineering that requires moderate investment; and *severe* means that the limitation is such that it can be overcome only by intensive planning and engineering that requires a considerable investment.

Dwellings are permanent residences, vacation cottages, and buildings that serve as recreational facilities, such as comfort stations, lodges, pavilions, bathhouses, and restaurants. Some important soil characteristics to be considered are seasonal high water table, flooding, shrink-swell potential, and slope. The soil ratings and limitations for these structures are found in the table. The type of sewage disposal system is not considered in the evaluation of soils for these structures, because intensive site preparation is frequently required.

Sewage lagoons or *septic tank filter fields* are necessary for the sanitary disposal of sewage. Disposal by either method requires approval by the Health Department or the Air and Water Pollution Control Commission, and feasibility of using either method is heavily dependent on the nature of the soils. The selection of sites for these facilities should consider slope, permeability, the water table, hazard of flooding, and other soil characteristics.

Campsites are those areas that are suitable for temporary living out-of-doors in tents, pickup campers, or camping trailers. Site preparation for this activity normally requires developing an area for tents and a parking area. Soils for a campsite should be well suited to heavy pedestrian traffic and limited vehicular traffic during the period of May through September. The best soils have gentle slopes, good drainage, are without flooding during heavy use, and have a surface texture that remains firm after rain but does not become dusty when dry.

Picnic areas are sites where the main activity is eating a meal out-of-doors, and a visit to such an area by an individual or a group normally does not last more than 2 or 3 hours. Picnic areas are used to some degree throughout the year, and soil selected for such areas should be capable of supporting heavy pedestrian traffic. Site preparation is required for the placement of picnic tables and fireplaces, and these are generally within easy walking distance of a road or parking area. Important soil properties affecting this use are wetness, flooding, slope, and surface texture.

Playgrounds are those sites used by small children at play or sites providing for baseball, softball, tennis, archery, target and skeet shooting, and other group or competitive sports. Site preparation, including clearing, grading, shaping, and drainage, is required in those areas that are as much as several acres in size. Important soil properties influencing the selection of a site for playgrounds are seasonal water table and drainage, texture, slope, permeability, and trafficability.

Paths and trails are used for hiking, horseback riding, and bicycling. Selection of areas for these activities is largely influenced by their condition as they occur in nature. Site preparation generally includes some clearing and minor construction for hiking, horses, and bicycles. Simple bridges and some cuts and fills may be needed also. Soil properties that affect paths and trails are wetness, texture of the surface soil, flooding, and slope.

Light industry refers mainly to buildings other than residences that are used for stores, offices, and small industries, none of which is more than three stories high. It is assumed that public or community sewage disposal facilities are provided. Some important soil characteristics to be considered are seasonal high water table, flooding, shrink-swell potential, bearing strength, and slope.

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

The soil ratings and limitations for light industry are given in table 8.

Formation and Classification of the Soils

This section has three main parts. The first describes the five major factors of soil formation; the second, the processes involved in soil horizon differentiation; and the third, the system of classifying soils and the placement of the soils of Pontotoc County in the nationwide classification system.

Factors of Soil Formation

Soil is the product of the interaction of the five major factors of soil formation: living organisms, climate, parent material, relief, and time.

Living organisms

Plants, earthworms, animals, insects, and other forms of life that live on and in the soil have an active part in soil forming processes. The plants and animals play an extremely important part in the development of soils. Some plants and animals tend to encourage the growth of some plants and to destroy other plants. Animals burrow beneath the surface and mix the soil.

The soils of Pontotoc County formed under a deciduous forest. Early settlers found dense stands of mixed hardwoods and an understory of vines and native shrubs on the lower hillsides. The upper ridges were covered with hardwood and pine trees. The stream bottoms had a native vegetation ranging from thick stands of large deciduous trees and a heavy understory of vines and cane to fresh water swamp vegetation.

A number of organisms live in the soils of the county. Most of the organisms are plants, but there are also small animals. The plants include algae, fungi, bacteria, the roots of higher plants, and others. The existence of these organisms depends mainly on the soil conditions, particularly the food supply. The most intensive activity of earthworms and crayfish is within the uppermost few inches of the soil. When both animals and plants die, their bodies return to the soil and decay to form humus.

The complex of living organisms affecting soil genesis in Pontotoc County has been drastically changed by man's activity. The clearing of forests, cultivation of fields, introduction of new plant species, and drainage of wet areas affect the direction and the rate of soil formation.

Climate

Pontotoc County has the humid, temperate climate typical of that in the southeastern United States. Summers are hot and winters are mild. Annual rainfall averages about 53 inches. Annual snowfall is generally light. The high rainfall and temperature have favored soil development. Many of the soils are strongly weathered, highly leached, acid, and low in natural fertility.

The climate is uniform throughout the county; therefore, differences in soils within the county cannot be explained on the basis of differences in climate.

Parent material

In this county the older soils have developed from parent material consisting of coastal plain sediment and a thin mantle of loess over this sediment. The younger soils are developing from material washed from the older soils and in most cases reflect their origin.

Along the eastern boundary of the county the parent material is weathered Selma chalk. The soils, locally known as "post oak" prairie, have a high content of clay. Examples are the moderately well drained Oktibbeha soils and the somewhat poorly drained Kipling soils.

Westward from the eastern boundary is an area of transition from weathered Selma chalk to weathered loamy materials. In this area, parent material is variable and the developed soils are mixed on the landscape. Generally, the well-drained Ruston and Cahaba soils and the moderately well drained Ora soils are on the ridgetops and upper side slopes. Oktibbeha and Kipling soils occur at the toe of side slopes.

The central part of the county is occupied by a land formation called Pontotoc Ridge. The soils that developed on the Pontotoc Ridge were derived from weathered loamy materials mixed with windblown materials known as "loess." These materials are easily observed on ridgetops and hillsides that have western exposure. They have played a leading role in the development of these soils, as is evidenced by the high content of silt in these soils. Atwood soils are an example.

Parent material in the west-central part of the county has weathered from the Porters Creek geological formation and has been to some extent mixed with silty windblown material. The Porters Creek geological formation is composed of blue-gray clay that has weathered to gray clay that contains many bits of shale. The developed soils in this area have a high content of silt and clay that reflects this mixing of parent materials. Examples of such soils in this "Flatwoods" area are the somewhat poorly drained Falkner and Wilcox soils and the poorly drained Mayhew soils.

The western part of the county has a thin mantle of loess over coastal plain sediments consisting of sand, sandy clay, and clay. The soils developed in this area are characterized by silty upper horizons and loamy or clayey lower horizons. Examples of these soils are the moderately well drained Providence and Tippah soils.

Relief

The shape of a landscape influences soil formation through its effects on drainage, erosion, plant cover, and soil temperature. The topography of Pontotoc County ranges from nearly level to steep. Slopes range from 0 to 30 percent. The maximum difference in elevation between the valleys and the crests of the adjacent hills is about 125 feet.

Time

Time is required for soil formation—usually long periods of time. Differences in the length of time account for most of the soil differences not attributed to the other factors of soil formation. The soils along the streams are the youngest in the county, and those on the uplands are the oldest. The older soils have a greater degree of horizon differentiation than the young ones.

TABLE 8.—*Degree of limitations*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or this reason it is necessary to follow carefully the instructions

Soil series and map symbols	Dwellings	Sewage lagoons	Septic tank filter fields
Adaton: Ad	Severe: wetness	Slight	Severe: high water table; slow permeability.
Arkabutla: Ar	Severe: wetness; flooding	Moderate: moderate permeability.	Severe: high water table; flooding.
Atwood:			
AtA	Moderate: fair bearing strength.	Moderate: moderate permeability.	Moderate: moderate permeability.
AtB, AtB2	Moderate: fair bearing strength.	Moderate: moderate permeability.	Moderate: moderate permeability.
AtC3	Moderate: slope; fair bearing strength.	Moderate: moderate permeability.	Moderate: moderate permeability.
AtD3	Moderate: slope; fair bearing strength.	Severe: moderate permeability; slope.	Severe: moderate permeability; slope.
Boswell: BoB2, BoC2	Severe: high shrink-swell potential; poor bearing strength.	Moderate: slope	Severe: slow percolation rate and permeability.
Bude:			
BuA	Severe: wetness; perched water table; fair bearing strength.	Slight	Severe: perched water table; slow permeability.
BuB	Severe: wetness; perched water table; fair bearing strength.	Moderate: slope	Severe: perched water table; slow permeability.
Cahaba	Severe: slope	Severe: moderate permeability; slope.	Severe: slope
Mapped only with Ruston soils.			
Cascilla: Ca	Severe: flooding	Moderate: moderate permeability.	Severe: flooding
Catalpa: Cc	Severe: flooding; high shrink-swell potential.	Slight	Severe: slow permeability; flooding.
Chewacla: Ce, Ch	Severe: flooding; wetness	Moderate: moderate permeability.	Severe: flooding; wetness.
Commerce: Co	Severe: flooding; wetness	Slight	Severe: flooding; wetness.
Falaya: Fa	Severe: flooding; wetness	Moderate: moderate permeability.	Severe: seasonal high water table; flooding; wetness.
Falkner:			
FkA	Severe: high shrink-swell potential; wetness.	Slight	Severe: slow permeability; wetness.
FkB	Severe: high shrink-swell potential; wetness.	Moderate: slope	Severe: slow permeability; wetness.
FkC, FkC2	Severe: high shrink-swell potential; wetness.	Moderate: slope	Severe: slow permeability; wetness.
Frizzell:			
FlA	Moderate: wetness; fair bearing strength.	Slight	Severe; slow permeability; wetness.
FlB	Moderate: wetness; fair bearing strength.	Moderate: slope	Severe: slow permeability; wetness.
*Gullied land: GoE			
Properties too variable to rate. For the Oktibbeha part of GoE, see Oktibbeha series.			
Henry: Hn	Severe: wetness	Slight	Severe: slow permeability; wetness; high water table.

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more kinds of soil. The soils in such mapping units may have different properties and limitations, and for for referring to other series that appear in the first column of this table]

Campsites	Picnic areas	Playgrounds	Paths and trails	Sites for light industry
Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness.
Severe: wetness; flooding.	Moderate: wetness; flooding.	Severe: flooding; wetness.	Moderate: flooding; wetness.	Severe: wetness; flooding; fair bearing strength.
Slight	Slight	Slight	Slight	Moderate: fair bearing strength.
Slight	Slight	Moderate: slope	Slight	Moderate: fair bearing strength.
Slight	Slight	Severe: slope	Slight	Moderate: fair bearing strength.
Moderate: slope	Moderate: slope	Severe: slope	Slight	Severe: slope; fair bearing strength.
Severe: slow permeability.	Moderate: slope; slow permeability.	Severe: slow permeability; slope.	Slight	Severe: high shrink-swell potential; poor bearing strength.
Moderate: wetness; slow permeability.	Moderate: wetness	Moderate: wetness	Moderate: wetness	Severe: fair bearing strength; wetness.
Moderate: wetness; slow permeability.	Moderate: wetness	Moderate: wetness	Moderate: wetness	Severe: fair bearing strength; wetness.
Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope.
Slight	Slight	Moderate: flooding	Slight	Severe: flooding.
Severe: flooding	Moderate: flooding; silty clay loam surface layer.	Severe: flooding	Moderate: silty clay loam surface layer; flooding.	Severe: flooding; poor bearing strength; high shrink-swell.
Severe: flooding; wetness.	Severe: flooding; wetness.	Severe: flooding; wetness.	Moderate: flooding; wetness.	Severe: flooding; wetness.
Severe: flooding; wetness.	Severe: flooding; wetness.	Severe: flooding; wetness.	Moderate: wetness	Severe: flooding; wetness.
Severe: wetness; flooding.	Moderate: wetness; flooding.	Severe: wetness; flooding.	Moderate: wetness; flooding.	Severe: flooding; wetness.
Moderate: slow permeability.	Moderate: wetness	Moderate: slow permeability; wetness.	Moderate: wetness	Severe: high shrink-swell potential; wetness; fair bearing strength.
Moderate: slow permeability.	Moderate: wetness	Moderate: slow permeability; wetness.	Moderate: wetness	Severe: high shrink-swell potential; wetness; fair bearing strength.
Moderate: slow permeability.	Moderate: wetness	Severe: slow permeability; slope; wetness.	Moderate: wetness	Severe: high shrink-swell potential; wetness; fair bearing strength; slope.
Moderate: slow permeability; wetness.	Slight	Moderate: wetness; slow permeability.	Slight	Moderate: fair bearing strength; wetness.
Moderate: slow permeability; wetness.	Slight	Moderate: wetness; slow permeability.	Slight	Moderate: fair bearing strength; wetness.
Severe: wetness; ponding in some areas.	Severe: wetness; ponding in some areas.	Severe: wetness; ponding in some areas.	Severe: wetness; ponding in some areas.	Severe: wetness.

TABLE 8.—*Degree of limitations*

Soil series and map symbols	Dwellings	Sewage lagoons	Septic tank filter fields
*Iuka: Io. For Ochlockonee part of Io, see Ochlockonee series.	Severe: flooding	Severe: moderate permeability.	Severe: flooding
Kipling:			
KlB	Severe: very high shrink-swell potential.	Moderate: slope	Severe: slow to very slow permeability.
KlC	Severe: very high shrink-swell potential.	Moderate: slope	Severe: slow to very slow permeability.
KlD2, KnD3	Severe: very high shrink-swell potential.	Severe: slope	Severe: slow to very slow permeability.
Leeper: Le	Severe: flooding; wetness; high shrink-swell potential.	Slight	Severe: very slow permeability; wetness.
Mantachie: Mc	Severe: flooding; wetness	Moderate: moderate permeability.	Severe: wetness; flooding
Marietta: Me	Severe: flooding	Moderate: moderate permeability.	Severe: flooding.
Mashulaville: Mh	Severe: wetness; may flood	Slight	Severe: slow permeability; wetness.
Mayhew:			
MsA	Severe: high shrink-swell potential; wetness.	Slight	Severe: very slow permeability; wetness.
MsB	Severe: high shrink-swell potential; wetness.	Moderate: slope	Severe: very slow permeability; wetness.
MsD, MsD2	Severe: high shrink-swell potential; wetness; slope.	Severe: slope	Severe: very slow permeability; wetness; slope.
Ochlockonee. Mapped only in undifferentiated unit with Iuka.	Severe: flooding	Severe: moderately rapid permeability.	Severe: flooding
*Oktibbeha: ObE3, OKE. For Ruston part of OKE, see Ruston series.	Severe: high shrink-swell potential; slope; poor bearing strength.	Severe: slope	Severe: very slow permeability; slope.
Ora:			
OrB, OrB2	Moderate: wetness; fair bearing strength.	Moderate: slope	Severe: moderately slow permeability.
OrC, OrC2	Moderate: wetness; fair bearing strength.	Moderate: slope	Severe: moderately slow permeability.
OrD2	Moderate: wetness; fair bearing strength.	Severe: slope	Severe: moderately slow permeability; slope.

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Campsites	Picnic areas	Playgrounds	Paths and trails	Sites for light industry
Severe: flooding	Moderate: flooding	Severe: flooding	Moderate: flooding	Severe: flooding.
Moderate: wetness; slow to very slow permeability.	Moderate: wetness	Moderate: slow to very slow permeability; wetness.	Moderate: wetness	Severe: very high shrink-swell potential.
Moderate: wetness; slow to very slow permeability.	Moderate: wetness; slow to very slow permeability.	Severe: slow to very slow permeability; slope.	Moderate: wetness	Severe: very high shrink-swell potential.
Moderate: wetness; slope; slow to very slow permeability.	Moderate: wetness; slope.	Severe: slow to very slow permeability.	Moderate: wetness	Severe: very high shrink-swell potential; slope.
Severe: wetness; flooding; very slow permeability.	Moderate: wetness; flooding.	Severe: wetness; flooding; very slow permeability.	Moderate: wetness; surface soil high in content of clay.	Severe: high shrink-swell potential; flooding; wetness; poor bearing strength.
Severe: flooding; wetness.	Moderate: wetness; flooding.	Severe: flooding; wetness.	Moderate: wetness; flooding.	Severe: wetness; flooding.
Severe: flooding	Moderate: flooding	Severe: flooding	Moderate: flooding	Severe: flooding.
Severe: wetness	Severe: wetness	Severe: wetness; may flood.	Severe: wetness	Severe: high water table; may flood.
Severe: wetness; very slow permeability.	Severe: wetness	Severe: very slow permeability; wetness.	Severe: wetness	Severe: high shrink-swell potential; wetness.
Severe: wetness; very slow permeability.	Severe: wetness	Severe: very slow permeability; wetness.	Severe: wetness	Severe: high shrink-swell potential; wetness.
Severe: wetness; very slow permeability; slope.	Severe: wetness	Severe: very slow permeability; wetness; slope.	Severe: wetness	Severe: high shrink-swell potential; slope.
Moderate to severe: flooding.	Moderate: flooding	Moderate: flooding	Slight to moderate: flooding.	Severe: flooding.
Severe: surface layer high in content of clay; slope.	Severe: surface layer high in content of clay; slope.	Severe: surface layer high in content of clay; very slow permeability.	Severe: surface layer high in content of clay.	Severe: high shrink-swell potential; poor bearing strength.
Moderate: moderately slow permeability.	Slight	Moderate: slope; moderately slow permeability.	Slight	Moderate: wetness; fair bearing strength; slope.
Moderate: moderately slow permeability.	Slight	Severe: slope; moderately slow permeability.	Slight	Moderate: wetness; fair bearing strength; slope.
Moderate: moderately slow permeability; slope.	Moderate: slopes	Severe: slope; moderately slow permeability.	Slight	Severe: slope; wetness; fair bearing strength.

TABLE 8.—*Degree of limitations*

Soil series and map symbols	Dwellings	Sewage lagoons	Septic tank filter fields
Providence:			
PrB, PrB2	Moderate: fair bearing strength.	Moderate: slope	Severe: moderately slow permeability.
PrC2	Moderate: fair bearing strength.	Moderate: slope	Severe: moderately slow permeability.
PrD3	Moderate: fair bearing strength.	Severe: slope	Severe: moderately slow permeability; slope.
PsB, PsB2	Severe: fair bearing strength; high shrink-swell potential.	Moderate: slope	Severe: moderately slow permeability.
PsC, PsC2	Severe: fair bearing strength; high shrink-swell potential.	Moderate: slope	Severe: moderately slow permeability.
PsD2	Severe: fair bearing strength; high shrink-swell potential; slope.	Severe: slope	Severe: moderately slow permeability; slope.
PuE	Moderate: fair bearing strength.	Severe: slope	Severe: moderately slow permeability; slope.
Robinsonville: Ro	Severe: flooding	Severe: moderately rapid permeability.	Severe: flooding
Rosebloom: Rs	Severe: flooding; wetness	Slight	Severe: wetness; flooding; slow permeability.
*Ruston: RuE, RuE2 For Cahaba part of RuE and RuE2, see Cahaba series.	Severe: slope	Severe: slope	Severe: slope
*Tippah:			
TpB	Moderate to severe: wetness; poor bearing strength; high shrink-swell potential.	Moderate: slope	Severe: slow permeability.
TpC	Moderate to severe: wetness; poor bearing strength; high shrink-swell potential.	Moderate: slope	Severe: slow permeability.
TWE For Providence or Wilcox part of TWE, see Providence or Wilcox series.	Severe: wetness; poor bearing strength; high shrink-swell potential; slope.	Severe: slope	Severe: slow permeability; slope.
Urbo: Ur	Severe: flooding; wetness; high shrink-swell potential.	Slight	Severe: very slow permeability; flooding; wetness.
Wilcox:			
WcB	Severe: poor bearing strength; very high shrink-swell potential.	Moderate: slope	Severe: very slow permeability; wetness.
WcC	Severe: poor bearing strength; very high shrink-swell potential.	Moderate: slope	Severe: very slow permeability; wetness.

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Campsites	Picnic areas	Playgrounds	Paths and trails	Sites for light industry
Slight	Slight	Moderate: slope; moderately slow permeability.	Slight	Moderate: fair bearing strength; slope.
Slight	Slight	Severe: slope; moderately slow permeability.	Slight	Moderate: fair bearing strength; slope.
Moderate: slope	Moderate: slope	Severe: slope; moderately slow permeability.	Slight	Severe: slope; fair bearing strength.
Slight	Slight	Moderate: slope; moderately slow permeability.	Slight	Severe: slope, fair bearing strength; high shrink-swell potential.
Slight	Slight	Severe: slope; moderately slow permeability.	Slight	Severe: slope; fair bearing strength; high shrink-swell potential.
Moderate: slope	Moderate: slope	Severe: slope; moderately slow permeability.	Slight	Severe: slope; high shrink-swell potential.
Moderate: slope	Moderate: slope	Severe: slope; moderately slow permeability.	Slight	Severe: slope; fair bearing strength.
Severe: flooding	Moderate: flooding	Severe: flooding	Slight	Severe: flooding.
Severe: wetness; flooding.	Severe: wetness; flooding.	Severe: wetness; flooding.	Severe: wetness; flooding.	Severe: flooding; wetness.
Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope.
Moderate: wetness; slow permeability.	Slight	Moderate: slope	Slight	Severe: high shrink-swell potential; poor bearing strength.
Moderate: wetness; slow permeability.	Slight	Moderate to severe: slope.	Slight	Severe: high shrink-swell potential; poor bearing strength.
Moderate: wetness; slow permeability.	Severe: slope	Severe: slope	Moderate: slope	Severe: high shrink-swell potential; poor bearing strength; slope.
Severe: flooding; very slow permeability; wetness.	Moderate: wetness; flooding; surface layer high in content of clay.	Severe: flooding; very slow permeability; wetness.	Moderate: wetness; flooding; surface layer high in content of clay.	Severe: flooding; wetness.
Severe: very slow permeability; wetness.	Moderate: wetness; surface layer high in content of clay.	Severe: very slow permeability; wetness; surface layer high in content of clay.	Moderate: wetness; surface layer high in content of clay.	Severe: very high shrink-swell potential; wetness; poor bearing strength.
Severe: very slow permeability; wetness.	Moderate: wetness; surface layer high in content of clay.	Severe: very slow permeability; wetness; surface layer high in content of clay; slope.	Moderate: wetness; surface layer high in content of clay.	Severe: very high shrink-swell potential; wetness; poor bearing strength.

Most of the soils that formed on the smoother parts of the uplands and on older stream terraces have a well defined soil profile. These soils have A horizons and B horizons containing accumulations of silicate clay. The Ora, Atwood, and Providence soils are examples.

The soil materials of the flood plains are more recent and have not yet developed into mature soils. These soils have A horizons and B horizons that have been altered but do not contain accumulations of silicate clay. Mantachie and Leeper soils are examples.

Processes of Soil Horizon Differentiation

The marks that soil-forming factors leave on the soil are recorded in the soil profile in the form of successive layers, or horizons. The soil horizons differ in one or more properties, such as color, texture, structure, consistence, porosity, and reaction, and they may be thick or thin. The soil forming processes are accumulations of organic matter, leaching of calcium carbonate, reduction and transfer of iron, and translocation of silicate clay minerals.

Leaching of carbonates and bases have occurred in all the soils except those of the flood plains, such as the Catalpa, Leeper, Marietta, and Robinsonville soils.

Reduction and transfer of iron are evident in such soils as the poorly drained Mashulaville soils. The gray color indicates the reduction and loss of iron, and the reddish mottles and concretions indicate an accumulation of iron.

Silicate clay translocation is evident in the B horizons for such soils as the Ora and Providence soils. These have an A horizon that is low in content of clay. The B horizon has an accumulation of clay and clay films around the peds and in the pores and has an evident subangular blocky structure. Arkabutla and Mantachie soils, for example, have accumulations of organic matter in the A horizon, have lost bases by leaching, have reduction and transfer of iron, and have B horizons that have evident structure. In addition, silicate clay has not accumulated on ped faces and in the pores.

Classification of the Soils

Classification consists of an orderly grouping of soils according to a system designed to make it easier to remember soil characteristics and interrelationships. Classification is useful in organizing and applying the results of experience and research. Soils are placed in narrow classes for discussion in detailed soil surveys and for application of knowledge within farms and fields. The many thousands of narrow classes are then grouped into progressively fewer and broader classes in successively higher categories, so that information can be applied to large geographic areas.

Two systems of classifying soils have been used in the United States in recent years. The older system was adopted in 1938 (*2*) and revised later (*4*). The system currently used by the National Cooperative Soil Survey was developed in the early sixties (*3*) and adopted in 1965 (*6*). It is under continual study.

The current system of classification has six categories. Beginning with the most inclusive, these categories are the order, the suborder, the great group, the subgroup, the family, and the series. The criteria for classification are soil properties that are observable or measurable, but the properties are selected so that soils of similar genesis are grouped together. The placement of some soil series in the current system of families, may change as more precise information becomes available.

Table 9 shows the classification of each soil series of Pontotoc County by family, subgroup, and order.

The classes in the current system are briefly defined in the following paragraphs.

Order.—The orders in Pontotoc County are the Entisols, Inceptisols, Alfisols, Ultisols, and Mollisols. The Entisols are recent soils that lack genetic horizons except for an ochric epipedon. Inceptisols occur on young surfaces but have been altered by soil-forming processes. Alfisols are soils that have a clay-enriched B horizon that is high in base saturation. The Ultisols are soils that have a clay-enriched B horizon that is low in base saturation. The Mollisols have mollic epipedons.

Suborder.—Each order is divided into suborders, primarily on the basis of those soil characteristics that seem to produce classes with 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.

Great Group.—Soil suborders are separated into great groups on the basis of uniformity in the kinds and the sequence of genetic horizons. The horizons used to make separations are those in which clay, iron, or humus have accumulated or those that have pans that interfere with the growth of roots or the movement of water.

Subgroup.—The subgroups are subdivisions of the great groups consisting of the central (typic) segments and others called intergrades. The intergrades have, in addition to properties of the great group, one or more properties of another great group, subgroup, or order.

Family.—The families are separated within a subgroup primarily on the basis of properties important to the growth of plants or engineering behavior. Some of these properties are texture, mineralogy, reaction, soil temperature, permeability, thickness of horizons, and consistence. With the exception of soil temperature, all of these soil properties are variable in the soils of Pontotoc County.

Series.—The series is a group of soils that have major horizons that, except for texture of surface layer, are similar in important characteristics and arrangement of the profile. A detailed description of each soil series in the county is given in the section "Descriptions of the Soils."

General Nature of the County

Pontotoc County once was a part of the Chickasaw nation. The present land area of the county was ceded to the United States in 1832 by the treaty of Pontotoc. The land area was settled mainly by people from the Middle Atlantic States. The county was formed in 1836.

The population was 22,904 in 1940 but had decreased to 17,232 in 1960. It is largely rural. The city of Pontotoc is the county seat.

TABLE 9.—*Classification of the soils of Pontotoc County*

Series	Family	Subgroup	Order
Adaton	Fine-silty, mixed, thermic	Typic Ochraqualfs	Alfisols.
Arkabutla	Fine-silty, mixed, acid, thermic	Aeric Fluvaquents	Entisols.
Atwood	Fine-silty, mixed, thermic	Typic Paleudalfs	Alfisols.
Boswell	Fine, mixed, thermic	Vertic Paleudalfs	Alfisols.
Bude	Fine-silty, mixed, thermic	Glossaquic Fragiudalfs	Alfisols.
Cahaba	Fine-loamy, siliceous, thermic	Typic Hapludults	Ultisols.
Cascilla	Fine-silty, mixed, thermic	Fluventic Dystrochrepts	Inceptisols.
Catalpa	Fine, mixed, thermic	Fluvaquentic Hapludolls	Mollisols.
Chewacla	Fine-loamy, mixed, thermic	Fluvaquentic Dystrochrepts	Inceptisols.
Commerce	Fine-silty, mixed, nonacid, thermic	Aeric Fluvaquents	Entisols.
Falaya	Coarse-silty, mixed, acid, thermic	Aeric Fluvaquents	Entisols.
Falkner	Fine-silty, siliceous, thermic	Aquic Paleudalfs	Alfisols.
Frizzell	Coarse-silty, siliceous, thermic	Aquic Glossudalfs	Alfisols.
Henry	Coarse-silty, mixed, thermic	Typic Fragiaqualfs	Alfisols.
Iuka	Coarse-loamy, siliceous, acid, thermic	Aquic Udifluvents	Entisols.
Kipling	Fine, montmorillonitic, thermic	Vertic Hapludalfs	Alfisols.
Leeper	Fine, montmorillonitic, nonacid, thermic	Vertic Haplaquepts	Inceptisols.
Mantachie	Fine-loamy, siliceous, acid, thermic	Aeric Fluvaquents	Entisols.
Marietta	Fine-loamy, mixed (siliceous), thermic	Fluvaquentic Eutrochrepts	Inceptisols.
Mashulaville	Coarse-loamy, siliceous, thermic	Typic Fragiaquults	Ultisols.
Mayhew	Fine, montmorillonitic, thermic	Vertic Ochraqualfs	Alfisols.
Ochlockonee	Coarse-loamy, siliceous, acid, thermic	Typic Udifluvents	Entisols.
Oktibbeha	Very fine, montmorillonitic, thermic	Vertic Hapludalfs	Alfisols.
Ora	Fine-loamy, mixed, thermic	Typic Fragiudults	Ultisols.
Providence	Fine-silty, mixed, thermic	Typic Fragiudalfs	Alfisols.
Robinsonville	Coarse-loamy, mixed, nonacid, thermic	Typic Udifluvents	Entisols.
Rosebloom	Fine-silty, mixed, acid, thermic	Typic Fluvaquents	Entisols.
Ruston	Fine-loamy, siliceous, thermic	Typic Paleudults	Ultisols.
Tippah	Fine-silty, mixed, thermic	Aquic Paleudalfs	Alfisols.
Urbo	Fine, mixed, acid, thermic	Aeric Haplaquepts	Inceptisols.
Wilcox	Fine, montmorillonitic, thermic	Vertic Hapludalfs	Alfisols.

Pontotoc County has always been a farming area. The early economy was based on small farms, and cotton was the main crop. Cotton, corn, soybeans, and livestock are now the principal crops.

The total acreage of cotton decreased steadily after 1950, but the yield per acre increased because of improved drainage, improvement in methods of management, and the use of only the more productive soils for crops.

Acreage of corn fluctuates from year to year, but acreage as a whole has decreased, and the yield per acre has increased. Soybeans grow well on most soils in the county, and the acreage has increased rapidly. Higher yielding varieties, no acreage controls, and good markets have stimulated this growth.

The acreage in pasture increased after 1950, and most farmers raise livestock. There are several Class "A" dairies and a number of farms producing grade "C" milk.

The number of farms decreased after 1950, but the average size increased from 71.6 acres in 1950 to 98.4 in 1960.

Timber and water are principal natural resources of Pontotoc County. Large areas of woodland have good stands of mixed hardwood and pines. There are three sawmills located in the county that saw almost three million board feet of lumber annually. The woodlands of the county also support two wood preserving plants, two post buyers, and one pulpwood dealer (*7*). There are several furniture plants in Pontotoc County, which furnish excellent markets for hardwood lumber.

The major watersheds in Pontotoc County are the Yocona River, the Skuna River, Mud Creek, Lappatubby Creek, Chiwapa Creek, Coonewah Creek, and Tallabinnela Creek. All major watersheds in the county except Tallabinnela Creek are in operating drainage districts and are being improved. Drilled wells ranging from about 400 to 800 feet in depth provide an adequate supply of water for domestic and industrial uses. Most livestock water is provided by farm ponds.

Climate [7]

The principal influences which determine the climate of this area are its subtropical latitude, the huge land mass to the north, and proximity to the warm waters of the Gulf of Mexico. Local modifications caused by variations in topography generally are not pronounced.

In summer the prevailing southerly winds provide a moist tropical climate, but occasionally the distribution of atmospheric pressure is such that it brings west winds or north winds that cause hot dry weather. If these winds are prolonged, they cause drought of varying severity. The most widespread and severe droughts in this State occurred in 1924 and 1952, even though the driest year in this county may have occurred in some other year, as shown in table 10.

In winter this area is subjected alternately to moist tropical air and dry polar air. The change from one to the other sometimes results in rather large and sudden changes in temperature. Cold spells, however, are generally short.

[7] Data provided by National Weather Service, U.S. Department of Commerce.

The relative humidity is 60 percent or higher for 64 percent of the time, and below 40 percent for only 12 percent of the time. When the temperature is 90° F. or higher, relative humidity never exceeds 79 percent but ranges from 50 to 79 percent for about 26 percent of the time. Even when the temperature is low, relative humidity is generally high. In 54 percent of the hours when temperature is below 50°, the relative humidity is 50 to 79 percent, and in 36 percent of such hours it is 80 to 100 percent.

A temperature of 32° (freezing) or lower occurs on an average of 45 days per year, and a temperature of 90° or higher occurs on an average of 77 days per year. A temperature of 90° or higher occurs in about 12 percent of the hours from May through October, and a temperature of 80° or higher occurs in about 31 percent of such hours in these months. During the months of November through April, temperatures are 70° or higher in about 8 percent of the hours and below 50° in about 47 percent of the hours. A temperature of 20° or lower occurs at least once each winter in 9 out of 10 years. There is a 50 percent chance of a freeze (32°) after March 27 in spring and before November 5 in fall. The freeze-free period between last spring and first fall freezes averages 223 days. There is a 20 percent chance of a freeze after April 8 in spring and before October 25 in fall.

In a general way the year can be divided into two wet and two dry seasons. Winter and spring are generally wet, but summer and fall are generally dry; fall is the driest season. This is beneficial for farming because it generally permits harvesting operations to proceed unhindered. Copious winter rains furnish sufficient soil moisture for spring planting, which generally makes good progress. The summer rains diminish as distance from the coast increases, but rainfall is generally sufficient for growth of most crops. Snowfall is of little economic importance but a measurable amount is received at least once in three or four winters.

Tornadoes, severe thundersqualls, damaging hailstorms, and tropical storms and hurricanes are hazards of varying frequency. A tornado can be expected once in about 5 years, a severe thundersquall once in 8 years, and a damaging hailstorm once in 10 years somewhere in this county. About six tropical storms or hurricanes per 100 years move across or close enough to this county to cause some property or crop damage.

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Table 10.—*Temperature and precipitation*

[Pontotoc, Miss.; elevation 501 feet]

Month	Temperature [1]			Precipitation [2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1928) [3]	Wettest year (1932) [3]	Average snowfall
	°F.	°F.	°F.	Inches	Inches	Inches	Inches
December	45. 8	81	2	5. 08	1. 07	11. 34	0. 6
January	45. 1	80	−5	5. 90	2. 70	14. 02	2. 2
February	46. 8	83	−11	5. 05	1. 65	8. 30	. 5
Winter	45. 8	83	−11	16. 03	5. 42	33. 66	3. 3
March	54. 3	92	12	6. 41	4. 00	4. 35	. 3
April	62. 7	92	25	4. 53	6. 88	3. 03	0
May	70. 8	99	35	3. 49	2. 22	1. 68	0
Spring	62. 6	99	12	14. 42	13. 10	9. 06	. 3
June	78. 7	108	46	4. 06	7. 43	4. 20	0
July	80. 8	110	50	4. 68	2. 90	8. 74	0
August	80. 5	109	48	3. 52	3. 10	3. 87	0
Summer	80. 0	110	46	12. 26	13. 43	16. 81	0
September	74. 7	111	36	3. 34	. 15	10. 22	0
October	65. 1	97	25	2. 38	. 33	7. 53	0
November	52. 4	88	6	4. 83	1. 99	3. 13	. 3
Fall	64. 1	111	6	10. 56	2. 47	20. 88	. 3
Year	63. 1	111	−11	53. 27	34. 42	80. 41	3. 9

[1] Temperature averages are based on data for the years 1931–52. Temperature extremes are for the period 1892–1958.
[2] The precipitation and snowfall averages are based on data for the years 1931–52.
[3] The driest and wettest years were determined by an analysis of the records for the years 1891 through 1958.

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Glossary

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

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.

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.

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.

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

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.

Mottled. 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.

Natural soil drainage. Refers to the conditions of frequency and duration of periods of saturation or partial saturation that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven different classes of natural soil drainage are recognized.

Excessively drained soils are commonly very porous and rapidly permeable and have a low water-holding capacity.

Somewhat excessively drained soils are also very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and upper B horizons and have mottling in the lower B and the C horizons.

Imperfectly or somewhat poorly drained soils are wet for significant periods but not all the time, and in Podzolic soils commonly have mottlings below a depth of 6 to 16 inches, in the lower A horizon and in the B and C horizons.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

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

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

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. In words, the degrees of acidity or alkalinity are expressed thus:

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

Sand. Individual rock or mineral fragments in soils having diameters ranging from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be 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.

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 (1) *single grain* (each grain by itself, as in dune sand) or (2) *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subbase. A selected soil material used under roads that have rigid or flexible pavement. It makes up the lower part of the base course and is placed directly on the subgrade.

Subgrade (engineering). In-place material or fill material that is prepared for highway construction; does not include stabilized base course or actual paving material.

Subsoil. Technically, the B horizon; roughly, the part of the profile below plow depth.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

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 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.

Topsoil. A presumed fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

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