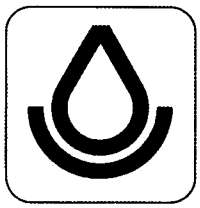
SOIL SURVEY OF

Madison County, Tennessee



United States Department of Agriculture
Soil Conservation Service
In cooperation with
Tennessee Agricultural Experiment Station

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

Major fieldwork for this soil survey was completed in the period 1966–73. Soil names and descriptions were approved in 1973. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1973. This survey was made cooperatively by the Soil Conservation Service and the Tennessee Agricultural Experiment Station. It is part of the technical assistance furnished to the Madison County Soil Conservation District by the Soil Conservation Service.

THIS SOIL SURVEY contains information that can be applied in managing farms, woodlands, and wildlife areas; 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 Madison 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

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.

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

Wildlife managers 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 "Community developments."

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

Scientists and others can read about the soils in the section "Formation and Classification of the Soils."

Newcomers in the area 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."

Contents

Issued April 1978

Index to Mapping Units

Summary of Tables

SOIL SURVEY OF MADISON COUNTY, TENNESSEE

BY WILLIAM T. BROWN, GLISSON L. KEATHLEY, AND CLARENCE T. CONNER, SOIL CONSERVATION SERVICE

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

MADISON COUNTY is in the west-central part of Tennessee (fig. 1). It has a land area of 358,400 acres.

The soils in the northwestern part of Madison County are mainly on gently rolling uplands that have been dissected by the Forked Deer River and smaller streams. These soils formed mainly in loess, and they are high in content of silt. They differ in drainage. Many of them have a fragipan. A few areas of the steeper soils are sandy.

Most of the southwestern and northeastern parts of the county consist of rolling and hilly soils on uplands. These soils formed in loess, in loess over Coastal Plain sediment, and in Coastal Plain sediment. The loess layer is 3 to 5 feet thick on gentle slopes. It becomes thinner as the slopes become steeper. The steep slopes have little or no loess on them. The loess layer and most of the underlying Coastal Plain deposits are loamy. These soils are commonly well drained.

The southeastern corner of the county has soils that are underlain by clay and soils that formed in clay. These soils occupy only a small part of the county. They are gently rolling and rolling. Two to 3 feet of loess that is underlain by clay is common where slopes are gentle. The steeper soils on hillsides formed in clay. The soils commonly are moderately well drained, but some are well drained.

Stream bottoms throughout the county have loamy soils in which drainage is variable.

All the soils in Madison County are alike in some properties; for example, they have low organic-matter content. In cultivated soils the organic-matter content of the plow layer seldom exceeds 2 or 3 percent. It is commonly less than 1 percent. The soils are strongly acid or very strongly acid except where lime has been applied in recent years. Content of phosphorus and potassium is low or medium except where these elements have been added.

Where drainage is adequate and slopes are gentle, the soils in Madison County respond well to additions of lime and fertilizer and to other good management practices. Most soils on uplands erode easily, and control of runoff and erosion is imperative.

Many favorable sites for residential, industrial, and commercial developments are in Madison County. Many other sites have severe limitations for these uses, especially if septic tank absorption fields are used.

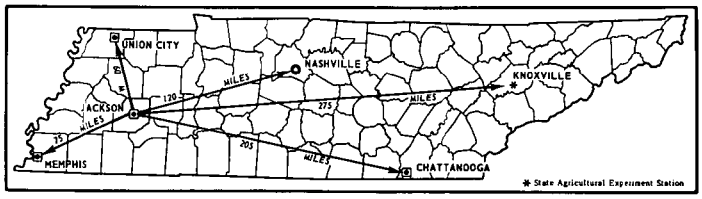


Figure 1.—**Location of Madison County in Tennessee.**

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soils are in Madison County, where they are located, and how they can be used. The soil scientists went into the county knowing they would find several different kinds of soils. They observed the steepness, length, and shape of slopes, the size and speed of streams, and the kinds of native plants or crops. 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 to the parent material, which 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 (*3*).[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. Lexington and Memphis, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

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. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management.

[1] Italic numbers in parentheses refer to Literature Cited, p. 50.

For example, Loring silt loam, 2 to 5 percent slopes, is one of several phases within the Loring 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 survey 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. A soil complex is one such kind of mapping unit shown on the soil map of the county.

A soil complex consists of areas of two or more soils or areas of non-soil, such as Urban land, 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 units, 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 or non-soil. Lexington-Urban land complex, 1 to 12 percent slopes, is an example.

While a soil survey is in progress, samples of soils are taken as needed for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soil in other places are assembled. Data on yields of crops under defined 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 mapped and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in a way that is readily useful to different groups of users, among them farmers, managers of woodland and range, 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; they 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 the survey area. A soil association is a landscape that has a distinctive pattern of soils in defined proportions. It typically consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in an association can occur in other associations, but in different patterns.

A map showing soil associations is useful to people who want to have a general idea of the soils in a survey area, who want to compare different parts of that area, or who want to locate large tracts that are suitable for a certain kind of land use. Such a map is a useful general guide for broad planning on a watershed, a wooded tract, or a wildlife area or for broad planning of recreational facilities, community developments, and such engineering works as transportation corridors. It is not a suitable map for detailed planning for management of a farm or field or for selecting the exact location of a road or building or other structure, because the soils within an association ordinarily vary in slope, depth, stoniness, drainage, and other characteristics that affect their management.

The soil associations in this survey area are described on the pages that follow.

1. Falaya-Waverly-Collins association

Poorly drained to moderately well drained, level, loamy soils on first bottoms

This association consists of level soils on long, wide, flat bottoms (fig. 2). These bottoms are as much as 1½ miles wide along the Forked Deer River. They become more narrow and increase slightly in elevation as they branch off along the smaller streams.

This association makes up about 20 percent of the county. It is 40 percent Falaya soils, 30 percent Waverly soils, and 25 percent Collins soils. The remaining 5 percent is mainly Iuka and Mantachie soils.

The Falaya soils are on bottoms of Forked Deer River and of smaller streams. These soils are somewhat poorly drained. They are silt loam throughout the profile. They commonly are brown in the upper 15 inches. Below this depth they commonly are gray.

The Waverly soils are mainly on bottoms of Forked Deer River, but a few areas are in low places along smaller streams. These soils are poorly drained. They commonly are silt loam in the upper 55 inches but are silt loam, sandy clay loam, or silty clay below that depth. They commonly are gray throughout the profile, but in cleared areas the plow layer is dark grayish brown.

The Collins soils commonly are along the channels of the smaller streams. They are moderately well drained. Typically, these soils are brown silt loam throughout the profile and have a few gray mottles in the upper 28 inches. Below a depth of 28 inches they are grayish brown or gray.

The Iuka soils are moderately well drained, and the Mantachie soils are somewhat poorly drained. These soils are fine sandy loam in the upper part and silt loam below a depth of about 2½ to 3 feet.

Most of this association is suited to farming. Row crops, such as soybeans, cotton, and corn, grow well where drainage is adequate. Flooding and wetness limit the use of this association. Drainage ditches remove the excess water from most areas during the crop season. The lowest areas, however, are too wet for farming, but they are suited to trees. Wetness severely limits nearly all of this association for residential, industrial, or commercial developments. Many sites are suitable as habitat for wetland wildlife.

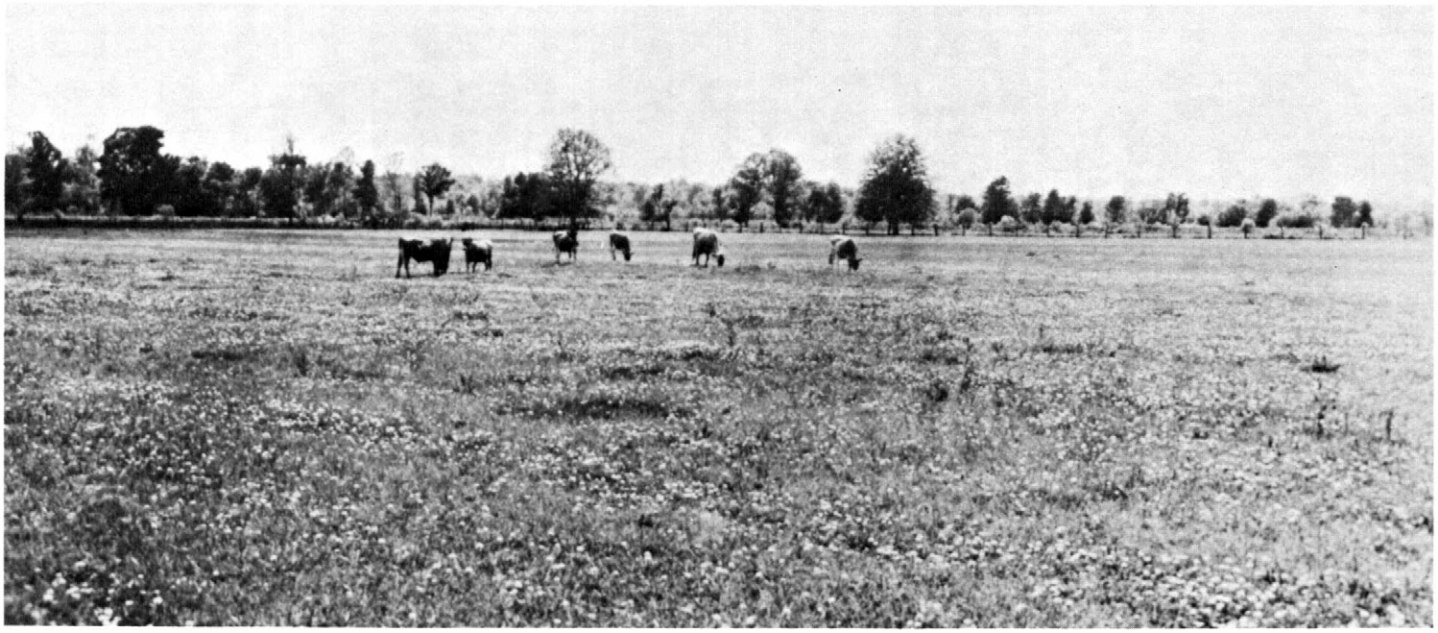


Figure 2.—**Area of association 1; Falaya soils and Collins soils in pasture.**

2. *Grenada-Calloway-Calhoun-Henry association*

Moderately well drained to poorly drained, nearly level to gently rolling, loamy soils on uplands

This association consists of soils on the broad, flat ridgetops and on low benches next to the stream bottoms. It has many nearly level areas that are interrupted by narrow, shallow valleys in which the soils have mild slopes.

This association makes up about 10 percent of the county. It is 35 percent Grenada soils, 25 percent Calloway soils, 20 percent Calhoun soils, and 10 percent Henry soils. The remaining 10 percent is Loring and Memphis soils.

The Grenada soils are on ridgetops and hillsides where drainage is good. These soils are moderately well drained. They have a plow layer of dark brown, friable silt loam and a subsoil of yellowish brown silt loam. They have a fragipan. Where erosion has not been severe, the fragipan begins at a depth between 24 and 36 inches.

The Calloway soils are in slight depressions on the ridgetops. They are somewhat poorly drained. They have a plow layer of brown silt loam over a subsoil of yellowish brown and gray. They have a firm, brittle fragipan that commonly begins at a depth of 29 inches.

The Calhoun and Henry soils are in depressions and flat areas near the beginning of drains where drainage is poor. These soils are poorly drained. They are intermingled in intricate patterns. They have a plow layer of dark grayish brown or grayish brown silt loam over a subsoil of gray silt loam. The Henry soils have a firm, brittle fragipan that commonly begins at a depth of about 19 inches.

The minor soils in this association are Memphis and Loring soils, which commonly are on the higher places. The Memphis soils are well drained, and the Loring soils are moderately well drained. The Loring soils have a firm, brittle fragipan that commonly begins at a depth between 22 and 37 inches.

This association is suited to most of the crops commonly grown in the county. Nearly all of this association is used for row crops, hay, and pasture. Excess wetness and the brittle fragipan are limitations to some crops. Generally, the limitation for crops is not serious and can be overcome by selecting crops that are suited to the soil. About half of this association has slight limitations for residential and small commercial buildings, and the rest has a severe limitation because of wetness. The excess wetness and the slow percolation of the soils severely limit the use of much of the association for developments that require septic tank absorption fields.

3. *Memphis-Loring-Grenada association*

Well drained and moderately well drained, gently rolling, loamy soils on uplands

This association consists of gently rolling soils on parts of broad ridgetops. Small, narrow valleys that have formed give this association an undulating or wavy surface.

This association makes up about 15 percent of the county. It is 40 percent Memphis soils, 35 percent Loring soils, and 15 percent Grenada soils. The remaining 10 percent is Vicksburg, Collins, and Lexington soils.

The Memphis soils are on the higher, better drained positions. These soils are well drained. They have a plow layer of brown, friable silt loam over a subsoil of dark brown, friable silt loam or silty clay loam.

The Loring soils are on ridgetops. These soils are moderately well drained. They have a plow layer of brown,

Figure 3.—**Area of association 4. Plowed area in foreground is a Memphis soil, and severely eroded area is a Lexington soil.**

friable silt loam. Below that is a subsoil of dark brown or strong brown silty clay loam or silt loam. Where erosion has not been severe, the subsoil extends to a depth of 35 inches. A firm, brittle fragipan is below a depth of 35 inches.

The Grenada soils are on ridgetops. These soils are moderately well drained. They have a plow layer of dark brown, friable silt loam and a subsoil of yellowish brown, friable silt loam. They have a firm, brittle fragipan. Where erosion has not been severe, the fragipan begins at a depth between 24 and 36 inches.

Well drained Vicksburg soils and moderately well drained Collins soils are in the small drainageways. Well drained Lexington soils are on the ridgetops. There are also small areas of poorly drained Calhoun and Henry soils and somewhat poorly drained Calloway soils in this association.

Practically all of this association is suited to row crops grown in rotation with hay and pasture. Only a few areas are so steep or so wet that they are suited only to woods. Most of this association has slight limitations for residential and small commercial developments. Wetness severely limits a few areas. Slow percolation or wetness severely limits about half of the association for septic tank absorption fields.

4. Memphis-Lexington-Smithdale association

Well drained, gently rolling, loamy soils on uplands

This association consists of gently rolling soils on fairly wide ridgetops and on short hillsides (fig. 3) that decline to narrow bottoms. Slopes are mild.

This association makes up about 11 percent of the county. It is about 50 percent Memphis soils, 25 percent Lexington soils, and 10 percent Smithdale soils. The remaining 15 percent is Collins, Grenada, Calhoun, and Henry soils.

The Memphis soils occupy the higher places on the wider ridgetops. These soils are well drained. They have a plow layer of brown silt loam over a subsoil of dark brown silt loam or silty clay loam.

The Lexington soils are on the ridgetops and hillsides. They are well drained. Typically, these soils have a plow layer of brown silt loam. Below that is reddish brown and dark brown silt loam and silty clay loam to a depth between 27 and 55 inches. Below this depth, these soils are sandy loam and loamy sand.

The Smithdale soils are on hillsides. These soils are well drained. They have a surface layer of brown, dark brown, and very dark brown silt loam that is 4 to 21 inches thick. They have a subsoil of yellowish red and red sandy clay loam that extends to a depth of several feet.

The minor soils in this association are Collins, Grenada, Calhoun, and Henry soils. Collins and Grenada soils are moderately well drained, and Calhoun and Henry soils are poorly drained. Collins soils are on first bottoms. Grenada, Calhoun, and Henry soils are on the uplands.

Nearly all the soils in this association are suited to row crops. Slopes limit some areas to hay and pasture. Steeper slopes or gullies limit a few areas to woods. Most of the soils in this association have slight limitation for residential developments, small commercial buildings, and septic

Figure 4.—**Area of association 5; rolling Lexington and Smithdale soils seeded to pasture.**

tank absorption fields. Steep slopes severely limit a few areas.

5. Lexington-Memphis-Smithdale association

Well drained, rolling, loamy soils on uplands

This association consists of rolling soils on moderately wide and narrow ridgetops, on short hillsides, and in narrow bottoms (fig. 4).

This association makes up about 25 percent of the county. It is 40 percent Lexington soils, 25 percent Memphis soils, and 15 percent Smithdale soils. The remaining 20 percent is Vicksburg, Collins, and Iuka soils.

The Lexington soils are on ridgetops and hillsides. These soils are well drained. They have a surface layer of brown, dark brown, or very dark brown silt loam. They have a subsoil of reddish brown and dark brown silt loam and silty clay loam that extends to a depth between 27 and 55 inches. They have sandy loam and loamy sand below this depth.

The Memphis soils are on the widest part of the ridgetops. These soils are well drained. They have a plow layer of brown silt loam and a subsoil of dark brown silt loam or silty clay loam.

The Smithdale soils are on hillsides, most of which are steep. These soils are well drained. They have a surface layer of very dark brown, brown, and dark brown fine sandy loam or silt loam. They have a subsoil of yellowish red and red sandy clay loam that is several feet thick.

The minor soils of this association are mainly on the narrow bottoms. Vicksburg soils are well drained, and Collins and Iuka soils are moderately well drained.

Much of this association is suited to row crops in rotation with hay and pasture. Strong and moderately steep slopes and the severe hazard of erosion limit use of part of the association to hay, pasture, or trees. Steep slopes and severely eroded hillsides limit use of some areas to woods. Most of this association has slight or moderate limitations for dwellings that have septic tank absorption fields or central sewer service; however, a few areas that have steeper slopes have severe limitations for these uses. Steeper slopes severely limit most of the association for industrial and commercial developments.

6. Smithdale-Lexington association

Well drained, hilly, loamy soils on uplands

This association consists of hilly soils on narrow, winding ridgetops, on long hillsides, and in narrow, winding valleys (fig. 5).

This association makes up about 16 percent of the county. It is 40 percent Smithdale soils and 25 percent

Figure 5.—**Area of association 6. Cleared areas are Lexington soils; steeper, wooded areas are Smithdale soils.**

Lexington soils. The remaining 35 percent is Collins, Iuka, and Providence soils.

The Smithdale soils are on hillsides. These soils are well drained. They have a surface layer of very dark brown, brown, and dark brown fine sandy loam or silt loam. They have a subsoil of yellowish red and red sandy clay loam that is several feet thick.

The Lexington soils are on ridgetops and hillsides. These soils are well drained. They have a surface layer of brown, dark brown, or very dark brown silt loam. They have a subsoil of reddish brown and brown silt loam and silty clay loam that extends to a depth between 27 and 55 inches. Below this depth they commonly are sandy loam or loamy sand.

The minor soils in this association are mainly Collins and Iuka soils. These soils are on narrow bottoms. They are moderately well drained. There are some areas of Providence soils. Providence soils are moderately well drained and have a fragipan.

Only a small part of this association is suited to row crops. The areas suited to row crops are on narrow, winding ridgetops and narrow bottoms. Because of their size, shape, and location, most of these areas are still wooded. Steep slopes severely limit the use of most of this association for crops, except for hay and pasture. Steep slopes also severely limit most of the soils in this association for residential, industrial, and commercial developments. A few areas on ridgetops have slight or moderate limitations for these uses.

7. *Dulac-Sweatman association*

Gently rolling and rolling, moderately well drained, loamy soils and well drained loamy soils that have a clayey subsoil; on uplands

This association consists of gently rolling soils on uplands. These uplands are interrupted by valleys that have fairly short slopes. Also occasional knolls that rise above the surrounding area are conspicuous.

This association makes up about 3 percent of the county. It is 65 percent Dulac soils and 30 percent Sweatman soils. The remaining 5 percent is mainly Collins and Lexington soils.

The Dulac soils are on the ridgetops. These soils are moderately well drained. Typically, they have a plow layer of brown silt loam 6 inches thick and a subsoil of strong brown silt loam to a depth of 23 inches. At a depth of about 23 inches is a mottled silt loam fragipan. At a depth of 40 inches or less, the fragipan is underlain by yellowish red and gray clay.

The Sweatman soils are on the steeper hillsides. These

soils are well drained. Commonly, they have a surface layer of brown silt loam about 6 inches thick. They are yellowish red and strong brown clay between the depths of 6 and 45 inches. Gray shaly clay is beneath the clay subsoil.

The minor soils in this association are mainly Collins soils. These soils are on the small bottoms and are moderately well drained. The Lexington soils are on the tops of some of the knolls and are well drained.

Most of this association is suited to row crops in rotation with hay and pasture. Because of the steep slopes and the clay soil on the steeper hillsides, part of this association is poorly suited to uses other than woods. The fragipan and underlying clay layer moderately limit most of this association for residential, industrial, and commercial uses even though central sewer service is provided. Nearly all of the association is severely limited for septic tank filter fields. Clay soil and steep slopes severely limit many areas for residential, industrial, and commercial developments.

Detailed Soil Map

The soils in Madison County are described in alphabetic order in this section. Preceding the name of each soil is the symbol that identifies the soil on the detailed soil map. The descriptions in this section give the characteristics that distinguish each soil from other soils.

A brief profile that is representative of each soil is described. A profile description is a record of what the soil scientist sees when he examines a soil.

The suitability of each soil for farming is discussed briefly. The degree of limitation of each soil for some other common uses is also given. The capability subclass and woodland suitability subclass in which each soil has been placed are given at the end of each mapping unit.

The soil map at the back of this survey shows the location and distribution of the individual soils. Table 1 gives the approximate acreage and proportionate extent of the soils. The Glossary defines many of the technical terms used in this section.

Ar—Arents-Urban land complex. This complex is on flood plains of streams. The areas have been built up by using soil material removed from adjoining areas, by pumping sand from adjacent areas, or by burying layers of refuse such as tree stumps, waste lumber, and fragments along with soil material. The upper 3 feet of these areas is a cover of silt loam, silty clay loam, or sandy clay loam that makes the areas level with the road or street. In places the borrow areas hold water and are ponds. Each mapped area is about 50 percent Arents and 50 percent Urban land.

These built-up areas are suited to dwellings, but they are commonly used for industrial and commercial developments. These areas are suited to most of the lawn grasses, shrubs, and ornamental trees commonly grown in the county. Not placed in a capability subclass or woodland suitability subclass.

Ca—Calhoun and Henry silt loams. This mapping unit consists of poorly drained soils in depressions on wide ridgetops and on low benches next to flood plains of streams. The slopes range from 0 to 2 percent. Calhoun soils make up 60 to 75 percent of most areas, and Henry soils that have a fragipan make up most of the rest of these areas. Most mapped areas consist of both soils, but there are a few areas in which one soil or the other does not occur.

Profile description of Calhoun silt loam:

0 to 8 inches; dark grayish brown very friable silt loam.
8 to 36 inches; light gray very friable and friable silt loam that has mottles in shades of brown and yellow.
36 to 50 inches; light gray friable silty clay loam that has a few dark brown mottles.
50 to 72 inches; mottled gray and dark brown friable silt loam.

Below a depth of 36 inches, the Calhoun soil is silt loam or silty clay loam.

Profile description of Henry silt loam:

0 to 7 inches; grayish brown very friable silt loam.
7 to 19 inches; gray very friable silt loam that has mottles in shades of brown.
19 to 50 inches; gray and grayish brown firm brittle silt loam fragipan that has common mottles in shades of brown.
50 to 72 inches; mottled grayish brown, strong brown, and dark brown friable silt loam.

Depth to the fragipan in the Henry soil ranges from 18 to 37 inches.

Included with these soils in mapping were some areas of soils that are dominantly dark brown or strong brown below a depth of 50 inches. Also included were some soils that are subject to flooding.

These soils are excessively wet in winter and spring. Most areas collect some water from the surrounding higher areas. In spring, when the excess water drains away, these soils are easy to work and to keep in good tilth. The soils in 25 to 40 percent of each of the mapped areas have a fragipan that restricts root growth and the movement of water and air below a depth of 18 to 37 inches. The soils in this mapping unit have medium available water capacity. They are strongly acid or very strongly acid. Content of phosphorus and potassium is low. Generally, rather heavy applications of potassium and little or no nitrogen are necessary to make cotton bolls open.

Where surface drainage is adequate, these soils are suited to the commonly grown summer row crops. Pasture and hay crops that grow in summer and those that tolerate wetness in winter are suited.

Because of their poor drainage, these soils have severe limitations for dwellings and commercial developments. Capability subclass IIIw; woodland suitability subclass 3w.

Co—Calloway silt loam. This somewhat poorly drained soil is mostly in slight depressions on wide ridgetops and on low benches next to the flood plains of streams. It has a fragipan. Slopes range from 0 to 2 percent.

Profile description of Calloway silt loam:

0 to 7 inches; brown very friable silt loam.
7 to 21 inches; yellowish brown friable silt loam that has common gray and grayish brown mottles.
21 to 26 inches; light gray very friable silt loam that has a few yellowish brown and strong brown mottles.
26 to 45 inches; mottled gray and strong brown firm brittle silt loam fragipan.
45 to 72 inches; mottled dark brown, light gray, and gray friable silt loam.

Depth to the fragipan ranges from 18 to 30 inches.

Included with this soil in mapping were a few areas of soils on the flood plains.

The fragipan in this soil restricts root growth and the

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

Soil	Acres	Percent	Soil	Acres	Percent
Arents-Urban land complex	452	0.1	Lexington-Urban land complex, 1 to 12 percent slopes	947	0.3
Calhoun and Henry silt loams	15,726	4.4	Lexington and Smithdale soils, 10 to 30 percent slopes, severely eroded	12,827	3.6
Calloway silt loam	10,005	2.8	Loring silt loam, 2 to 5 percent slopes	11,127	3.1
Collins silt loam	27,288	7.6	Loring silt loam, 2 to 5 percent slopes, severely eroded	2,292	.6
Dulac silt loam, 2 to 5 percent slopes	1,753	.5	Loring silt loam, 5 to 8 percent slopes, severely eroded	7,161	2.0
Dulac silt loam, 2 to 5 percent slopes, severely eroded	1,244	.3	Mantachie fine sandy loam	1,240	.4
Dulac silt loam, 5 to 8 percent slopes, severely eroded	2,619	.7	Memphis silt loam, 0 to 2 percent slopes	1,211	.3
Dulac silt loam, 8 to 12 percent slopes, severely eroded	1,833	.5	Memphis silt loam, 2 to 5 percent slopes	46,492	13.0
Eustis sandy loam, 12 to 35 percent slopes	545	.2	Memphis silt loam, 2 to 5 percent slopes, eroded	11,592	3.2
Falaya silt loam	33,453	9.3	Memphis silt loam, 5 to 8 percent slopes, severely eroded	6,807	1.9
Grenada silt loam, 0 to 2 percent slopes	1,001	.3	Ochlockonee fine sandy loam	3,105	.9
Grenada silt loam, 2 to 5 percent slopes	14,054	3.9	Providence silt loam, 2 to 5 percent slopes	767	.2
Grenada silt loam, 2 to 5 percent slopes, severely eroded	3,204	.9	Providence silt loam, 5 to 8 percent slopes, severely eroded	1,850	.5
Grenada silt loam, 5 to 8 percent slopes, severely eroded	3,853	1.1	Providence silt loam, 8 to 12 percent slopes, severely eroded	1,937	.5
Iuka fine sandy loam	4,701	1.3	Smithdale soils, 10 to 20 percent slopes	21,657	6.0
Lexington silt loam, 2 to 5 percent slopes	5,263	1.5	Smithdale soils, 20 to 30 percent slopes	19,423	5.4
Lexington silt loam, 2 to 5 percent slopes, severely eroded	2,554	.7	Sweatman soils, 5 to 12 percent slopes	834	.2
Lexington silt loam, 5 to 8 percent slopes	1,665	.5	Sweatman soils, 12 to 25 percent slopes	2,415	.7
Lexington silt loam, 5 to 8 percent slopes, severely eroded	13,953	3.9	Vicksburg silt loam	4,145	1.2
Lexington silt loam, 8 to 12 percent slopes	2,744	.8	Waverly silt loam	21,458	6.0
Lexington silt loam, 8 to 12 percent slopes, severely eroded	20,889	5.8	Waverly silt loam, frequently flooded	396	.1
Lexington silt loam, 12 to 20 percent slopes	9,918	2.8	Total	358,400	100.0

movement of water and air below a depth of 18 to 30 inches. Consequently, this soil is excessively wet in winter and early in spring. When the excess water drains away, this soil is easy to work and to keep in good tilth. Roots, water, and air easily penetrate the soil above the fragipan. This soil has medium available water capacity. The upper part of the soil is strongly acid or very strongly acid, and the lower part is strongly acid. Content of phosphorus and potassium is low.

Wetness limits the kinds of plants that are suited to this soil. This soil is suited to all the commonly grown summer annuals that are grown for row crops.

Wetness is a severe limitation for dwellings and commercial developments. Wetness and slow percolation are severe limitations for septic tank filter fields. Capability subclass IIw; woodland suitability subclass 2w.

Cs—Collins silt loam. This moderately well drained soil is mostly on flood plains of streams. Slopes range from 0 to 2 percent.

Profile description of Collins silt loam:

0 to 8 inches; brown very friable silt loam.
8 to 28 inches; brown friable silt loam that has common grayish brown mottles and pale brown bedding planes.
28 to 72 inches; grayish brown and gray friable silt loam that has common mottles in various shades of brown.

Depth to the grayish brown and gray layer ranges from 20 to 30 inches.

Included with this soil in mapping were small areas of soils that have more than 15 percent sand in the upper 40 inches. Also included were small areas of somewhat poorly drained soils and of soils in narrow drainageways that do not flood.

Most areas of this soil are frequently flooded for a brief duration, mainly in winter and spring. When the excess water drains away, this soil is easy to work and has good tilth. Roots, water, and air easily penetrate this soil. This soil has high available water capacity. It is strongly acid or very strongly acid. Content of phosphorus and potassium is low or medium.

This soil is suited to most crops commonly grown in the county. It is well suited to summer row crops and to plants that tolerate flooding and wetness in winter (fig. 6).

Most areas of this soil have severe limitations for dwellings and commercial developments because of flooding. Those areas that do not flood have slight limitations for dwellings and commercial developments. Capability subclass IIw; woodland suitability subclass 1w.

DuB—Dulac silt loam, 2 to 5 percent slopes. This moderately well drained soil is on wide ridgetops. It has a fragipan that is underlain by clayey sediment.

Profile description of Dulac silt loam, 2 to 5 percent slopes:

0 to 6 inches; brown friable silt loam.
6 to 23 inches; strong brown friable silt loam that has common yellowish brown and light gray mottles below a depth of 20 inches.
23 to 37 inches; mottled yellowish brown, strong brown, and light gray very firm brittle silt loam fragipan.
37 to 72 inches; yellowish red and gray firm plastic clay.

Depth to the fragipan ranges from 20 to 30 inches. Below the fragipan is clay or silty clay that ranges from yellowish red to gray.

This soil is easy to work and to keep in good tilth. Roots, water, and air easily penetrate the upper 20 to 30

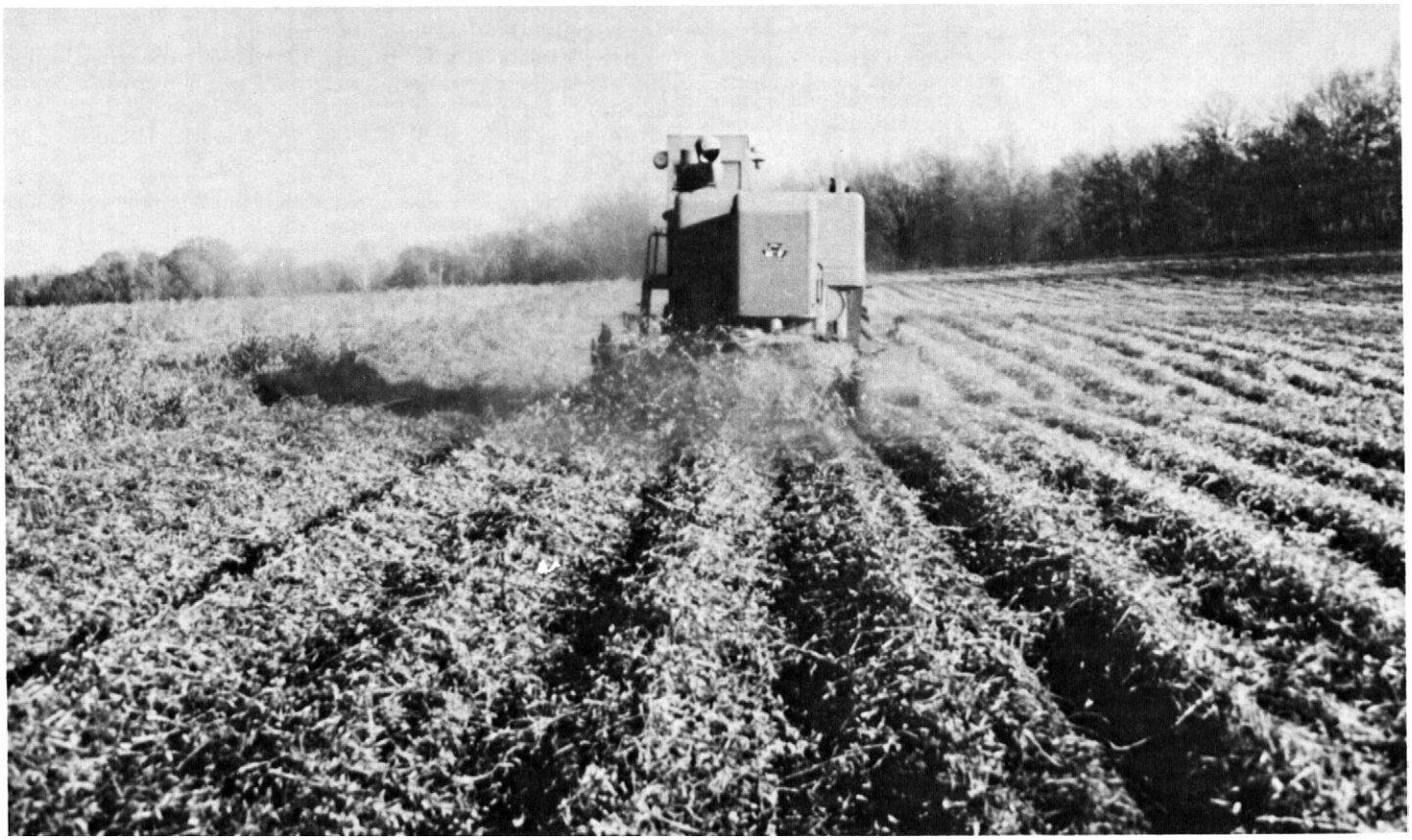


Figure 6.—**Collins silt loam is well suited to summer annual row crops such as soybeans. Flooding severely limits this soil for dwellings and commercial development.**

inches of this soil. Below those depths the fragipan and clay layer restrict root growth and the movement of water and air. This soil has medium available water capacity. It is very strongly acid or strongly acid. Content of phosphorus and potassium is low.

This soil is suited to all the row crops commonly grown in the county if runoff is controlled. It is suited to most of the hay and pasture crops commonly grown in the county.

This soil has moderate limitations for dwellings and commercial developments because of the underlying clay. It has severe limitations for septic tank absorption fields because of slow percolation. Capability subclass IIe; woodland suitability subclass 3o.

DuB3—Dulac silt loam, 2 to 5 percent slopes, severely eroded. This moderately well drained soil is on wide ridgetops and has a fragipan. It is underlain by clay. Erosion has removed most of the original surface layer.

Profile description of Dulac silt loam, 2 to 5 percent slopes, severely eroded:

0 to 6 inches; strong brown friable silt loam.
6 to 18 inches; strong brown friable silt loam that has common yellowish brown and light gray mottles below a depth of 14 inches.
18 to 32 inches; mottled yellowish brown, strong brown, and light gray very firm brittle silt loam fragipan.
32 to 72 inches; yellowish red and gray firm plastic clay.

Depth to the fragipan ranges from 16 to 20 inches. The part of the soil beneath the fragipan is clay or silty clay. It ranges from yellowish red to gray.

Included with this soil in mapping were areas of soils that do not have a fragipan.

This soil is easy to work and to keep in good tilth. Roots, water, and air easily penetrate the upper 16 to 20 inches of this soil. The fragipan and underlying clay restrict root growth and the movement of water and air below those depths. This soil has medium available water capacity. The restricted root zone causes this soil to be somewhat droughty during summer. This soil is strongly acid or very strongly acid. Content of phosphorus and potassium is low.

This soil is suited to all of the row crops and most of the hay and pasture crops commonly grown in the county. Runoff should be controlled to conserve moisture and soil.

This soil has moderate limitations for dwellings and commercial developments because of the underlying clay. It has a severe limitation for septic tank filter fields because of slow percolation. Capability subclass IIIe; woodland suitability subclass 3o.

DuC3—Dulac silt loam, 5 to 8 percent slopes, severely eroded. This moderately well drained soil is on hillsides. It has a fragipan that is underlain by clayey sediment. Erosion has removed nearly all the original surface layer. Some areas have a few shallow gullies.

Profile description of Dulac silt loam, 5 to 8 percent

slopes, severely eroded:

0 to 6 inches; strong brown friable silt loam.
6 to 18 inches; strong brown friable silt loam that has common yellowish brown and light gray mottles below a depth of 14 inches.
18 to 32 inches; mottled yellowish brown, strong brown, and light gray very firm brittle silt loam.
32 to 72 inches; yellowish red and gray firm plastic clay.

Depth to the fragipan ranges from 16 to 20 inches. The part of the soil beneath the fragipan is clay or silty clay and ranges from yellowish red to gray.

Included with this soil in mapping were areas of some soils that do not have a fragipan.

This soil is easy to work and is fairly easy to keep in good tilth. Roots, water, and air easily penetrate the upper 16 to 20 inches of this soil. The fragipan and underlying clay restrict root growth and the movement of water and air below those depths. This soil has medium available water capacity. The restricted root zone, however, makes this soil somewhat droughty in summer. This soil is strongly acid or very strongly acid. Content of phosphorus and potassium is low.

This soil is suited to all row crops and to most hay and pasture crops commonly grown in the county. Runoff and erosion are difficult to control when row crops are grown.

This soil has moderate limitations for dwellings and commercial developments because of the underlying clay. It has a severe limitation for septic tank absorption fields because of slow percolation. Capability subclass IVe; woodland suitability subclass 3o.

DuD3—Dulac silt loam, 8 to 12 percent slopes, severely eroded. This moderately well drained soil is on hillsides. It has a fragipan that is underlain by clay. Erosion has removed nearly all the original surface layer. There are a few shallow gullies.

Profile description of Dulac silt loam, 8 to 12 percent slopes, severely eroded:

0 to 6 inches; strong brown friable silt loam.
6 to 16 inches; strong brown friable silt loam that has common yellowish brown and light gray mottles below a depth of 12 inches.
16 to 30 inches; mottled yellowish brown, strong brown, and light gray very firm brittle silt loam fragipan.
30 to 72 inches; yellowish red and gray firm plastic clay.

The depth to the fragipan is typically 16 to 20 inches.

Included with this soil in mapping were a few places where the plow layer is in or near the fragipan. Also included were areas of soils that do not have a fragipan and some areas of soils that have a clayey surface layer.

This soil is easy to work and to keep in good tilth. Roots, water, and air easily penetrate the upper 16 to 20 inches of this soil. Below those depths the fragipan restricts root growth and the movement of water and air. This soil has medium available water capacity. The restricted root zone and rapid runoff, however, make this soil somewhat droughty in summer. This soil is strongly acid or very strongly acid. Content of phosphorus and potassium is low.

This soil is suited to most of the hay and pasture crops commonly grown in the county. Runoff and erosion are difficult to control.

This soil has moderate limitations for dwellings and commercial developments because of the slopes and underlying clay. It has severe limitation for septic tank filter fields because of slow percolation. Capability subclass VIe; woodland suitability subclass 3o.

EuE—Eustis sandy loam, 12 to 35 percent slopes. This excessively drained, sandy soil is on hillsides. Some areas have gullies.

Profile description of Eustis sandy loam, 12 to 35 percent slopes:

0 to 8 inches; very dark grayish brown and brown very friable sandy loam.
8 to 72 inches; yellowish brown very friable or loose loamy sand and yellowish red very friable sandy loam.

This soil is difficult to work because of sand and slopes. Roots, water, and air easily penetrate this soil, which has good tilth. This soil has low available water capacity. It is strongly acid or very strongly acid. Content of phosphorus and potassium is low. Crops generally give poor response to lime and fertilizer because the soil is droughty.

This soil is poorly suited to hay and pasture. It is suited to trees.

Slope is a severe limitation for dwellings and commercial developments. Capability subclass VIIs; woodland suitability subclass 3s.

Fa—Falaya silt loam. This somewhat poorly drained soil is mostly on fairly low areas of first bottoms along streams. Slopes are 0 to 2 percent.

Profile description of Falaya silt loam:

0 to 8 inches; brown very friable silt loam.
8 to 15 inches; brown friable silt loam that has few medium light gray mottles and black stains.
15 to 72 inches; gray and light gray friable silt loam that has common dark stains and mottles in various shades of brown.

Included with this soil in mapping were soils that have a fragipan at a depth of about 24 inches.

This soil is excessively wet during wet periods in winter and spring. Most areas frequently flood or have some water standing on them for a brief time during periods of heavy rainfall. During winter and spring the water table is often at a depth of 1 foot to 2 feet.

When the soil dries out, it is easy to work and to keep in good tilth. The lowest areas on the river bottoms, however, are wet until fairly late in spring. This soil has high available water capacity. It is strongly acid or very strongly acid. Content of phosphorus is low or medium, and content of potassium is low. Most crops respond well to phosphorus, potassium, and lime. Cotton responds especially well to potassium. Nonlegumes, such as cotton, corn, and tall fescue, have good response to nitrogen. Heavy applications of nitrogen keep cotton bolls from opening properly in fall.

This soil is suited to summer row crops such as cotton, corn, and soybeans (fig. 7). It is suited to hay and pasture plants such as tall fescue, white clover, and annual lespedeza. It is poorly suited to long lived, deep rooted perennials such as alfalfa. If this soil is farmed, ditches are needed to remove the excess water.

This soil is suited to many kinds of hardwood trees. Trees make good growth, but the excess wetness interferes with logging in winter and spring.

Many summer annuals provide food and cover for wildlife. Wastes from corn and soybean harvest provide food for wildlife. Low areas that are 3 acres or more in size can be developed into feeding areas for waterfowl by establishing food producing plants, such as corn, and

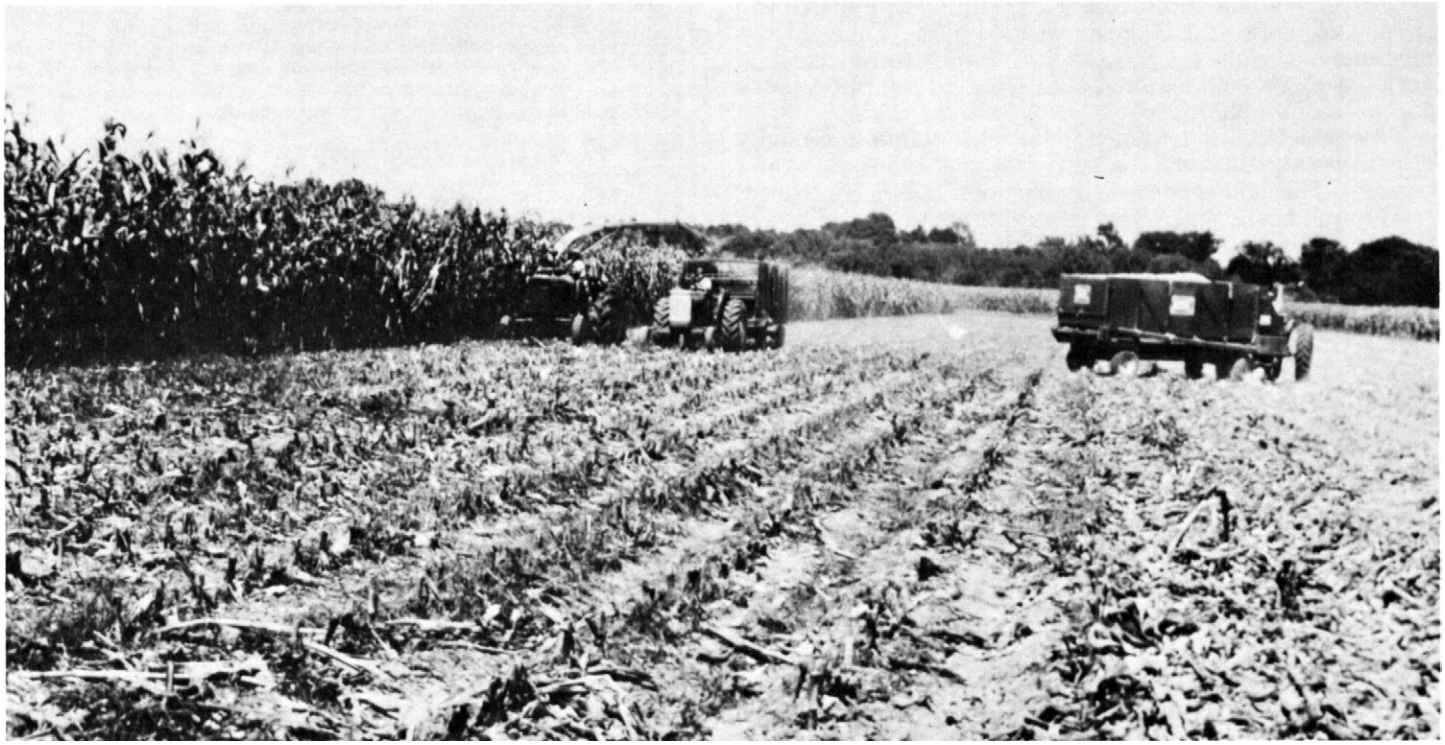


Figure 7.—**Corn silage being cut on Falaya silt loam; because of flooding and excess wetness, this soil is better suited to summer annual crops than to most other uses.**

then by flooding. The water must be removed in spring so a new crop can be planted.

This soil has severe limitations for dwellings and commercial developments because of the excess wetness and flooding. Capability subclass IIw; woodland suitability subclass 1w.

GrA—Grenada silt loam, 0 to 2 percent slopes. This moderately well drained, nearly level soil is on wide ridgetops and on the low benches next to the flood plains of streams. It has a fragipan.

Profile description of Grenada silt loam, 0 to 2 percent slopes:

0 to 8 inches; dark brown very friable silt loam.
8 to 23 inches; yellowish brown friable silt loam that has common grayish brown and pale brown mottles below a depth of 19 inches.
23 to 29 inches; light brownish gray very friable silt loam that has yellowish brown and strong brown mottles.
29 to 63 inches; yellowish brown and brown firm brittle silt loam fragipan that has common mottles in various shades of gray and brown.
63 to 72 inches; dark brown friable silt loam.

Depth to the fragipan ranges from 24 to 36 inches. Below a depth of 65 inches, the soil is dark brown, brown, or yellowish brown. In places it has mottles in various shades of gray.

Roots, water, and air easily penetrate the upper 24 to 36 inches of this soil. Below those depths the dense, compact fragipan restricts root growth and the movement of water and air. The part of the soil above the fragipan is wet during winter and spring. When the excess water drains away, this soil is easy to work and to keep in good tilth. This soil has medium available water capacity. It is strongly acid or very strongly acid throughout. Content of phosphorus and potassium is low.

This soil is suited to row crops, hay, and pasture. It is suited to nearly all the crops commonly grown in the county. Runoff and erosion generally are not limitations.

Wetness is a moderate limitation for commercial developments and dwellings if septic tanks are not used. This soil has a severe limitation for septic tank absorption fields because of slow percolation. Capability subclass IIw; woodland suitability subclass 3o.

GrB—Grenada silt loam, 2 to 5 percent slopes. This moderately well drained soil is on wide ridgetops and on the low benches next to the stream flood plains. It has a fragipan.

Profile description of Grenada silt loam, 2 to 5 percent slopes:

0 to 8 inches; dark brown very friable silt loam.
8 to 23 inches; yellowish brown friable silt loam that has grayish brown and pale brown mottles below a depth of 19 inches.
23 to 29 inches; light brownish gray very friable silt loam that has common yellowish brown and strong brown mottles.
29 to 63 inches; yellowish brown and brown firm brittle silt loam fragipan that has common mottles in various shades of gray and brown.
63 to 72 inches; dark brown friable silt loam.

The depth to the fragipan ranges from 24 to 36 inches. Below a depth of 63 inches, this soil is dark brown or brown and has mottles in various shades of gray in places.

Roots, water, and air easily penetrate the upper 24 to 36 inches of this soil. The fragipan restricts the movement of water and air and root growth below those depths. The part of the soil above the fragipan is wet during winter

and spring. When the excess water drains away, this soil is easy to work and to keep in good tilth. This soil has medium available water capacity. It is strongly acid or very strongly acid throughout. Content of phosphorus and potassium is low.

This soil is suited to nearly all the plants commonly grown in the county. It is suited to row crops, hay, and pasture. This soil erodes easily if runoff is not controlled.

This soil has a severe limitation for septic tank absorption fields because of slow percolation. Wetness is a moderate limitation for dwellings and commercial developments. Capability subclass IIe; woodland suitability subclass 3o.

GrB3—Grenada silt loam, 2 to 5 percent slopes, severely eroded. This moderately well drained soil is mostly on the wide ridgetops. Some areas are on low benches next to the flood plains of streams. This soil has a fragipan. Erosion has removed nearly all of the original surface layer.

Profile description of Grenada silt loam, 2 to 5 percent slopes, severely eroded:

0 to 6 inches; dark brown friable silt loam.
6 to 18 inches; yellowish brown friable silt loam that has common grayish brown and pale brown mottles below a depth of 12 inches.
18 to 22 inches; light brownish gray very friable silt loam that has common yellowish brown or strong brown mottles.
22 to 55 inches; yellowish brown and brown firm brittle silt loam fragipan that has many mottles in various shades of gray and brown.
55 to 72 inches; dark brown friable silt loam.

Depth to the fragipan ranges from 18 to 24 inches.

Included with this soil in mapping were areas of soils where erosion has not been severe. Also included were some areas of soils that have better drainage than this soil.

Roots, water, and air easily penetrate the upper 18 to 24 inches of this soil. Below those depths the fragipan restricts the movement of water and air and root growth. The part of the soil above the fragipan is wet during winter and spring. When the excess water drains away, this soil is easy to work and to keep in good tilth. This soil has medium available water capacity. The restricted root zone makes this soil somewhat droughty late in summer. This soil is strongly acid or very strongly acid. The content of phosphorus and potassium is low.

This soil is suited to most plants commonly grown in the county. It is suited to row crops, hay, and pasture. This soil erodes easily if runoff and erosion are not controlled.

Wetness is a moderate limitation for dwellings and commercial developments if central sewer service is provided. This soil has a severe limitation for septic tank absorption fields because of slow percolation. Capability subclass IIIe; woodland suitability subclass 3o.

GrC3—Grenada silt loam, 5 to 8 percent slopes, severely eroded. This moderately well drained soil is mostly on hillsides. A few areas are on narrow ridgetops. This soil has a fragipan. Erosion has removed nearly all of the original surface layer.

Profile description of Grenada silt loam, 5 to 8 percent slopes, severely eroded:

0 to 6 inches; dark brown friable silt loam.
6 to 18 inches; yellowish brown friable silt loam that has common grayish brown and pale brown mottles.
18 to 21 inches; light brownish gray very friable silt loam that has common yellowish brown and strong brown mottles.
21 to 50 inches; yellowish brown and brown firm brittle silt loam fragipan that has many mottles in various shades of gray and brown.
50 to 72 inches; dark brown friable silt loam.

Typically, the fragipan begins at a depth between 18 and 24 inches.

Included with this soil in mapping were some areas of soils where the plow layer is in or near the fragipan.

Roots, water, and air easily penetrate the upper 18 to 24 inches of this soil. The fragipan restricts the movement of water and air and root growth below those depths. The part of the soil above the fragipan is wet during winter and spring. When the excess water drains away, this soil is easy to work and to keep in good tilth. The restricted root zone causes this soil to be somewhat droughty late in summer. This soil has medium available water capacity. It is strongly acid or very strongly acid. Content of phosphorus and potassium is low.

This soil is suited to most of the plants commonly grown in the county. It is suited to hay, pasture, and row crops. Runoff and erosion are difficult to control when row crops are grown.

Slope and wetness are moderate limitations for commercial developments. Wetness is a moderate limitation for dwellings if central sewer systems are provided. This soil has a severe limitation for septic tank absorption fields because of slow percolation. Capability subclass IVe; woodland suitability subclass 3o.

Iu—Iuka fine sandy loam. This moderately well drained soil is on first bottoms. Generally, it is in strips next to the stream channels. Slopes range from 0 to 2 percent.

Profile description of Iuka fine sandy loam.

0 to 33 inches; brown very friable fine sandy loam that has mottles in various shades of gray and brown. Mottles are few in the upper part and become more numerous as depth increases.
33 to 50 inches; brown very friable silt loam that has many light gray mottles and black stains.
50 to 72 inches; light gray friable silt loam that has common mottles in various shades of brown.

Included with this soil in mapping were areas of soils that have a fragipan at a depth of about 3 feet.

Most areas of this soil are frequently flooded. Flooding lasts only an hour or so in some places to a few days in other places. When the excess water drains away, this soil is easy to work and keep in good tilth. Roots, water, and air penetrate this soil. This soil has medium or high available water capacity. It is strongly acid or very strongly acid. The content of phosphorus and potassium is low or medium.

This soil is suited to all the row crops commonly grown in the county. It is suited to hay and pasture crops that tolerate winter flooding and wetness.

This soil has severe limitations for dwellings, commercial developments, and septic tank filter fields because of the flooding and winter wetness. Capability subclass IIw; woodland suitability subclass 1w.

LeB—Lexington silt loam, 2 to 5 percent slopes. This deep, well drained soil is on ridgetops.

Profile description of Lexington silt loam, 2 to 5 percent slopes:

0 to 7 inches; brown very friable silt loam.

7 to 38 inches; reddish brown and dark brown friable silt loam and silty clay loam.
38 to 50 inches; dark brown very friable sandy loam.
50 to 72 inches; alternating layers of yellow loose loamy sand and reddish brown very friable sandy loam.

Included with this soil in mapping were areas of soils that have sandy loam or loamy sand at a depth of 24 inches or less. Also included were areas of soils that have layers of sandy loam and loamy sand below a depth of 60 inches.

This soil is easy to work and keep in good tilth. Roots, water, and air penetrate it easily. This soil has high available water capacity. It is very strongly acid to medium acid. Content of phosphorus and potassium is low.

This soil is suited to all plants commonly grown in the county. It is suited to row crops, hay, and pasture. This soil erodes easily if runoff is not controlled.

This soil has slight limitations for dwellings and commercial developments. It is among the soils preferred for those uses in Madison County. Capability subclass IIe; woodland suitability subclass 3o.

LeB3—Lexington silt loam, 2 to 5 percent slopes, severely eroded. This deep, well drained soil is on ridgetops. Erosion has removed most of the original surface layer.

Profile description of Lexington silt loam, 2 to 5 percent slopes, severely eroded:

0 to 6 inches; dark brown friable silt loam.
6 to 34 inches; reddish brown and dark brown friable silty clay loam and silt loam.
34 to 45 inches; dark brown friable sandy loam.
45 to 72 inches; alternating layers of yellow loose loamy sand and reddish brown very friable sandy loam.

Included with this soil in mapping were areas where erosion has not been severe. Also included were areas of soils that have sandy loam or loamy sand at a depth of 24 inches or less.

This soil is easy to work and to keep in good tilth; however, in places some clods form in the plow layer, especially if the soil is worked when wet. Roots, water, and air penetrate this soil easily. It has high available water capacity. It is very strongly acid to medium acid. Content of phosphorus and potassium is low.

This soil is suited to all plants commonly grown in the county. It is suited to row crops, hay, and pasture. Further erosion can be reduced and needed moisture conserved if runoff is controlled.

This soil has slight limitations for dwellings and commercial developments. Capability subclass IIIe; woodland suitability subclass 3o.

LeC—Lexington silt loam, 5 to 8 percent slopes. This deep, well drained soil is mostly on narrow, winding ridgetops between steep hillsides. A few areas are on hillsides.

Profile description of Lexington silt loam, 5 to 8 percent slopes:

0 to 3 inches; very dark brown very friable silt loam.
3 to 9 inches; brown very friable silt loam.
9 to 31 inches; reddish brown and dark brown friable silty clay loam and silt loam.
31 to 48 inches; dark brown friable sandy loam.
48 to 72 inches; alternating layers of yellow loose loamy sand and reddish brown friable sandy loam.

Included with this soil in mapping were areas of severely eroded soils that have a plow layer of dark brown silt loam.

This soil has good tilth and is easy to work. Roots, water, and air penetrate it easily. This soil has high available water capacity. It is very strongly acid to medium acid. Content of phosphorus and potassium is low.

This soil is suited to the plants commonly grown in the county. It is suited to row crops, hay, and pasture; however, because of their size, irregular shape, and location between steep hillsides, areas of this soil generally are in woods.

This soil has slight limitations for dwellings. Slope is a moderate limitation for commercial developments. Capability subclass IIIe; woodland suitability subclass 3o.

LeC3—Lexington silt loam, 5 to 8 percent slopes, severely eroded. This deep, well drained soil is mostly on hillsides. A few areas are on narrow ridgetops.

Profile description of Lexington silt loam, 5 to 8 percent slopes, severely eroded:

0 to 6 inches; dark brown friable silt loam.
6 to 30 inches; reddish brown and dark brown friable silty clay loam and silt loam.
30 to 45 inches; dark brown friable sandy loam.
45 to 72 inches; alternating layers of yellow loose loamy sand and reddish brown very friable sandy loam.

Included with this soil in mapping were areas where erosion has not been severe. Also included were a few areas of soils that have sandy loam and loamy sand at a depth of 24 inches or less.

This soil is easy to work and is fairly easy to keep in good tilth. Some clods form in the plow layer, especially if the soil is worked when wet. Roots, water, and air easily penetrate this soil. This soil has high available water capacity. It is medium acid to very strongly acid. Content of phosphorus and potassium is low.

This soil is suited to all plants commonly grown in the county. It erodes easily if runoff is not controlled.

This soil has slight limitations for dwellings. Slope is a moderate limitation for commercial developments. Capability subclass IVe; woodland suitability subclass 3o.

LeD—Lexington silt loam, 8 to 12 percent slopes. This deep, well drained soil is on hillsides.

Profile description of Lexington silt loam, 8 to 12 percent slopes:

0 to 3 inches; very dark brown very friable silt loam.
3 to 9 inches; brown very friable silt loam.
9 to 30 inches; reddish brown and dark brown friable silty clay loam and silt loam.
30 to 45 inches; dark brown friable sandy loam.
45 to 72 inches; alternating layers of yellow loose loamy sand and reddish brown very friable sandy loam.

Included with this soil in mapping were areas of severely eroded soils. Also included were areas of soils that have sand at a depth of 24 inches or less.

This soil has good tilth, but the strong slopes make it somewhat difficult to work. Roots, water, and air easily penetrate this soil. This soil has high available water capacity. It is very strongly acid to medium acid. Content of phosphorus and potassium is low.

This soil is suited to all plants commonly grown in the county. It is suited to row crops, hay, and pasture. This soil erodes easily if runoff is not controlled. Runoff and erosion are nearly impossible to control if row crops are grown.

Slope is a moderate limitation for dwellings and a severe

limitation for commercial developments. Capability subclass IVe; woodland suitability subclass 3o.

LeD3—Lexington silt loam, 8 to 12 percent slopes, severely eroded. This deep, well drained soil is on hillsides. Erosion has removed most of the original surface layer. There are a few shallow gullies.

Profile description of Lexington silt loam, 8 to 12 percent slopes, severely eroded:

0 to 6 inches; dark brown friable silt loam.
6 to 30 inches; reddish brown and dark brown friable silty clay loam and silt loam.
30 to 45 inches; dark brown friable sandy loam.
45 to 72 inches; alternating layers of yellow loose loamy sand and reddish brown very friable sandy loam.

Included with this soil in mapping were areas of soils where erosion is not severe. Also included were areas of soils that have loamy sand or sandy loam at a depth of 24 inches or less.

This soil is fairly easy to keep in good tilth. Some clods form in the plow layer, especially if the soil is worked when wet. The strong slopes make areas of this soil somewhat difficult to work. Roots, air, and water penetrate this soil easily. It has high available water capacity. It is very strongly acid to medium acid. Content of phosphorus and potassium is low.

This soil is suited to the plants commonly grown in the county. It is suited to hay, pasture, and row crops. This soil erodes when runoff is not controlled. Runoff and erosion are nearly impossible to control if row crops are grown on this soil (fig. 8).

Slope is a moderate limitation for dwellings and a severe limitation for commercial developments. Capability subclass VIe; woodland suitability subclass 3o.

LeE—Lexington silt loam, 12 to 20 percent slopes. This deep, well drained soil is on hillsides.

Profile description of Lexington silt loam, 12 to 20 percent slopes:

0 to 6 inches; dark brown friable silt loam.
6 to 30 inches; reddish brown and dark brown friable silty clay loam and silt loam.
30 to 45 inches; dark brown friable sandy loam.
45 to 72 inches; alternating layers of yellow loose loamy sand and reddish brown very friable sandy loam.

Included with this soil in mapping were areas of soils that have loamy sand or sandy loam at a depth of 24 inches or less. Also included were areas of soils that have a few shallow gullies.

This soil is fairly easy to keep in good tilth, but strong slopes make it difficult to work. Some clods form in the plow layer, especially if the soil is worked when wet. This soil is penetrated easily by roots, water, and air. It has high available water capacity. It is very strongly acid to medium acid. Content of phosphorus and potassium is low.

This soil is suited to hay, pasture, and woods. If this soil has a sparse plant cover or is left bare, it erodes rapidly.

This soil has severe limitations for dwellings and commercial developments because it has moderately steep slopes. Capability subclass VIe; woodland suitability subclass 3o.

LgC—Lexington-Urban land complex, 1 to 12 per-

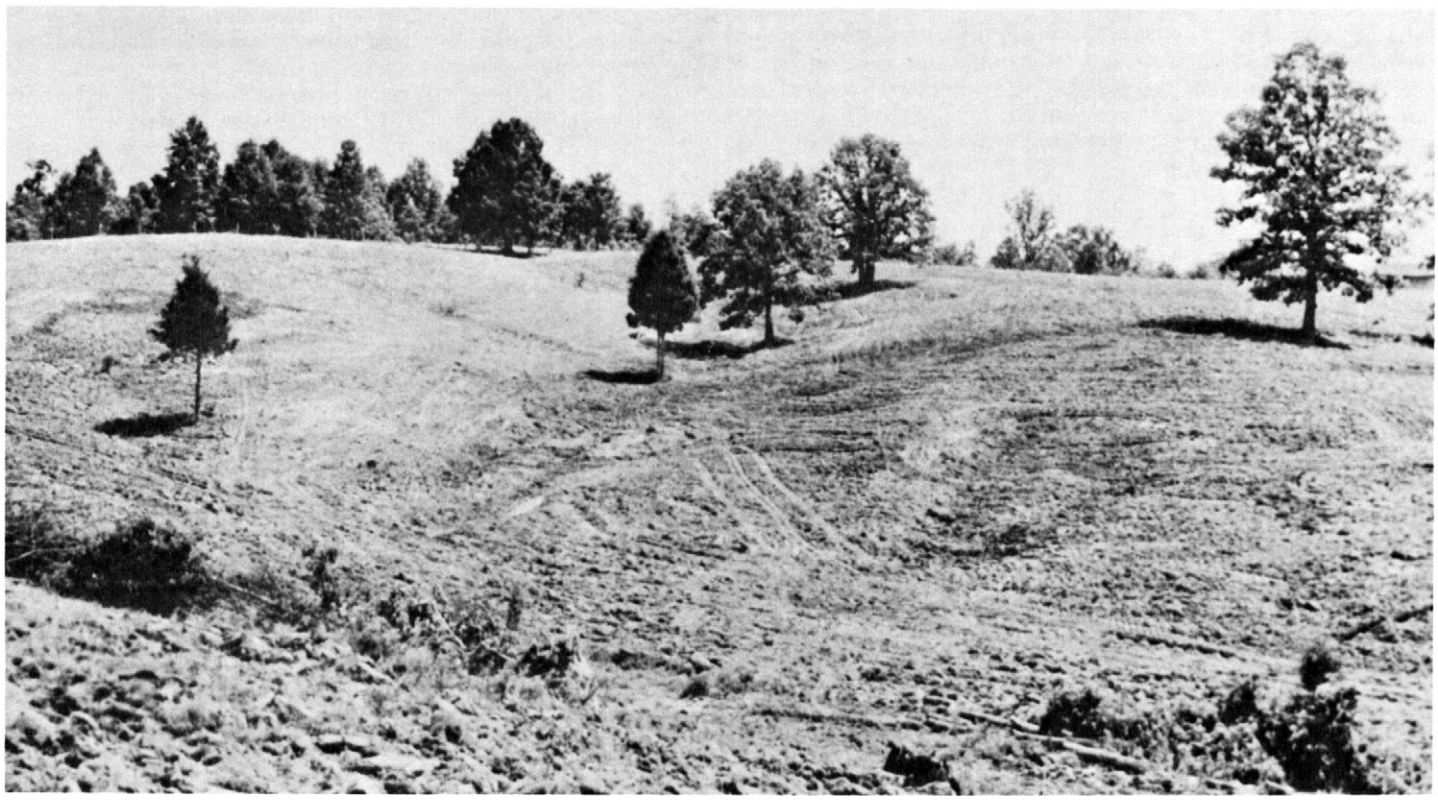


Figure 8.—**Seedbed for pasture on Lexington silt loam, 8 to 12 percent slopes, severely eroded. Some shallow gullies were filled during seedbed preparation.**

cent slopes. This mapping unit consists of Lexington soils and areas of adjacent soils that have been so disturbed that soil classification is impossible. Although slopes range from 1 to 12 percent, they generally are less than 5 percent. The soil material is loamy. The deep, well drained Lexington soils make up 20 to 50 percent of this complex.

In places there are borrow areas from which soil material has been removed. Some of the borrow areas have been smoothed, but others have a rough, uneven surface. Slopes range from 5 to 12 percent. There are other places where soil material has been removed from part of the area and used to fill or build up the rest of that same area. Generally these cut and filled areas are used for large buildings, industrial sites, residential subdivisions, shopping centers, and other commercial developments. The soils in some of these areas have been artificially compacted to a density of 100 pounds to about 120 pounds per cubic foot.

Profile description of a Lexington soil in this mapping unit:

0 to 30 inches; reddish brown and dark brown friable silt loam and silty clay loam.
30 to 45 inches; dark brown friable sandy loam.
45 to 72 inches; alternating layers of yellow loose loamy sand and reddish brown very friable sandy loam.

Onsite evaluation is needed to predict the behavior of these areas for a particular use. Not placed in a capability subclass or woodland suitability subclass.

LmE3—Lexington and Smithdale soils, 10 to 30 percent slopes, severely eroded. This mapping unit consists of soils on hillsides. Gullies 6 feet to more than 30 feet deep make up 30 to 80 percent of each of the areas. Most mapped areas contain both Lexington and Smithdale soils between the gullies, but there are a few areas in which there is only one of these soils. Lexington soils generally make up 10 to 50 percent of each area, and Smithdale soils generally make up 10 to 20 percent of each area.

Profile description of a Lexington soil in this mapping unit:

0 to 5 inches; dark brown friable silt loam.
5 to 24 inches; reddish brown and dark brown friable silt loam.
24 to 42 inches; dark brown friable sandy loam.
42 to 72 inches; alternating layers of yellow loose loamy sand and reddish brown very friable sandy loam.

Yellowish red or reddish brown sandy loam is below a depth of 42 inches in some places.

Profile description of a Smithdale soil in this mapping unit:

0 to 4 inches; dark brown friable silt loam.
4 to 15 inches; reddish brown friable silt loam.
15 to 72 inches; yellowish red and red friable sandy clay loam.

In the steeper, wooded areas, the upper part of the profile consists of 1 inch to 3 inches of very dark brown, very friable silt loam over 8 to 15 inches of light yellowish brown, very friable fine sandy loam.

The soils in this mapping unit are penetrated easily by roots, water, and air. The soil material can be worked easily with large machinery. Gullied areas can be reclaimed, but the cost generally is high. These soils have high available water capacity, but they commonly are droughty because the rapid runoff is nearly impossible to control. These soils are medium acid to very strongly acid. Content of phosphorus and potassium is low.

Areas of these soils are poorly suited to improved pasture and hay because the surface is rough and uneven as a result of gullying. They are suited to trees, especially pines. Slope is a severe limitation for dwellings and commercial developments. Capability subclass VIIe; woodland suitability subclass 3o.

LoB—Loring silt loam, 2 to 5 percent slopes. This moderately well drained soil is on fairly wide ridgetops. It has a fragipan.

Profile description of Loring silt loam, 2 to 5 percent slopes:

0 to 7 inches; brown very friable silt loam.
7 to 16 inches; dark brown friable silty clay loam.
16 to 35 inches; strong brown friable silt loam that has a few light brownish gray mottles below a depth of 24 inches.
35 to 47 inches; dark brown firm brittle silt loam fragipan that has common light brownish gray and yellowish brown mottles.
47 to 65 inches; dark brown friable silt loam that has common light brownish gray mottles.
65 to 72 inches; red friable silty clay loam, slightly plastic wet.

Depth to the fragipan ranges from 28 to 37 inches.

This soil is easy to work and to keep in good tilth. Roots, water, and air easily penetrate the upper 24 to 37 inches of this soil. Below those depths, the fragipan slightly restricts root growth and the movement of water and air. This soil has high available water capacity. It is strongly acid. Content of phosphorus and potassium is medium.

This soil is suited to all crops commonly grown in the county. It is suited to row crops, hay, and pasture.

This soil has slight limitations for dwellings and commercial developments because of slow percolation. It has a severe limitation for septic tank absorption fields. Capability subclass IIe; woodland suitability subclass 3o.

LoB3—Loring silt loam, 2 to 5 percent slopes, severely eroded. This moderately well drained soil is on ridgetops. It has a fragipan. Erosion has removed nearly all of the original surface layer.

Profile description of Loring silt loam, 2 to 5 percent slopes, severely eroded:

0 to 6 inches; dark brown friable silt loam.
6 to 12 inches; dark brown friable silty clay loam.
12 to 38 inches; strong brown friable silt loam that has few light brownish gray mottles below a depth of 16 inches.
38 to 45 inches; dark brown firm brittle silt loam fragipan that has common light brownish gray and yellowish brown mottles.
45 to 65 inches; dark brown friable silt loam that has common light brownish gray mottles.
65 to 72 inches; red friable silty clay loam, slightly plastic wet.

Depth to the fragipan ranges from 24 to 38 inches.

This soil is easy to work and is fairly easy to keep in good tilth.

Roots, water, and air easily penetrate the upper 24 to 38 inches of this soil. Below those depths, the fragipan slightly restricts the movement of water and air and the growth of roots. This soil is strongly acid. Content of phosphorus and potassium is medium.

This soil is suited to all the crops commonly grown in the county. It is suited to row crops, hay, and pasture. This soil erodes easily if runoff is not controlled.

This soil has slight limitations for dwellings and commercial developments because of slow percolation. It has a severe limitation for septic tank absorption fields. Capability subclass IIIe; woodland suitability subclass 3o.

LoC3—Loring silt loam, 5 to 8 percent slopes, severely eroded. This moderately well drained soil is

mostly on hillsides. It has a fragipan. Erosion has removed nearly all of the original surface layer.

Profile description of Loring silt loam, 5 to 8 percent slopes, severely eroded:

0 to 6 inches; dark brown friable silt loam.
6 to 12 inches; dark brown friable silty clay loam.
12 to 24 inches; strong brown friable silt loam that has few light brownish gray mottles below a depth of 16 inches.
24 to 42 inches; dark brown firm brittle silt loam fragipan that has light brownish gray and yellowish brown mottles.
42 to 65 inches; dark brown friable silt loam that has common light brownish gray mottles.
65 to 72 inches; red friable silty clay loam, slightly plastic wet.

Depth to the fragipan ranges from 22 to 36 inches.

Included with this soil in mapping were areas of soils that have a fragipan at a depth of 18 inches or less.

This soil is easy to work and to keep in good tilth. Roots, water, and air easily penetrate the upper 24 to 36 inches of this soil. The fragipan retards the movement of water and air and the growth of roots below those depths. This soil has medium available water capacity. It is strongly acid. Content of phosphorus and potassium is medium.

This soil is suited to all crops commonly grown in the county. It is suited to row crops, hay, and pasture.

This soil has a slight limitation for dwellings. Slope is a moderate limitation for commercial developments. This soil has a severe limitation for septic tank absorption fields because of slow percolation. Capability subclass IIIe; woodland suitability subclass 3o.

Ma—Mantachie fine sandy loam. This somewhat poorly drained soil is on stream bottoms. Slopes range from 0 to 2 percent.

Profile description of Mantachie fine sandy loam:

0 to 13 inches; dark grayish brown very friable fine sandy loam that has common medium gray mottles below a depth of 8 inches.
13 to 38 inches; light gray very friable and loose sandy loam that has common mottles in various shades of brown.
38 to 72 inches; light gray friable silt loam that has common mottles in various shades of brown.

Nearly all areas of this soil are occasionally flooded for a brief period by overflow from streams. This soil is excessively wet during winter and spring. When the excess water drains away, this soil is easy to work and keep in good tilth. Roots, water, and air easily penetrate this soil. This soil has low to medium available water capacity. It is strongly acid or very strongly acid. Content of phosphorus and potassium is low. Generally, rather large applications of potassium and little or no nitrogen are necessary to make cotton bolls open.

This soil is suited to all row crops commonly grown in the county. It is suited to pasture and hay crops that tolerate winter wetness and flooding.

This soil has severe limitations for dwellings, septic tank filter fields, and commercial developments because of the excess wetness and flooding. Capability subclass IIw; woodland suitability subclass 1w.

MeA—Memphis silt loam, 0 to 2 percent slopes. This deep, well drained soil is commonly on rather wide ridgetops.

Profile description of Memphis silt loam, 0 to 2 percent slopes:

0 to 8 inches; brown very friable silt loam.
8 to 22 inches; dark brown friable silty clay loam.
22 to 72 inches; dark brown friable silt loam.

This soil may have pale brown silt coatings on some ped faces and a few gray mottles below a depth of 30 inches.

This soil is easy to work and to keep in good tilth. Roots, water, and air penetrate this soil to a great depth. This soil has high available water capacity. It is strongly acid or very strongly acid. Content of phosphorus and potassium is medium.

This soil is suited to all crops commonly grown in the county. Runoff and erosion generally are not limitations.

This soil has slight limitations for dwellings, septic tank absorption fields, and commercial developments. Capability class I; woodland suitability subclass 2o.

MeB—Memphis silt loam, 2 to 5 percent slopes. This deep, well drained soil is on the wide ridgetops.

Profile description of Memphis silt loam, 2 to 5 percent slopes:

0 to 7 inches; brown very friable silt loam.
7 to 19 inches; dark brown friable silty clay loam.
19 to 72 inches; dark brown friable loam.

This soil may have pale brown silt coatings on some ped faces and gray mottles below a depth of 30 inches.

This soil is easy to work and to keep in good tilth. Roots, water, and air easily penetrate this soil. This soil has high available water capacity. It is strongly acid or very strongly acid. Content of phosphorus and potassium is medium.

This soil is suited to all crops commonly grown in the county (fig. 9). It is suited to row crops, hay, and pasture. It erodes easily if runoff is not controlled.

This soil has only slight limitations for dwellings, septic tank absorption fields, and commercial developments. Capability subclass IIe; woodland suitability subclass 2o.

MeB2—Memphis silt loam, 2 to 5 percent slopes, eroded. This deep, well drained soil is on wide ridgetops.

Profile description of Memphis silt loam, 2 to 5 percent slopes, eroded:

0 to 6 inches; brown friable silt loam.
6 to 14 inches; dark brown friable silty clay loam.
14 to 72 inches; dark brown friable silt loam.

This soil may have gray mottles and pale brown silt coatings on some ped faces below a depth of 30 inches.

Included with this soil in mapping were small areas of soils that are severely eroded and have a dark brown plow layer.

This soil is easy to work and to keep in good tilth. Roots, water, and air penetrate this soil easily. This soil has high available water capacity. It is strongly acid or very strongly acid. Content of phosphorus and potassium is medium.

This soil is suited to all the crops commonly grown in the county. It erodes easily if runoff is not controlled.

This soil has only slight limitations for dwellings, septic tank absorption fields, and commercial developments. It is among the soils preferred for those uses. Capability subclass IIe; woodland suitability subclass 2o.

MeC3—Memphis silt loam, 5 to 8 percent slopes, severely eroded. This deep, well drained soil is mostly on hillsides. A few areas are on narrow ridgetops.

Profile description of Memphis silt loam, 5 to 8 percent slopes, severely eroded:

0 to 6 inches; dark brown friable silt loam.
6 to 12 inches; dark brown friable silty clay loam.

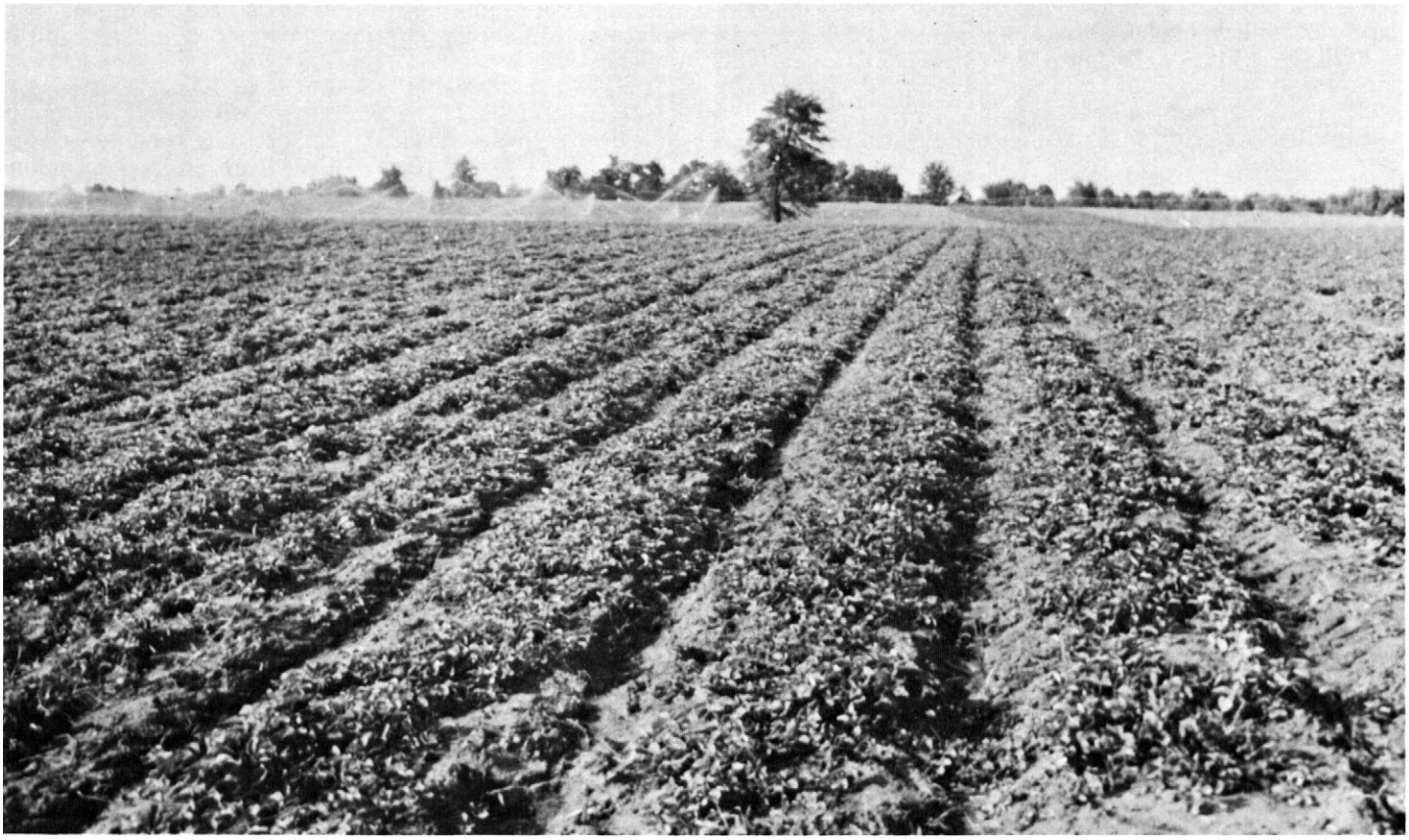


Figure 9.—**Strawberries on Memphis silt loam, 2 to 5 percent slopes. This soil is suited to all crops commonly grown in the county, to dwellings, and to industrial and commercial developments.**

12 to 60 inches; dark brown friable silt loam.
60 to 72 inches; brown friable fine sandy loam.

On narrow ridgetops in woods, the upper 3 inches of this soil is a very dark brown, very friable silt loam and the next 7 inches is brown, very friable silt loam. In places, this soil is dark brown silt loam to a depth of 72 inches. In some places, it has gray mottles and pale brown silt coatings below a depth of 30 inches. Below a depth of 60 inches this soil is brown, dark brown, reddish brown, or yellowish red fine sandy loam, sandy loam, or sandy clay loam.

This soil is easy to work and is fairly easy to keep in good tilth. Roots, water, and air penetrate this soil easily. This soil has high available water capacity. If runoff is controlled, plants generally have a good supply of moisture. This soil is strongly acid or very strongly acid. Content of phosphorus and potassium is medium.

This soil is suited to plants commonly grown in the county. It is suited to row crops, hay, and pasture. Runoff should be controlled to conserve moisture and soil.

This soil has slight limitations for dwellings and septic tank absorption fields. Slope is a moderate limitation for commercial developments. Capability subclass IIIe; woodland suitability subclass 2o.

Oc—Ochlockonee fine sandy loam. This well drained soil is on first bottoms. It is mostly in strips along the channels and former channels of streams on wide flood plains. In some areas it is also on the narrow bottom lands of streams. Slopes are 0 to 2 percent.

Profile description of Ochlockonee fine sandy loam:

0 to 31 inches; brown and brownish yellow very friable fine sandy loam and sandy loam.
31 to 46 inches; yellowish brown friable silt loam that has many strong brown and light gray mottles.
46 to 72 inches; strong brown friable silt loam that has many light gray mottles.

Below a depth of 10 inches, this soil is sandy loam, loam, or silt loam or it is in alternating layers of two or more of these textures. Sand content between depths of 10 and 40 inches ranges from 15 to 70 percent. Commonly it is near the upper limit. In places a few gray or grayish brown mottles are below a depth of 20 inches.

Included with this soil in mapping were small areas of very sandy soils.

Most areas of this soil are frequently flooded. Generally, the flooding lasts for only a few hours. Floods are mainly in winter and spring. This soil is easy to work and to keep in good tilth. Roots, water, and air penetrate this soil easily. This soil has low or medium available water capacity. It is strongly acid or very strongly acid. Content of phosphorus and potassium is low.

This soil is suited to all the crops commonly grown in the county.

Flooding is a severe limitation for dwellings and com-

mercial developments. This soil has a severe limitation for septic tank absorption fields. Capability class I; woodland suitability subclass 2o.

PrB—Providence silt loam, 2 to 5 percent slopes. This moderately well drained soil is on ridgetops that are fairly wide. It has a fragipan.

Profile description of Providence silt loam, 2 to 5 percent slopes:

0 to 6 inches; brown friable silt loam.
6 to 23 inches; brown friable silty clay loam.
23 to 30 inches; brown friable silt loam that has common grayish brown mottles.
30 to 45 inches; dark brown firm brittle silt loam fragipan that has common grayish brown and yellowish brown mottles.
45 to 72 inches; red friable clay loam, slightly plastic when wet.

This soil is silty clay loam or silt loam between the depths of 6 and 30 inches. Depth to the fragipan ranges from 24 to 36 inches.

Included with this soil in mapping were some areas of severely eroded soils in which the fragipan begins at a depth between 18 and 24 inches.

This soil is easy to work and to keep in good tilth. Roots, water, and air easily penetrate the upper 24 to 36 inches of this soil. Below this depth the fragipan restricts root growth and the movement of water and air. This soil has medium available water capacity. It is strongly acid or very strongly acid. Content of phosphorus and potassium is low.

This soil is suited to all the row crops commonly grown in the county. It is suited to most of the hay and pasture crops commonly grown in the county.

This soil has slight limitations for dwellings and commercial developments if central sewer service is provided. It has a severe limitation for septic tank absorption fields because of slow percolation. Capability subclass IIe; woodland suitability subclass 3o.

PrC3—Providence silt loam, 5 to 8 percent slopes, severely eroded. This moderately well drained soil is mostly on hillsides. Some areas are on narrow ridgetops. Erosion has removed nearly all of the original surface layer.

Profile description of Providence silt loam, 5 to 8 percent slopes, severely eroded:

0 to 6 inches; dark brown friable silt loam.
6 to 12 inches; dark brown friable silty clay loam.
12 to 20 inches; dark brown friable silt loam that has common grayish brown mottles.
20 to 37 inches; dark brown firm brittle silt loam fragipan that has common grayish brown and yellowish brown mottles.
37 to 72 inches; red friable clay loam, slightly plastic when wet.

Depth to the fragipan ranges from 18 to 24 inches.

Roots, water, and air easily penetrate the upper 18 to 24 inches of this soil. Below this depth, the fragipan restricts root growth and the movement of water and air. However, the restricted root zone and rapid runoff make it somewhat droughty in summer. This soil has medium available water capacity. It is very strongly or strongly acid. Content of phosphorus and potassium is low.

This soil is suited to most crops commonly grown in the county. It is suited to hay, pasture, and row crops. Runoff and erosion are difficult to control when row crops are grown.

Slope is a slight limitation for dwellings. This soil has moderate limitations for commercial developments if central sewer service is provided. It has a severe limitation for septic tank absorption fields because of slow percolation. Capability subclass IVe; woodland suitability subclass 3o.

PrD3—Providence silt loam, 8 to 12 percent slopes, severely eroded. This moderately well drained soil is on hillsides. It has a fragipan. Erosion has removed nearly all of the original surface layer. There are a few shallow gullies in some areas.

Profile description of Providence silt loam, 8 to 12 percent slopes, severely eroded:

0 to 6 inches; dark brown friable silt loam.
6 to 18 inches; dark brown friable silt loam that has common grayish brown mottles below a depth of 12 inches.
18 to 35 inches; dark brown firm brittle silt loam fragipan that has common grayish brown and yellowish brown mottles.
35 to 72 inches; red friable clay loam, slightly plastic when wet.

Depth to the fragipan ranges from 18 to 24 inches.

Included with this soil in mapping were a few areas that are in woods and that are not severely eroded.

This soil is fairly easy to work and to keep in good tilth. Roots, water, and air easily penetrate the upper 18 to 24 inches of this soil. Below this depth, the fragipan restricts root growth and the movement of water and air. This soil has medium available water capacity. It is somewhat droughty in summer because the root zone is restricted. It is strongly acid to very strongly acid. Content of phosphorus and potassium is low.

This soil is suited to most plants commonly grown for hay and pasture.

Slope is a moderate limitation for dwellings and a severe limitation for commercial developments if central sewer service is provided. This soil has a severe limitation for septic tank absorption fields because of slow percolation. Capability subclass VIe; woodland suitability subclass 3o.

SmE—Smithdale soils, 10 to 20 percent slopes. These deep, well drained soils are on hillsides.

Profile description of a Smithdale soil in an area of Smithdale soils, 10 to 20 percent slopes:

0 to 3 inches; very dark brown very friable fine sandy loam.
3 to 14 inches; brown very friable silt loam.
14 to 21 inches; dark brown friable silt loam.
21 to 72 inches; yellowish red and red friable sandy clay loam.

Cleared areas have a plow layer 4 to 7 inches thick that commonly is dark brown or brown. The plow layer is sandy clay loam, sandy loam, or fine sandy loam.

Included with these soils in mapping were some areas that have a few gullies.

These soils are difficult to work because of the moderately steep slopes. Roots, water, and air easily penetrate these soils. They have good tilth. They have high available water capacity. They are strongly acid or very strongly acid. Content of phosphorus and potassium is low.

These soils are suited to hay, pasture, and trees. If row crops are grown or if sparse vegetation is on these soils, runoff is rapid and erosion is difficult to control.

Slope is a severe limitation for dwellings, septic tank absorption fields, and commercial developments. Capability subclass VIe; woodland suitability subclass 3o.

SmF—Smithdale soils, 20 to 30 percent slopes. These deep, well drained soils are on hillsides.

Profile description of a Smithdale soil in an area of

Smithdale soils, 20 to 30 percent slopes:

0 to 21 inches; very dark brown light yellowish brown and dark brown very friable and friable fine sandy loam.
21 to 72 inches; yellowish red and red friable sandy clay loam.

The surface layer is sandy clay loam, sandy loam, or fine sandy loam.

Included with these soils in mapping were areas of soils that are sandy loam or loamy sand to a depth of 6 feet or more. Also included are some small areas, generally on foot slopes, of clayey soils and also some areas that have a few gullies.

These soils have good tilth, but the steep slopes make them difficult to work. Roots, water, and air penetrate these soils easily. These soils have high available water capacity, but runoff makes them somewhat droughty. They are very strongly acid or strongly acid. Content of phosphorus and potassium is low.

These soils are suited to trees. They are poorly suited to hay and pasture crops because of steep slopes and rapid runoff.

Slope is a severe limitation for dwellings, septic tank absorption fields, and commercial developments. Capability subclass VIIe; woodland suitability subclass 3o.

SwD—Sweatman soils, 5 to 12 percent slopes. These well drained clayey soils are mostly on hillsides. A few areas are on ridgetops.

Profile description of a Sweatman soil in an area of Sweatman soils, 5 to 12 percent slopes:

0 to 6 inches; brown friable silt loam.
6 to 45 inches; yellowish red and strong brown firm clay, plastic and sticky when wet.
45 to 72 inches; gray shaly clay and red firm clay, plastic and sticky when wet.

Where erosion has not been severe, the upper 6 inches of the profile is silt loam or fine sandy loam. In severely eroded areas, the upper 4 inches is yellowish red clay. Depth to the gray shaly clay commonly is 24 to 56 inches.

Included with these soils in the mapping were areas of soils where erosion has exposed the shaly clay. Also included were areas of soils where the shaly clay is below a depth of 60 inches and areas of soils that are silty clay loam between depths of 6 and 36 inches.

The high clay content restricts root growth and the movement of water and air in these soils. It causes them to swell when wet and to shrink when dry. During extended periods of drought, cracks about ½ inch wide form to a depth of about 24 inches. These soils have medium or high available water capacity. The high rate of runoff, however, causes them to be droughty during summer. These soils are very strongly acid. Content of phosphorus and potassium is low.

These soils are suited to pasture, hay, and trees. They are suited to most of the commonly grown pasture and hay crops.

These soils have severe limitations for dwellings and commercial developments because of the high clay content that causes them to swell when wet and to shrink when dry. These soils have a severe limitation for septic tank filter fields because of slow percolation. Capability subclass VIe; woodland suitability subclass 3c.

SwE—Sweatman soils, 12 to 25 percent slopes. These well drained, clayey soils are on hillsides.

Profile description of a Sweatman soil in an area of Sweatman soils, 12 to 25 percent slopes:

0 to 6 inches; brown friable silt loam.
6 to 45 inches; yellowish red and strong brown firm silty clay and clay; plastic and sticky when wet.
45 to 72 inches; gray shaly clay and red firm clay; plastic and sticky when wet.

The upper 6 inches is silt loam or fine sandy loam. Severely eroded areas have a surface layer of yellowish red clay about 4 inches thick. Depth to the shaly clay commonly is between 24 and 45 inches.

Included with these soils in the mapping were small areas of soils where the shaly clay has been exposed by erosion. Also included were some areas of soils where the shaly clay is below a depth of 50 inches and other soils that are silty clay loam between depths of 6 and 36 inches.

Root growth and the movement of water and air are restricted by the high clay content of these soils. These soils swell when wet and shrink when dry because of their high clay content. This swelling and shrinking causes cracks about ½ inch wide to form to a depth of about 24 inches during extended periods of drought. These soils have medium or high available water capacity, but high runoff causes them to be droughty during summer. They are very strongly acid. Content of phosphorus and potassium is low.

These soils are suited to trees. They are poorly suited to row crops, hay, and pasture.

These soils have severe limitations for dwellings and commercial developments because of their shrink-swell potential. They have severe limitations for septic tanks because of slow percolation. Capability subclass VIIe; woodland suitability subclass 3c.

Vk—Vicksburg silt loam. These well drained soils are on narrow first bottoms along the small streams. Slopes range from 0 to 2 percent.

Profile description of Vicksburg silt loam:

0 to 43 inches; dark brown and brown very friable and friable silt loam that has a few gray mottles below a depth of 28 inches.
43 to 50 inches; light brownish gray friable silt loam.
50 to 72 inches; yellowish brown friable silt loam that has many gray mottles.

This soil has no gray mottles in the upper 20 inches. It has no layers that are predominantly gray in the upper 30 inches. This soil is variable below a depth of 50 inches; it ranges from yellowish brown to gray and is silt loam, silty clay loam, loam, or sandy clay loam.

Even though this soil is on first bottoms, it rarely floods. Overflow from streams generally drains away within 1 to 2 hours after heavy rainfall. Excess water and flooding present only slight limitations in farm management and crop production.

This soil is easy to work and to keep in good tilth. Roots, water, and air penetrate it easily. This soil has high available water capacity. It is strongly acid or very strongly acid. Content of phosphorus and potassium is low or medium.

This soil is suited to nearly all the plants commonly grown in the county. It is suited to row crops, hay, and pasture.

This soil has severe limitations for dwellings and commercial developments even though flooding is rare. It has a moderate limitation for septic tank filter fields because of flooding. Capability class I; woodland suitability subclass 1o.

Wa—Waverly silt loam. This poorly drained soil is in low areas, mostly on flood plains of the larger streams. Slopes are from 0 to 2 percent.

Profile description of Waverly silt loam:

0 to 6 inches; dark grayish brown friable silt loam.
6 to 55 inches; light gray friable silt loam.
55 to 72 inches; light gray slightly firm silt loam or silty clay loam.

Included with this soil in mapping were areas of brown soils. Also included were some areas of soils that contain nearly 30 percent clay.

This soil is excessively wet during winter and spring. Nearly all areas of this soil are frequently flooded by overflow from streams for long to very long periods. All areas have some water on them during wet periods. The water table is often at or near the surface during winter and spring. When the excess water drains away, this soil is easy to cultivate and to keep in good tilth. Roots, water, and air penetrate it easily. This soil has high available water capacity. This soil is strongly acid or very strongly acid. Content of phosphorus and potassium is low. Cotton is especially responsive to fertilizer that is high in potassium and low in nitrogen.

This soil is suited to row crops and to summer annual hay and pasture crops when flooding does not occur in spring and summer. Improved perennial hay and pasture crops generally cannot tolerate the flooding and excess wetness during winter and spring. In the lowest places where flooding occurs during summer, this soil is only suited to trees.

This soil has severe limitations for dwellings, commercial developments, and septic tank filter fields because of flooding and excess wetness. Capability subclass IIIw; woodland suitability subclass 2w.

Wf—Waverly silt loam, frequently flooded. This poorly drained soil is on the lowest part of the flood plains of larger streams. It occupies saucerlike depressions, which trap water. Slopes range from 0 to 2 percent.

Profile description of Waverly silt loam, frequently flooded:

0 to 72 inches; gray friable silt loam.

Included with this soil in mapping were areas of soils that are silty clay loam and soils that have thin strata of fine sandy loam.

This soil is covered with 1 foot to 3 feet of water from late in fall through winter and spring and into summer. During the wettest years, water remains on many of these areas nearly all year. Generally, the water table remains near the surface during the summer.

Areas of this soil are conspicuous because the only vegetation is water-tolerant trees, such as baldcypress and water tupelo. Wetness and flooding are severe limitations for dwellings, commercial developments, and septic tank absorption fields.

This soil is suited to wetland wildlife habitat. Capability subclass VIIw; woodland suitability subclass 4w.

Use and Management of the Soils

This section describes the use and management of the soils for crops and pasture, for woodland, and for wildlife habitat. It also discusses the use of the soils for engineering purposes.

Crops and Pasture

The soils of Madison County are used extensively for crops and pasture. This section discusses the general principles of management that apply to all of the soils used for farming in the county. It explains the capability grouping used by the Soil Conservation Service. It also gives the estimated yields per acre for the principal crops under a high level of management.

General principles of soil management

Some principles of management are general enough to apply to all the soils suitable for farm crops and pasture throughout the county, though the individual soils or groups of soils require different kinds of management. These general principles of management are discussed in the following paragraphs.

Many soils in the county need lime or fertilizer, or both. The amounts needed depend on the natural content of lime and plant nutrients, which is determined by laboratory analyses of soil samples; on the needs of the crops; and on the level of yield desired. Only general suggestions for applications of lime and fertilizer are given in this survey.

Most of the soils in Madison County are low in organic-matter content, and it is not economical to build up the content to a high level. It is important, however, to return organic matter to the soil by adding farm manure, leaving plant residue on the surface, and growing sod crops, cover crops, and green-manure crops.

Tillage tends to break down soil structure. It should be kept to the minimum necessary for preparing a seedbed and controlling weeds. Maintaining the organic-matter content of the plow layer also protects the structure.

On wet soils, such as Falaya silt loam, yields of cultivated crops can be increased by open ditch drainage or tile drainage. Tile drains are costly to install, but they generally provide better drainage than open ditches. Soils that have a fragipan are difficult to drain; they can generally be drained better by open ditches than by tile. Open ditch drainage is more effective if the ditches intercept the water as it moves horizontally on top of the fragipan. Suitable outlets are needed for drainage by tile or open ditches.

All the soils that are gently sloping and steeper and are cultivated are subject to erosion. Runoff and erosion occur mostly while a cultivated crop is growing or soon after one has been harvested. On erodible soils, such as Grenada silt loam, 2 to 5 percent slopes, a cropping system that controls runoff and erosion is needed, in combination with other erosion control practices. As used here, cropping system refers to the sequence of crops grown, in combination with management.

Management includes minimum tillage, mulch planting, use of crop residue, growing of cover crops and green-manure crops, and use of lime and fertilizer. Also included are such erosion control practices as contour cultivation, terracing, contour stripcropping, diversion of runoff, and use of grassed waterways. The effectiveness of a management practice or particular combination of practices differs from one soil to another, but different combinations can be equally effective on the same soil. The local representative of the Soil Conservation Service will furnish assistance in planning an effective combination of practices.

Pasture is effective in controlling erosion on all but a few of the soils that are subject to erosion. A high level of pasture management is needed on some soils to provide enough ground cover to keep the soil from eroding. A high level of pasture management provides for applying fertilizers, controlling grazing, selecting pasture mixtures, and using other practices that are adequate for maintaining good ground cover and forage for grazing. Grazing is controlled by rotating the livestock from one pasture field to another and by providing rest periods for the pasture after each grazing period to allow for regrowth of the plants. It is important on some soils that pasture mixtures be selected that will require the least amount of renovation to maintain good ground cover and forage for grazing.

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 for engineering.

In the capability system, the kinds of soil are grouped into capability classes. Except for the soil in capability class I, the soils are further grouped into subclasses. The capability classes and subclasses 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 or require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or 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 or range, woodland, or wildlife habitat. (None in Madison County.)

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 habitat.

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 habitat.

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

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 the risk of erosion unless suitable conservation practices are used; *w* shows that excess water in or on the soil interferes with plant growth or cultivation unless artificial drainage is provided; *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. None of the soil in Madison County is in subclass c. Class I has no subclasses because the soils in this class have only slight limitations.

Estimated yields

Estimated yields of the main crops grown in Madison County are shown in table 2. The figures in table 2 represent average yields under a high level of management for the 10-year period ending in 1974. The estimates are based on data obtained from experiments and field trials and on information obtained from farmers.

No yields are shown for Arents-Urban land complex; Lexington-Urban land complex, 1 to 12 percent slopes; Lexington and Smithdale soils, 10 to 30 percent slopes, severely eroded; Sweatman soils, 12 to 25 percent slopes; and Waverly silt loam, frequently flooded. These soils are poorly suited to row crops, hay, or pasture.

High level of management includes—

1. Selecting crops and cropping systems suited to the soil.
2. Applying fertilizer and lime in accordance with needs indicated by chemical tests and by past cropping practices.
3. Preparing an adequate seedbed.
4. Using crop varieties that produce high yields and are suited to the area.
5. Planting or seeding by suitable methods at the proper rate and at the right time.
6. Inoculating legumes.
7. Using shallow cultivation of row crops.
8. Controlling weeds, insects, and diseases.
9. Using adequate surface drainage.
10. Harvesting by suited methods.

Woodland[2]

Originally all the acreage of Madison County was wooded. Now trees cover about 31 percent of the county.

Good stands of commercial trees are produced in the woodlands of the county. Needleleaf forest types occur most frequently in the eroded areas where they have been planted, and broadleaf types generally predominate on the bottoms along the rivers and creeks and on uplands that have not been cleared.

The value of wood products in the county is substantial,

[2] By C. M. HENNIGER, woodland conservationist, Soil Conservation Service.

TABLE 2.—*Yields per acre of crops and pasture*

[All yields are estimated for high level of management and are based on a 10-year period ending in 1974. Absence of a yield figure indicates the crop is seldom grown or is not suited]

Soil name and map symbol	Corn	Cotton	Soybeans	Wheat	Alfalfa	Pasture
	Bu	*Lb of lint*	*Bu*	*Bu*	*Tons*	*AUM* [1]
Arents-Urban land complex						
Calhoun and Henry silt loams	50	425	30	25		6.0
Calloway silt loam	75	575	30	30		6.0
Collins silt loam	110	800	40	45		7.0
Dulac silt loam, 2 to 5 percent slopes	75	600	35	35		6.0
Dulac silt loam, 2 to 5 percent slopes, severely eroded	60	500	25	30		5.0
Dulac silt loam, 5 to 8 percent slopes, severely eroded	60	500	20	25		5.0
Dulac silt loam, 8 to 12 percent slopes, severely eroded						5.0
Eustis sandy loam, 12 to 35 percent slopes						1.5
Falaya silt loam	90	700	40	25		7.0
Grenada silt loam, 0 to 2 percent slopes	80	650	35	35		6.5
Grenada silt loam, 2 to 5 percent slopes	75	600	30	40		6.5
Grenada silt loam, 2 to 5 percent slopes, severely eroded	60	550	25	30		5.5
Grenada silt loam, 5 to 8 percent slopes, severely eroded	45	450	20	25		5.0
Iuka fine sandy loam	90	725	35	35		5.5
Lexington silt loam, 2 to 5 percent slopes	85	700	35	45	4.0	6.0
Lexington silt loam, 2 to 5 percent slopes, severely eroded	75	500	25	28	3.9	5.5
Lexington silt loam, 5 to 8 percent slopes	80	600	30	40	4.0	5.5
Lexington silt loam, 5 to 8 percent slopes, severely eroded	65	400	20	30	3.9	5.0
Lexington silt loam, 8 to 12 percent slopes	70	500	25	35	4.0	5.5
Lexington silt loam, 8 to 12 percent slopes, severely eroded					3.3	5.0
Lexington silt loam, 12 to 20 percent slopes					1.5	4.5
Lexington-Urban land complex, 1 to 12 percent slopes						
Lexington and Smithdale soils, 10 to 30 percent slopes, severely eroded						
Loring silt loam, 2 to 5 percent slopes	90	750	35	40	3.5	7.0
Loring silt loam, 2 to 5 percent slopes, severely eroded	70	650	30	37	3.3	6.0
Loring silt loam, 5 to 8 percent slopes, severely eroded	60	525	25	30	2.6	6.0
Mantachie fine sandy loam	90	650	35	25	4.0	7.0
Memphis silt loam, 0 to 2 percent slopes	110	800	45	45	4.0	7.0
Memphis silt loam, 2 to 5 percent slopes	95	750	40	40	4.0	7.0
Memphis silt loam, 2 to 5 percent slopes, eroded	85	700	35	35	3.9	6.5
Memphis silt loam, 5 to 8 percent slopes, severely eroded	70	600	25	35	3.9	6.0
Ochlockonee fine sandy loam	80	600	35	32	3.5	6.0
Providence silt loam, 2 to 5 percent slopes	70	550	35	35		6.5
Providence silt loam, 5 to 8 percent slopes, severely eroded	45	450	20	25		5.0
Providence silt loam, 8 to 12 percent slopes, severely eroded						5.0
Smithdale soils, 10 to 20 percent slopes						2.0
Smithdale soils, 20 to 30 percent slopes						4.5
Sweatman soils, 5 to 12 percent slopes						4.5
Sweatman soils, 12 to 25 percent slopes						
Vicksburg silt loam	120	800	45	50	4.0	7.5
Waverly silt loam	60	500	30			6.0
Waverly silt loam, frequently flooded						

[1] AUM, animal-unit-month, is a term used to express the carrying capacity of pasture. It is the number of animal units, 1,000 pounds of live weight, that can be grazed on an acre of pasture for a period of 30 days without permanently damaging the pasture.

but it is below its potential. Other values for woodland include wildlife habitat, recreation, natural beauty, and conservation of soil and water. This section has been provided to explain how soils affect tree growth and management. In table 3 potential productivity and limitations to management of the soils used for woodland in Madison County are listed.

In table 3 the soils are listed alphabetically by series name and mapping unit symbol, or they are listed by mapping unit name, as in a complex. The ratings for each soil complex are based on the major soil in each complex.

Each woodland suitability subclass is identified by a two-part symbol. The first part of the symbol, a number, indicates the relative productivity of the soils. The number 1 indicates that potential productivity is very high, 2 indicates high, 3 indicates moderately high, 4 indicates moderate, and 5 indicates low.

The second part of the symbol, a letter, indicates an important soil property that imposes a moderate or severe hazard or limitation in managing the soils for wood production. The letter *w* shows that excessive water in or on the soil is the chief limitation; *c* shows that clay in the upper part of the soil is a limitation; *s* shows the soils are sandy; and *o* shows the soils have no significant restrictions or limitations for woodland use or management.

The factors of management evaluated in table 3 are erosion hazard, equipment limitation, seedling mortality, windthrow hazard, and plant competition.

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

Equipment limitation reflects the soil conditions that restrict the use of equipment normally used in woodland management or harvesting. A rating of *slight* indicates equipment use is not limited to kind or time of year; *moderate* indicates a seasonal limitation or need for modification in methods or equipment; and *severe* indicates the need for specialized equipment or operations.

Seedling mortality refers to the degree of expected mortality of planted seedlings when plant competition is not a limiting factor. Normal rainfall, good planting stock, and proper planting are assumed. The rating is *slight* if expected loss is less than 25 percent; *moderate* if expected loss is 25 to 50 percent; and *severe* if expected loss is more than 50 percent.

Windthrow hazard reflects the danger of trees being blown over by high-velocity winds. A rating is *slight* if no special hazard is recognized; *moderate* if there is a hazard during periods of excessive soil wetness and greatest wind velocity; and *severe* if the soils do not permit adequate tree rooting for stability.

Plant competition reflects the growth of undesirable plants when openings are made in the canopy. A rating is *slight* if competition will not prevent adequate natural regeneration and early growth or interfere with adequate development of planted seedlings. A rating is *moderate* if competition will delay natural or artificial regeneration but will not prevent the eventual development of fully stocked normal stands. A rating is *severe* if competition will prevent adequate natural or artificial regeneration without intensive site preparation and weeding.

Important trees is a list of some trees that are commercially important and are suited to the soil. These are the trees that woodland managers will generally favor in intermediate or improvement cuttings.

The potential productivity of these trees is given in terms of site index. *Site index* is the average height, in feet, of dominant trees at age 30 for cottonwood, at age 35 for sycamore, at age 25 for planted pines, and at age 50 for all other species or types.

In the last column in table 3 is a list of the trees that are suitable to planting for commercial wood production.

Wildlife

The abundance of a wildlife species depends largely on the amount and distribution of food, shelter, and water. If any of these elements is missing, inadequate, or inaccessible, the species is absent or scarce. The kinds of wildlife that live in a given area and the number of each kind are closely related to land use, to the resulting kinds and patterns of vegetation, and to the supply and distribution of water. These, in turn, are generally related to the kinds of soil. Major soil properties considered are rooting depth, soil texture, available water capacity, stoniness or rockiness, wetness, flooding, slope, and permeability of the soil to water and air.

Wildlife habitat normally can be created or improved by planting suitable vegetation, by properly managing the existing plant cover, by fostering the natural establishment of desirable plants, or by using a combination of these measures.

In table 4, soils in Madison County are rated for producing seven elements of wildlife habitat and three groups or kinds of wildlife. The ratings indicate relative suitability for various wildlife habitat elements.

The ratings in table 4 are explained in the following paragraphs.

A rating of *good* means that habitat generally is easily created, improved, and maintained on that soil.

A rating of *fair* means that habitat can be created, improved, or maintained on that soil in most places. Management requirements are moderate, and fairly frequent attention generally is required for satisfactory results.

A rating of *poor* means habitat can be created, improved, or maintained, but management requires frequent and prompt effort. The soil has severe limitations for that element of wildlife habitat.

A rating of *very poor* means it is impossible, or impractical, to create, improve, or maintain that element of habitat on that soil. The soil has very severe limitations for that element of wildlife habitat. Unsatisfactory results can be expected.

The habitat elements shown in table 4 are defined as follows:

Grain and seed crops are grain-producing or seed-producing annuals, such as corn, sorghums, millet, and soybeans.

Grasses and legumes are domestic grasses and legumes that are established by planting and that furnish food and cover for wildlife. They include tall fescue, ryegrass, panicgrass, clover, annual lespedeza, and bush lespedeza.

Wild herbaceous plants are native or introduced perennial grasses, forbs, and other plants that provide food and cover for upland wildlife. Examples are beggarweed, perennial lespedeza, wildbean, pokeberry, partridgepea, crotons, and cheatgrass.

Hardwood trees are deciduous trees, shrubs, and woody vines that produce fruits, nuts, buds, catkins, or foliage (browse) used extensively as food by wildlife. These plants are established mainly through natural processes. They include oak, beech, cherry, dogwood, maple, grape, honeysuckle, greenbrier, and autumn-olive.

Coniferous plants are cone-bearing trees that are used mainly as cover but also furnish food in the form of browse, seeds, or fruitlike cones. They are established through natural processes, but seed and seedlings can be planted. Examples are pines and cedars.

Wetland plants are annuals and perennial wild herbaceous plants on moist or wet sites. These do not include submerged or floating aquatic plants. These plants furnish food or cover for wetland wildlife. Examples are smartweed, wild millet, rushes, sedges, burreed, tearthumb, and aneilema.

Shallow water areas are areas of shallow water that have an average depth of less than 5 feet and are near food and cover for wetland wildlife. They can be natural wet areas or areas created by dams or levees or by water-control devices in marshes or streams. Examples are wildlife ponds, beaver ponds, muskrat marshes, and waterfowl feeding areas.

The kinds of wildlife habitat listed in table 4 are defined as follows:

Open-land includes quail, dove, cottontail rabbit, fox, meadowlark, field sparrow, and other birds and mammals that normally live on cropland, pasture, meadow, lawn, and other open-land areas that support grasses, herbs, and shrubs.

TABLE 3.—*Limitations to management, potential productivity,*

Soil and map symbols	Woodland suitability subclass	Limitations to management		
		Erosion hazard	Equipment limitation	Seedling mortality
Arents: Ar. Too variable to rate.				
Calhoun and Henry: Ca	3w	Slight	Severe	Moderate
Calloway: Co	2w	Slight	Moderate	Slight
Collins: Cs	1w	Slight	Slight	Slight
Dulac: DuB, DuB3, DuC3, DuD3	3o	Slight	Slight	Slight
Eustis: EuE	3s	Slight	Moderate	Severe
Falaya: Fa	1w	Slight	Severe	Moderate
Grenada: GrA, GrB, GrB3, GrC3	3o	Slight	Slight	Slight
Iuka: Iu	1w	Slight	Moderate	Moderate
Lexington: LeB, LeB3, LeC, LeC3, LeD, LeD3, LeE	3o	Slight	Slight	Slight
LgC. Too variable to rate.				
LmE3	3o	Slight	Slight	Slight
Loring: LoB, LoB3, LoC3	3o	Slight	Slight	Slight

and suitable trees to plant on soils used for woodland

Limitations to management—Continued		Potential productivity		Suitable trees to plant
Windthrow hazard	Plant competition	Important trees	Site index	
Slight	Moderate	Cherrybark oak	80	Cherrybark oak, loblolly pine, sweetgum.
		Southern red oak	60	
		Water oak	75	
		White oak	60	
		Loblolly pine	80	
		Sweetgum	80	
Slight	Severe	Green ash	70	Cherrybark oak, water oak, willow oak, green ash, sweetgum.
		Cherrybark oak	80	
		Water oak	80	
		Sweetgum	85	
		Loblolly pine	90	
Slight	Severe	Yellow-poplar	110	Yellow-poplar, cottonwood, cherrybark oak, water oak, sweetgum.
		Cottonwood	120	
		Cherrybark oak	110	
		Water oak	105	
		Green ash	95	
Slight	Moderate	Loblolly pine	80	Loblolly pine, shortleaf pine.
		Shortleaf pine	75	
		Sweetgum	80	
Slight	Moderate	Loblolly pine	80	Loblolly pine, shortleaf pine.
		Shortleaf pine	70	
Slight	Severe	Cherrybark oak	100	Cherrybark oak, cottonwood, willow oak, green ash, sweetgum.
		Cottonwood	110	
		Sweetgum	100	
		Green ash	90	
		Willow oak	100	
Slight	Moderate	Loblolly pine	85	Loblolly pine, shortleaf pine, cherrybark oak, southern red oak, [1] sweetgum. [1]
		Shortleaf pine	75	
		Cherrybark oak	85	
		Southern red oak	80	
		Sweetgum	85	
Slight	Severe	Loblolly pine	100	Sweetgum, cottonwood, cherrybark oak, water oak, Nuttall oak, loblolly pine.
		Sweetgum	100	
		Cottonwood	100	
		Cherrybark oak	100	
		Water oak	100	
		Nuttall oak	105	
Slight	Moderate	Loblolly pine	80	Loblolly pine, yellow-poplar, [1] black walnut, [1] cherrybark oak, [1] sweetgum. [1]
		Shortleaf pine	70	
		Cherrybark oak	80	
		Sweetgum	90	
		Yellow-poplar	90	
Slight	Moderate	Cherrybark oak	80	Loblolly pine, shortleaf pine, cherrybark oak, [1] sweetgum. [1]
		Shortleaf pine	70	
		Loblolly pine	80	
		Southern red oak	80	
		Sweetgum	90	
Slight	Moderate	Cherrybark oak	85	Loblolly pine, shortleaf pine, cherrybark oak, [1] sweetgum, [1] black walnut. [1]
		Southern red oak	75	
		Loblolly pine	85	
		Sweetgum	90	
		White oak	65	

TABLE 3.—*Limitations to management, potential productivity, and*

Soil and map symbols	Woodland suitability subclass	Limitations to management		
		Erosion hazard	Equipment limitation	Seedling mortality
Mantachie: Ma	1w	Slight	Severe	Moderate
Memphis: MeA, MeB, MeB2, MeC3	2o	Slight	Slight	Slight
Ochlockonee: Oc	2o	Slight	Slight	Slight
Providence: PrB, PrC3, PrD3	3o	Slight	Slight	Slight
Smithdale: SmE, SmF	3o	Slight	Slight	Slight
Sweatman: SwD, SwE	3c	Slight	Moderate	Moderate
Vicksburg: Vk	1o	Slight	Slight	Slight
Waverly:				
Wa	2w	Slight	Severe	Severe
Wf	4w	Slight	Severe	Severe

[1] Plant hardwoods only on uneroded sites.

Woodland includes woodcock, thrush, vireos, squirrel, deer, racoon, wild turkey, and other birds and mammals that normally live in wooded areas.

Wetland includes ducks, geese, rail, heron, shore birds, mink, muskrat, and other birds and mammals that normally live in wet areas, marshes, and swamps.

Engineering Uses of the Soils [3]

This section is useful to those who need information about soils used for sanitary facilities, building site development, construction materials, and water management. Among those who can benefit from this section are planning commissions, town and city managers, land developers, engineers, contractors, builders, farmers, and individual homeowners.

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

1. Evaluate sites for septic tank absorption fields.
2. Select sites for dwellings, shallow excavations, small commercial buildings, and local roads and streets.
3. Seek sources of roadfill, sand, gravel, and topsoil.
4. Plan farm ponds, drainage systems, irrigation systems, terraces and diversions, and grassed waterways.

Most of the information in this section is presented in tables 5, 6, and 7. This information, along with the soil map and other parts of this survey, can be used to make

[3] JOE D. CARMACK, civil engineer, Soil Conservation Service, helped to prepare this section.

suitable trees to plant on soils used for woodland—Continued

Limitations to management—Continued		Potential productivity		Suitable trees to plant
Windthrow hazard	Plant competition	Important trees	Site index	
Slight	Severe	Cherrybark oak	100	Loblolly pine, cherrybark oak, sweetgum, cottonwood, Nuttall oak.
		Willow oak	95	
		Cottonwood	95	
		Loblolly pine	100	
		Sweetgum	100	
Slight	Severe	Yellow-poplar	100	Yellow-poplar, [1] black walnut, [1] cherrybark oak, [1] sweetgum, [1] loblolly pine.
		Cherrybark oak	100	
		Southern red oak	75	
		Loblolly pine	90	
		Black walnut	90	
Slight	Severe	Yellow-poplar	100	Loblolly pine, sweetgum, cherrybark oak, yellow-poplar, black walnut.
		Sweetgum	90	
		Cherrybark oak	90	
		Loblolly pine	95	
		Black walnut		
Slight	Moderate	Loblolly pine	80	Loblolly pine, shortleaf pine.
		Shortleaf pine	75	
		Sweetgum	80	
		Southern red oak		
Slight	Moderate	Loblolly pine	80	Loblolly pine, shortleaf pine.
		Shortleaf pine	70	
Slight	Moderate	Loblolly pine	80	Loblolly pine, eastern redcedar.
		Shortleaf pine	70	
		Southern red oak	70	
		Eastern redcedar	45	
Slight	Severe	Green ash	90	Green ash, cottonwood, cherrybark oak, sweetgum, black walnut.
		Cottonwood	105	
		Cherrybark oak	100	
		Willow oak	100	
		Sweetgum	100	
Slight	Severe	Green ash	90	Green ash, cherrybark oak, cottonwood, sweetgum, water oak.
		Cherrybark oak	100	
		Nuttall oak	100	
		Cottonwood	105	
		Water oak	95	
Slight	Slight	Baldcypress	(2)	Too wet to plant. Reproduce by natural regeneration.
		Water tupelo	(2)	

[2] No reliable data available.

interpretations in addition to those given in the tables. Also, it can be used to make other useful maps.

This information, however, does not eliminate the need for further investigations at sites selected for engineering works, especially works that involve heavy loads or that require excavations to depths greater than 6 feet. Also, inspections of sites, especially the small ones, are needed because many delineated areas of a given soil mapping unit may contain small areas of other kinds of soil that have strongly contrasting properties and different suitabilities or limitations for soil engineering.

Some of the terms used in this soil survey have different meanings in soil science than in engineering. The Glossary defines many of these terms commonly used in soil science.

Community developments

Table 5 gives the degree and kind of limitations of the soils in Madison County as sites for septic tank absorption fields, dwellings without basements, shallow excavations, small commercial buildings, and local roads and streets.

The following are explanations of the columns in table 5.

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

Dwellings without basements and small commercial buildings, as rated in table 5, are buildings no more than three stories high that are supported by foundation footings

TABLE 4.—*Suitability of soils for elements*

Soil and map symbols	Elements of wildlife habitat			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees
Arents: Ar. Too variable to rate.				
Calhoun: Ca For Henry part, see Henry series.	Poor	Fair	Fair	Good
Calloway: Co	Fair	Good	Good	Good
Collins: Cs	Good	Good	Good	Good
Dulac:				
DuB, DuB3	Good	Good	Good	Good
DuC3, DuD3	Fair	Good	Good	Good
Eustis: EuE	Poor	Poor	Poor	Poor
Falaya: Fa	Poor	Fair	Fair	Good
Grenada:				
GrA, GrB, GrB3	Good	Good	Good	Good
GrC3	Fair	Good	Good	Good
Henry Mapped only in a complex with Calhoun soils.	Poor	Fair	Fair	Fair
Iuka: Iu	Good	Good	Good	Good
Lexington:				
LeB, LeB3	Good	Good	Good	Good
LeC, LeC3, LeD, LeD3	Fair	Good	Good	Good
LeE, LgC, LmE3	Poor	Fair	Good	Good
Urban land part of LgC is too variable to rate.				
Loring:				
LoB, LoB3	Good	Good	Good	Good
LoC3	Fair	Good	Good	Good
Mantachie: Ma	Fair	Good	Good	Good
Memphis:				
MeA, MeB, MeB2	Good	Good	Good	Good
MeC3	Fair	Good	Good	Good
Ochlockonee: Oc	Good	Good	Good	Good
Providence:				
PrB	Good	Good	Good	Good
PrC3, PrD3	Fair	Good	Good	Good
Smithdale: SmE, SmF	Poor	Fair	Good	Good
Sweatman:				
SwD	Fair	Fair	Fair	Good
SwE	Poor	Very poor	Fair	Good
Vicksburg: Vk	Good	Good	Good	Good
Waverly:				
Wa	Poor	Fair	Fair	Fair
Wf	Very poor	Very poor	Very poor	Very poor

of wildlife habitat and kinds of wildlife

Elements of wildlife habitat—Continued			Kinds of wildlife		
Coniferous plants	Wetland plants	Shallow-water areas	Open-land	Woodland	Wetland
Poor	Good	Good	Fair	Fair	Good.
Poor	Fair	Fair	Good	Good	Fair.
Good	Poor	Poor	Good	Good	Poor.
Good	Poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Poor	Poor	Very poor.
Good	Fair	Fair	Fair	Good	Fair.
Good	Poor	Very poor	Good	Good	Very poor.
Good	Poor	Very poor	Good	Good	Very poor.
Fair	Good	Good	Fair	Fair	Good.
Good	Poor	Poor	Good	Good	Poor.
Good	Poor	Very poor	Good	Good	Very poor.
Good	Poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Good	Good	Very poor.
Good	Fair	Fair	Good	Good	Fair.
Good	Poor	Very poor	Good	Good	Very poor.
Good	Poor	Very poor	Good	Good	Very poor.
Good	Poor	Poor	Good	Good	Poor.
Good	Poor	Very poor	Good	Good	Very poor.
Good	Poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Very poor	Very poor	Poor	Fair	Very poor.
Good	Poor	Very poor	Good	Good	Very poor.
Fair	Good	Fair	Fair	Fair	Fair.
Very poor	Good	Good	Very poor	Very poor	Good.

TABLE 5.—*Degree and kind of soil limitations for community developments*

Soil name and map symbol	Septic tank absorption fields	Dwellings without basements	Shallow excavations	Small commercial buildings	Local roads and streets
Arents: Ar. Too variable to rate.					
Calhoun: Ca For Henry part, see Henry series.	Severe: wet, percs slowly.	Severe: wet	Severe: wet	Severe: wet	Severe: wet.
Calloway: Co	Severe: wet, percs slowly.	Severe: wet	Severe: wet	Severe: wet	Moderate: wet, low strength.
Collins: Cs	Severe: floods	Severe: floods	Severe: floods	Severe: floods	Severe: floods.
Dulac: DuB, DuB3, DuC3, DuD3	Severe: percs slowly.	Moderate: low strength, slope, shrink-swell.	Moderate: too clayey.	Moderate: low strength, slope, shrink-swell.	Severe: low strength, shrink-swell.
Eustis: EuE	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Falaya: Fa	Severe: wet, floods.	Severe: floods, wet.	Severe: floods, wet.	Severe: floods, wet.	Severe: floods, wet.
Grenada:					
GrA, GrB, GrB3	Severe: percs slowly.	Moderate: wet	Moderate: wet	Moderate: wet	Moderate: low strength.
GrC3	Severe: percs slowly.	Moderate: wet	Moderate: wet	Moderate: slope, wet.	Moderate: low strength.
Henry Mapped only in a complex with Calhoun soils.	Severe: wet, percs slowly.	Severe: wet	Severe: wet	Severe: wet	Severe: wet.
Iuka: Iu	Severe: wet, floods.	Severe: wet, floods.	Severe: wet, floods.	Severe: wet, floods.	Severe: floods.
Lexington:					
LeB, LeB3	Slight	Slight	Slight	Slight	Moderate: low strength.
LeC, LeC3	Slight	Slight	Slight	Moderate: slope	Moderate: low strength.
LeD, LeD3	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Moderate: low strength, slope
LeE, LgC, LmE3 Urban land part of LgC is too variable to rate.	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Loring:					
LoB, LoB3	Severe: percs slowly.	Slight	Moderate: low strength.	Slight	Moderate: low strength.
LoC3	Severe: percs slowly.	Slight	Moderate: low strength.	Moderate: slope	Moderate: low strength.
Mantachie: Ma	Severe: wet, floods.	Severe: wet, floods.	Severe: wet, floods.	Severe: wet, floods.	Severe: floods.
Memphis:					
MeA, MeB, MeB2	Slight	Slight	Slight	Slight	Moderate: low strength.
MeC3	Slight	Slight	Slight	Moderate: slope	Moderate: low strength.
Ochlockonee: Oc	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding.
Providence:					
PrB	Severe: percs slowly.	Slight	Moderate: wet	Slight	Moderate: low strength.
PrC3	Severe: percs slowly.	Slight	Moderate: wet	Moderate: slope	Moderate: low strength.
PrD3	Severe: percs slowly.	Moderate: slope	Moderate: wet slope.	Severe: slope	Moderate: low strength.
Smithdale: SmE, SmF	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.

TABLE 5.—*Degree and kind of soil limitations for community developments*—Continued

Soil name and map symbol	Septic tank absorption fields	Dwellings without basements	Shallow excavations	Small commercial buildings	Local roads and streets
Sweatman: SwD, SwE	Severe: percs slowly.	Severe: low strength, shrink-swell.	Severe: too clayey.	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell.
Vicksburg: Vk	Moderate: floods.	Severe: floods.	Moderate: floods.	Severe: floods.	Moderate: low strength.
Waverly: Wa, Wf	Severe: wet, floods.	Severe: wet, floods.	Severe: wet, floods.	Severe: wet, floods.	Severe: wet, floods.

placed in undisturbed soil. The features that affect the rating of a soil for dwellings are those that relate to capacity to support load and resist settlement under load and those that relate to ease of excavation. Soil properties that affect capacity to support load are wetness, susceptibility to flooding, density, plasticity, texture, and shrink-swell potential. Those properties that affect excavation are wetness and slope.

Shallow excavations are those that require digging or trenching to a depth of 6 feet; as for example, excavations for pipelines, sewerlines, phone and power transmission lines, basements, open ditches, and cemeteries. Desirable soil properties are good workability, moderate resistance to sloughing, gentle slopes, and freedom from flooding or high water table.

Local roads and streets, as rated in table 5, have all-weather surface expected to carry automobile traffic all year. They have subgrade of underlying soil material; a base consisting of gravel, crushed rock, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. These roads are graded to shed water and have ordinary provisions for drainage. They are built mainly from soil at hand, and most cuts and fills are less than 6 feet deep. Soil properties that most affect design and construction of roads and streets are those affecting the load supporting capacity and stability of subgrade and those affecting the workability and quantity of cut and fill material available. The AASHTO and Unified classifications of soil material and the shrink-swell potential give an indication of the load supporting capacity. Wetness and flooding affect stability of the material. Slope and wetness affect ease of excavation and the amount of cut and fill needed to reach an even grade.

In table 5 the limitations of the soils are rated as slight, moderate, or severe. *Slight* indicates few or no limitations for that use; limitations that do exist are easy to overcome. *Moderate* indicates limitations that can normally be overcome by good planning, careful design, and good management. *Severe* indicates limitations that are difficult and costly to overcome. The cost to overcome these limitations may be prohibitive, or the risk of failure is high.

Construction material

In table 6, the soils in Madison County are rated according to their suitability as sources of construction material. The soils are rated good, fair, poor, or unsuited as sources of roadfill, sand, gravel, and topsoil.

Following are explanations of the columns in table 6.

Roadfill is soil material used in embankments for roads. The suitability ratings reflect the predicted performance of soil after it has been placed in an embankment that has been properly compacted and provided with adequate drainage. They also reflect the relative ease of excavating the material from borrow areas.

Sand and gravel are used in great quantities in many kinds of construction. The ratings in table 6 provide guidance about where to look for probable sources. A soil rated as a *good* or *fair* source of sand or gravel generally has a layer at least 3 feet thick, the top of which is within a depth of 6 feet. The ratings do not take into account thickness of overburden, location of the water table, or other factors that affect mining of the materials, and neither do they indicate quality of the deposit.

Topsoil is used for topdressing an area where vegetation is to be established and maintained. Suitability is affected mainly by ease of working and spreading the soil material, as for preparing a seedbed; natural fertility of the material, or the response of plants when fertilizer is applied; and absence of substances toxic to plants. Texture of the soil material is the most important characteristic that affects suitability, but also considered in the ratings is damage that will result at the area from which topsoil is taken.

Water management

The soil features affecting pond reservoir areas, embankments, dikes, and levees; drainage; irrigation; terraces and diversions; and grassed waterways are given in table 7. The columns in this table are explained in the following paragraphs.

Pond reservoir areas hold water behind a dam or embankment. Suitable soils have low seepage that is related to soil permeability.

Embankments, dikes, and levees require soil that can be compacted so it is resistant to seepage and erosion. This soil material should have favorable shear strength and resistance to piping. The presence of organic material in a soil is unfavorable.

Drainage of cropland and pasture is affected by such soil properties as permeability, which is given in this table as percolation rate, texture, structure, depth to impervious layers, depth to water table, slope, stability in ditchbanks, flooding, and availability of outlets for drainage.

Irrigation of a soil is affected by such features as slope, susceptibility to flooding, wetness, soil texture, depth of

TABLE 6.—*Suitability of soils as source of construction materials*

Soil and map symbols	Roadfill	Sand	Gravel	Topsoil
Arents: Ar. Too variable to rate.				
Calhoun: Ca. For Henry part of Ca, see Henry series.	Poor: wet	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wet.
Calloway: Co	Fair: low strength	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Collins: Cs	Fair: low strength	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Dulac: DuB, DuB3, DuC3, DuD3	Poor: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
Eustis: EuE	Fair: slope	Poor: excess fines	Unsuited: excess fines.	Poor: too sandy.
Falaya: Fa	Fair: low strength, wet.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Grenada: GrA, GrB, GrB3, GrC3	Fair: low strength	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Henry. Mapped only in a complex with Calhoun soils.	Poor: wet	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wet.
Iuka: Iu	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Lexington:				
LeB, LeB3, LeC, LeC3	Fair: low strength	Unsuited: excess fines.	Unsuited: excess fines.	Good.
LeD, LeD3	Fair: low strength	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope.
LeE, LgC, LmE3. Urban land part of LgC is too variable to rate. For Smithdale part of LmE3, see Smithdale series.	Fair: low strength, slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Loring: LoB, LoB3, LoC3	Fair: low strength	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Mantachie: Ma	Fair: wet	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Memphis: MeA, MeB, MeB2, MeC3	Fair: low strength	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Ochlockonee: Oc	Good	Fair: excess fines.	Unsuited: excess fines.	Good.
Providence: PrB, PrC3, PrD3	Fair: low strength	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Smithdale: SmE, SmF	Fair: slope	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Sweatman: SwD, SwE	Poor: shrink-swell, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey.
Vicksburg: Vk	Fair: low strength	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Waverly: Wa, Wf	Poor: low strength, wet.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wet.

TABLE 7.—*Soil features affecting water management*

Soil name and map symbol	Soil features affecting—					
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Arents: Ar. Too variable to rate.						
Calhoun: Ca. For Henry part, see Henry series.	Soil features favorable.	Piping, low strength, erodes easily.	Percs slowly, cutbanks cave.	Wet, percs slowly.	Not needed.	Not needed.
Calloway: Co	Soil features favorable.	Piping, low strength, erodes easily.	Percs slowly, cutbanks cave.	Wet, percs slowly.	Not needed.	Not needed.
Collins: Cs	Seepage.	Piping, low strength, hard to pack, erodes easily.	Soil features favorable.	Soil features favorable.	Not needed.	Not needed.
Dulac:						
DuB, DuB3, DuC3	Soil features favorable.	Low strength, compressible, erodes easily.	Not needed.	Percs slowly, erodes easily.	Percs slowly, erodes easily.	Percs slowly, erodes easily.
DuD3	Soil features favorable.	Low strength, compressible.	Not needed.	Percs slowly, erodes easily, slope.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
Eustis: EuE	Seepage.	Seepage, erodes easily.	Not needed.	Too sandy, slope, droughty.	Slope.	Slope.
Falaya: Fa	Seepage.	Piping, compressible.	Floods, cutbanks cave.	Wet, floods.	Not needed.	Not needed.
Grenada: GrA, GrB, GrB3, GrC3.	Soil features favorable.	Low strength, piping.	Not needed.	Erodes easily, percs slowly.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
Henry. Mapped only in a complex with Calhoun soils.	Soil features favorable.	Piping, low strength, erodes easily.	Percs slowly, wet.	Wet, percs slowly.	Not needed.	Not needed.
Iuka: Iu	Seepage.	Piping, low strength, erodes easily.	Floods.	Floods.	Not needed.	Not needed.
Lexington:						
LeB, LeB3, LeC, LeC3, LeD, LeD3.	Seepage.	Piping, low strength, erodes easily.	Not needed.	Erodes easily.	Erodes easily.	Erodes easily.
LeE, LgC, LmE3. Urban land part of LgC too variable to rate. For Smithdale part of LmE3, see Smithdale series.	Seepage.	Piping, low strength, erodes easily.	Not needed.	Slope.	Slope.	Slope.
Loring: LoB, LoB3, LoC3.	Soil features favorable.	Piping, low strength, erodes easily.	Not needed.	Erodes easily.	Erodes easily.	Erodes easily.
Mantachie: Ma	Seepage.	Piping, low strength, erodes easily.	Floods, cutbanks cave.	Wet, floods.	Not needed.	Not needed.
Memphis: MeA, MeB, MeB2, MeC3.	Seepage.	Piping, low strength, erodes easily.	Not needed.	Erodes easily.	Erodes easily.	Erodes easily.
Ochlockonee: Oc	Seepage.	Piping, low strength, erodes easily.	Cutbanks cave.	Soil features favorable.	Not needed.	Not needed.

TABLE 7.—*Soil features affecting water management*—Continued

Soil name and map symbol	Soil features affecting—					
	Pond reservoir areas	Embankments, Dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Providence:						
PrB, PrC3	Soil features favorable.	Piping, low strength, erodes easily.	Not needed	Percs slowly, erodes easily.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
PrD3	Soil features favorable.	Piping, low strength, erodes easily.	Not needed	Percs slowly, erodes easily, slope.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
Smithdale: SmE, SmF	Seepage	Piping, unstable fill.	Not needed	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Sweatman: SwD, SwE	Soil features favorable.	Shrink-swell	Not needed	Slope, slow intake.	Slope	Slope.
Vicksburg: Vk	Seepage	Piping, low strength, hard to pack, erodes easily.	Soil features favorable.	Soil features favorable.	Not needed	Not needed.
Waverly: Wa, Wf	Soil features favorable.	Piping, low strength, erodes easily.	Poor outlets, floods, wet.	Wet, floods	Not needed	Not needed.

root zone, rate of water intake, soil permeability, amount of water held available to plants, and resistance to erosion.

Terraces and diversions are small embankments or ridges constructed across the slope to intercept runoff so that it soaks into the soil or flows to a prepared outlet. Features that affect suitability of a soil for terraces and diversions are uniformity and steepness of slope, permeability, and resistance to erosion. A soil suitable for these structures must have outlets for runoff and the ability to support protective vegetation.

Grassed waterways carry runoff water safely to outlets. The features that affect the use of soils for waterways are permeability, resistance to erosion, and the ability to support permanent, protective vegetation.

Soil Properties

Extensive data about soil properties collected during the soil survey are summarized in the following pages. The two main sources of these data are the many thousands of soil borings made during the course of the survey and the laboratory analyses of samples selected from representative soil profiles in the field.

When the soil scientist makes soil borings during field mapping, he can identify several important soil properties. He notes the seasonal soil moisture condition or the presence of free water and its depth in the profile. For each horizon, he notes the thickness of the soil and its color; the texture or the amount of clay, silt, sand, and gravel or other coarse fragments; the structure or natural pattern of cracks and pores in the undisturbed soil; and the consistence of soil in-place under the existing soil moisture conditions. He records the root depth of existing plants, determines soil reaction, and identifies any free carbonates.

Samples of soil material are analyzed in the laboratory to verify the field estimates of soil properties and to characterize key soils, especially properties that cannot be estimated accurately by field observation. Laboratory analyses are not conducted for all soil series in the survey area, but laboratory data for many of the soil series are available from nearby areas.

Based on summaries of available field and laboratory data, and listed in tables in this section, estimates are made of the ranges in engineering properties and classifications and in physical and chemical properties for each major horizon of each soil in the survey area. Also, pertinent soil and water features are presented.

Engineering Soil Classification Systems

The two systems most commonly used in classifying samples of soils for engineering are the Unified system (*2*) and the AASHTO system (*1*).

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

The AASHTO system is used to classify soils according to those properties that affect the use in highway construction and maintenance. In this system a soil is placed in one of seven basic groups, ranging from A-1 through A-7, on the basis of grain-size distribution, liquid limit, and plasticity index. In group A-1 are gravelly soils of high bearing strength, or the best soils for subgrade (foundation). At the other extreme, in group A-7, are

clay soils that have low strength when wet and that are the poorest soils for subgrade. Where laboratory data are available to justify a further breakdown, the A-1, A-2, and A-7 groups are divided as follows: A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, and A-7-6. As additional refinement, the engineering value of a soil material can be indicated by a group index. Group indexes range from 0 for the best material to 20 or more for the poorest. The estimated AASHTO classification without group index numbers is given in table 8 for all soils mapped in Madison County.

Engineering Properties and Classifications

Several estimated engineering properties and engineering classifications are given in table 8. These estimates are made for representatives soil profiles, by layers sufficiently different to have different significance for engineering. The estimates are based on field observations made in the course of mapping and on test data for similar soils in western Tennessee.

Following are explanations of some columns in table 8.

Soil texture is described in table 8 in standard terms used by the United States Department of Agriculture (USDA). These terms take into account the relative percentages of sand, silt, and clay in soil material less than 2 millimeters in diameter. "Sand," "silt," "clay," and some other terms used in USDA textural classification are defined in the Glossary of this survey.

Estimates for *percentage passing sieves* are given for percentages, by weight, of soil particles that will pass sieves of certain sizes. The number 10 sieve has openings of 2.0 millimeters; number 40 sieve has opening of 0.42 millimeters; and number 200 sieve has openings of 0.074 millimeters.

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. If the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material changes from the semisolid to plastic state; and the liquid limit, from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic.

Physical and Chemical Properties of Soils

Physical and chemical properties of soils of interest to engineers are given in table 9. The data in this table are estimates for the significant layers of representative soil profiles.

The following paragraphs explain the columns in table 9.

Permeability is that quality of a soil that enables it to transmit water or air. It is estimated on the basis of those soil characteristics observed in the field, particularly structure and texture. The estimates in table 9 do not take into account lateral seepage or such transient soil features as plowpans and surface crust.

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

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

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

Corrosivity is the potential soil-induced chemical action that weakens uncoated steel or concrete. Rate of corrosion of uncoated steel is related to such soil properties as drainage, texture, total acidity, and electrical conductivity of the soil material. Corrosivity for concrete is influenced mainly by the content of sodium or magnesium sulfate, but also by soil texture and acidity. Installations of uncoated steel that intersect boundaries of highly contrasting soils or soil horizons are more susceptible to corrosion than installations entirely in one kind of soil or in one soil horizon. A corrosivity rating of *low* means that there is a low probability of soil-induced corrosion damage. A rating of *high* means that there is a high probability of damage, so that protective measures for steel and more resistant concrete should be used to avoid or minimize damage.

Soil and Water Features

The estimated features given in table 10 are useful to persons interested in hydrologic soil groups, susceptibility of soils to flooding, and water table characteristics of the soils.

Following are explanations of some of the columns in table 10.

Hydrologic soil groups give the runoff potential from rainfall. Four major soil groups are used. The soils are classified on the basis of intake of water at the end of long duration storms occurring after prior wetting and opportunity for swelling and without the protective effects of vegetation.

The major soil groups are:

A. Soils that have a high infiltration rate even when thoroughly wetted. These consist chiefly of deep, well drained to excessively drained sand or gravel. These soils have a high rate of water transmission. They have low runoff potential.

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

C. Soils that have a slow infiltration rate when thoroughly wetted. They are chiefly soils that have a layer that impedes downward movement of water or soils that have moderately fine texture to fine texture. These soils have a slow rate of water transmission.

TABLE 8.—*Estimated engineering properties and classifications of soils*

[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. These soils may have different properties, and it is necessary to follow carefully the instructions for referring to other series that appear in the first column. The symbol < means less than]

Soil and map symbol	Depth from surface	USDA texture	Classification		Percentage passing sieve—			Liquid limit	Plasticity index
			Unified	AASHTO	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)		
	Inches								
Arents: Ar. Too variable to rate.									
*Calhoun: Ca. For Henry part, see Henry series.	0–19	Silt loam	ML, CL–ML, CL	A–4	100	100	90–95	25–35	5–10
	19–72	Silt loam, silty clay loam.	CL, CL–ML	A–6, A–4	100	100	90–95	25–40	6–18
Calloway: Co.	0–7	Silt loam	ML, CL–ML, CL	A–4	100	100	90–95	25–35	5–10
	7–26	Silt loam	CL, CL–ML	A–4, A–6	100	100	90–95	25–35	5–15
	26–45	Silt loam	CL	A–6	100	100	90–95	30–40	11–20
	45–72	Silt loam	CL–ML, CL	A–4, A–6	100	100	90–95	25–35	5–15
Collins: Cs.	0–47	Silt loam	ML, CL–ML, CL	A–4	100	100	90–95	<25	NP–10
	47–72	Silt loam	CL, ML	A–6	100	95–100	85–95	<35	11–15
Dulac: DuB, DuB3, DuC3, DuD3.	0–6	Silt loam	ML, CL–ML	A–4	100	95–100	85–95	20–25	2–7
	6–23	Silt loam	CL, ML	A–6, A–7	100	90–100	85–95	30–45	11–25
	23–37	Silt loam	CL	A–6, A–7	100	90–100	85–95	30–45	11–25
	37–72	Clay	CH, MH	A–7	100	85–100	80–95	55–85	25–50
Eustis: EuE.	0–72	Sandy loam, loamy sand.	SW–SM, SM, SP–SM	A–2, A–4	80–90	50–70	10–40	NP	NP
Falaya: Fa.	0–60	Silt loam	ML, CL–ML, CL	A–4	100	100	90–100	<30	NP–10
	60–72	Silt loam	CL	A–6, A–4	100	100	85–95	25–35	8–18
Grenada: GrA, GrB, GrB3, GrC3.	0–29	Silt loam	ML, CL–ML, CL	A–4, A–6	100	100	90–100	27–35	5–11
	29–63	Silt loam	CL, CL–ML	A–4, A–6	100	100	85–95	20–30	5–15
	63–72	Silt loam	CL, CL–ML	A–4, A–6	100	100	80–90	20–35	5–15
Henry: Mapped only in a complex with Calhoun soil.	0–19	Silt loam	ML, CL, CL–ML	A–4	100	95–100	90–95	24–34	NP–10
	19–50	Silt loam	ML–CL	A–6, A–4	100	95–100	90–95	30–40	10–15
	50–72	Silt loam	ML, CL–ML, CL	A–4	100	95–100	90–95	20–30	5–10
Iuka: Iu.	0–33	Fine sandy loam	SM, SC, SM–SC, CL–ML, ML, CL	A–4	100	70–90	40–55	<30	NP–10
	33–72	Silt loam	CL, CL–ML	A–4, A–6	100	90–100	70–80	<30	5–15
*Lexington: LeB, LeB3, LeC, LeC3, LeD, LeD3, LeE, LgC, LmE3. Urban land part of LgC too variable to rate. For Smithdale part of LmE3, see Smithdale series.	0–7	Silt loam	ML, CL, CL–ML	A–4	100	90–100	80–90	25–40	5–15
	7–38	Silty clay loam, silt loam.	CL	A–6	100	100	85–95	27–45	11–25
	38–72	Sandy loam, loamy sand.	SM, SC, SM–SC	A–2, A–4	100	50–70	20–40	<35	NP–10
Loring: LoB, LoB3, LoC3.	0–7	Silt loam	ML, CL–ML, CL	A–4, A–6	100	95–100	90–100	20–35	4–15
	7–35	Silt loam, silty clay loam.	CL	A–6, A–7	100	95–100	90–100	35–45	15–25
	35–47	Silt loam	CL, ML	A–4, A–6, A–7	100	95–100	90–100	30–45	8–18
	47–65	Silt loam	CL, CL–ML, ML	A–4, A–6	100	95–100	90–100	25–40	6–15
	65–72	Silty clay loam	CL	A–6	100	90–100	80–90	30–40	15–25

TABLE 8.—*Estimated engineering properties and classifications of soils*—Continued

Soil and map symbol	Depth from surface	USDA texture	Classification		Percentage passing sieve—			Liquid limit	Plasticity index
			Unified	AASHTO	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)		
	Inches								
Mantachie: Ma.	0–31	Sandy loam, fine sandy loam.	SM, SM–SC, ML, CL–ML	A–4	100	60–85	40–60	<20	NP–5
	31–38	Sandy loam	SM	A–2, A–4	100	60–80	30–50	NP	NP
	38–72	Silt loam	CL, ML	A–4, A–6	100	95–100	80–90	25–35	8–15
Memphis: MeA, MeB, MeB2, MeC3.	0–7	Silt loam	ML, CL–ML, CL	A–4	100	100	90–100	<30	NP–10
	7–19	Silty clay loam	CL	A–6, A–7	100	100	90–100	35–45	15–25
	19–72	Silt loam	CL, ML	A–4, A–6	100	100	90–100	30–40	7–15
Ochlockonee: Oc.	0–31	Fine sandy loam, sandy loam.	SM, SM–SC	A–4	100	90–100	36–50	<20	NP–5
	31–72	Silt loam	CL, ML, CL–ML	A–6, A–4	100	100	80–90	20–35	4–15
Providence: PrB, PrC3, PrD3.	0–6	Silt loam	ML, CL–ML, CL	A–4	100	90–100	85–100	<30	NP–10
	6–30	Silty clay loam, silt loam.	CL	A–6, A–7	100	95–100	85–100	30–45	11–20
	30–45	Silt loam	CL	A–6	100	90–100	70–90	25–40	11–20
	45–72	Clay loam	CL	A–6	100	75–85	55–80	30–40	15–25
Smithdale: SmE, SmF.	0–21	Fine sandy loam	SM, SM–SC	A–2, A–4	100	60–80	36–49	<20	NP–5
	21–72	Sandy clay loam	SC, CL–ML, CL, SC–SM	A–4, A–6	100	80–95	45–70	23–38	7–15
Sweatman: SwD, SwE.	0–6	Silt loam	CL	A–6	100	100	90–95	30–40	15–25
	6–45	Clay, silty clay	CH	A–7	100	100	95–100	50–59	32–40
	45–72	Shaly clay fragments.							
Vicksburg: Vk.	0–50	Silt loam	ML, CL–ML, CL	A–4	100	90–100	70–100	20–30	NP–10
	50–72	Silt loam	CL	A–6	100	90–95	80–90	<35	11–15
Waverly: Wa, Wf.	0–55	Silt loam	ML, CL, CL–ML	A–4, A–6	100	95–100	85–95	20–30	3–10
	55–72	Silt loam, silty clay loam.	CL	A–6	100	100	95–100	25–35	11–15

[1] NP means nonplastic.

D. Soils that have a very slow infiltration rate when thoroughly wetted. They are chiefly clays that have high swelling potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. These soils have a very slow rate of water transmission. They have high runoff potential.

Flooding is estimated in terms of the frequency of occurrence, duration of flooding, and months when flooding normally occurs.

Ratings for *frequency* of flooding are none, rare, occasional, or frequent. *Rare* means that flooding is unlikely but is possible under abnormal conditions. *Occasional* means that flooding occurs less than once in 2 years. *Frequent* means that flooding occurs more than once in 2 years.

Duration of flooding is rated according to the following classes: *very brief*, less than 2 days; *brief*, 2 to 7 days; *long*, 7 to 30 days; and *very long*, more than 30 days.

Months are given to indicate when flooding normally occurs.

High water table is estimated in terms of depth, kind, and months. *Depth* of water table is the range in distance from the surface of the soil to the highest level that water accumulates in the soil in most years. The *kind* of water table is either *perched* or *apparent* (ground water). *Months* indicate time of high water table.

Formation and Classification of the Soils

The soils in Madison County differ from place to place. The characteristics of the soil at any given place depend on the nature of the parent material and the effects of the soil forming factors.

Factors of Soil Formation

Soils are the result of the interaction of five major factors: parent material, climate, living organisms, relief, and time. All five factors affect the formation of every

TABLE 9.—*Estimated chemical and physical properties of soils*

[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. These soils may have different properties, and it is necessary to follow carefully the instructions for referring to other series that appear in the first column. The symbol < means less than]

Soil and map symbols	Depth from surface	Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity	
						Steel	Concrete
	In	*In/hr*	*In/in*	*pH*			
Arents: Ar. Too variable to rate.							
*Calhoun: Ca. For Henry part, see Henry series.	0–19 19–72	0.2–0.6 0.06–0.2	0.21–0.23 0.20–0.22	4.5–5.5 4.5–5.5	Low Low	High High	Moderate. Moderate.
Calloway: Co.	0–7 7–26 26–45 45–72	0.6–2.0 0.6–2.0 0.06–0.2 0.06–0.2	0.20–0.23 0.18–0.20 0.09–0.12 0.09–0.12	4.5–5.5 4.5–5.5 4.5–5.5 5.1–5.5	Low Low Low Low	High High High High	Moderate. High. High. Moderate.
Collins: Cs.	0–47 47–72	0.6–2.0 0.6–2.0	0.20–0.24 0.18–0.20	4.5–5.5 4.5–5.5	Low Low	Moderate Moderate	Moderate. High.
Dulac: DuB, DuB3, DuC3, DuD3.	0–6 6–23 23–37 37–72	0.6–2.0 0.6–2.0 0.06–0.2 0.2–0.6	0.20–0.22 0.20–0.22 0.10–0.13 0.10–0.13	4.5–5.5 4.5–5.5 4.5–5.5 4.5–5.5	Low Low Low High	Low Low High High	Moderate. Moderate. High. High.
Eustis: EuE.	0–72	0.6–0.2	0.05–0.10	4.5–5.5	Low	Low	High.
Falaya: Fa.	0–60 60–72	0.6–2.0 0.6–2.0	0.20–0.22 0.18–0.22	4.5–5.5 4.5–5.5	Low Low	High High	High. High.
Grenada: GrA, GrB, GrB3, GrC3.	0–29 29–63 63–72	0.6–2.0 0.06–0.2 0.06–0.2	0.20–0.23 0.10–0.15 0.10–0.15	4.5–5.5 4.5–5.5 4.5–5.5	Low Low Low	Moderate Moderate Moderate	Moderate. High. Moderate.
Henry. Mapped only in a complex with Calhoun soils.	0–19 19–50 50–72	0.6–2.0 0.06–0.2 0.2–0.6	0.20–0.23 0.14–0.17 0.20–0.23	4.5–5.5 4.5–5.5 4.5–5.5	Low Low Low	High High High	High. High. Moderate.
Iuka: Iu.	0–33 33–72	0.6–2.0 0.6–2.0	0.10–0.15 0.10–0.20	4.5–5.5 4.5–5.5	Low Low	Moderate Moderate	High. Moderate.
*Lexington: LeB, LeB3, LeC, LeC3, LeD, LeD3, LeE, LgC, LmE3. Urban land part of LgC is too variable to rate. For Smithdale part of LmE3, see Smithdale series.	0–7 7–38 38–72	0.6–2.0 0.6–2.0 2.0–6.0	0.17–0.22 0.16–0.21 0.06–0.12	4.5–6.0 4.5–6.0 4.5–6.0	Low Low Low	Low Low Low	Moderate. Moderate. High.
Loring: LoB, LoB3, LoC3.	0–7 7–35 35–47 47–65 65–72	0.6–2.0 0.6–2.0 0.2–0.6 0.6–2.0 0.6–2.0	0.20–0.23 0.20–0.22 0.06–0.13 0.06–0.13 0.06–0.13	5.1–5.5 5.1–5.5 5.1–5.5 5.1–5.5 5.1–5.5	Low Low Low Low Low	Moderate Moderate Moderate Moderate Moderate	Moderate. Moderate. Moderate. Moderate. High.
Mantachie: Ma.	0–31 31–38 38–72	0.6–2.0 0.6–2.0 0.6–2.0	0.10–0.15 0.08–0.12 0.14–0.20	4.5–5.5 4.5–5.5 4.5–5.5	Low Low Low	High High High	High. High. High.
Memphis: MeA, MeB, MeB2, MeC3.	0–7 7–19 19–72	0.6–2.0 0.6–2.0 0.6–2.0	0.20–0.23 0.20–0.23 0.20–0.23	4.5–5.5 4.5–5.5 4.5–5.5	Low Low Low	Low Moderate Low	Moderate. Moderate. Moderate.
Ochlockonee: Oc.	0–31 31–72	2.0–6.0 0.6–2.0	0.07–0.11 0.14–0.19	5.1–5.5 5.1–5.5	Low Low	Low High	High. Moderate.
Providence: PrB, PrC3, PrD3.	0–6 6–30 30–45 45–72	0.6–2.0 0.6–2.0 0.2–0.6 0.6–2.0	0.20–0.22 0.20–0.22 0.08–0.10 0.10–0.15	4.5–5.5 4.5–5.5 4.5–5.5 4.5–5.5	Low Low Low Low	Moderate Moderate Moderate Moderate	Moderate. Moderate. High. High.
Smithdale: SmE, SmF.	0–21 21–72	2.0–6.0 0.6–2.0	0.14–0.16 0.15–0.17	4.5–5.5 4.5–5.5	Low Low	Low Low	High. High.

TABLE 9.—*Estimated chemical and physical properties of soils*—Continued

Soil and map symbols	Depth from surface	Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity	
						Steel	Concrete
	In	*In/hr*	*In/in*	*pH*			
Sweatman: SwD, SwE. No valid estimates can be made for the layer, 45 to 72 inches, of these soils.	0–6	0.6–2.0	0.17–0.22	4.5–5.0	Low	Low	High.
	6–45	<0.06	0.10–0.14	4.5–5.0	High	Moderate	High.
Vicksburg: Vk.	0–50	0.6–2.0	0.20–0.24	4.5–5.5	Low	Low	Moderate.
	50–72	0.6–2.0	0.18–0.20	4.5–5.5	Low	Low	High.
Waverly: Wa, Wf.	0–55	0.6–2.0	0.20–0.24	4.5–5.5	Low	High	High.
	55–72	0.6–2.0	0.20–0.24	4.5–5.5	Low	High	High.

soil, but the importance of each varies from place to place and from time to time. In some places and at some times the influence of each factor is about equal. Some hypotheses about soil formation in Madison County suggest that the soils, especially those that have a fragipan, developed in a different way than the same soils in other locations.

Parent material

To better understand the nature of the various kinds of soil parent material in Madison County, knowledge of what the area was like before, during, and after the ice age should be considered. Before the present soils had begun to form, the entire county was under water and was part of the gulf that extended up the Mississippi Valley into what is now southern Illinois. About a million years ago, ice sheets began to form on the area that is now the northern part of the United States and Canada. As these ice sheets or glaciers became larger, they enclosed large volumes of water from the oceans and the gulf. Consequently, the shoreline dropped in elevation, and the Mississippi Valley and Madison County were exposed.

Soil formation began in these marine sediments, commonly known as Coastal Plain deposits. These deposits range from sand to clay but are mostly loamy. They have a low silt content. Generally, red soils formed in the Coastal Plain deposits. Smithdale, Sweatman, and Eustis soils, which remain exposed on many of the hillsides, formed in these sediments.

The glaciers began to melt and to release large volumes of water. The ice sheets began to move; many miles to the north, they gouged out large valleys and removed the tops of hills. Water released by the melting glaciers washed the loose soil material down the Mississippi River flood plain. Prevailing winds from the southwest picked up the medium-sized soil particles (silt) and moved them toward the east. This wind-blown soil material (loess) was deposited on most of Madison County.

Three distinct layers of loess were deposited. In places, especially on steep slopes, the loess washed away. In other places, one, two, or all three of the loess layers remain. Loveland Loess is the oldest and most leached layer; it commonly is red. Roxanna Loess is the middle layer; it commonly is dark brown or very dark brown. Peorian Loess is the latest deposit; it commonly is brown or dark brown where drainage and aeration are adequate. The total thickness of the three loess layers ranges from about 1½ feet to 12 feet.

The Memphis, Loring, Grenada, Calloway, Calhoun, and Henry soils formed in loess. The upper part of the Providence and Lexington soils formed in loess, and the lower part formed in loamy Coastal Plain deposits. The Dulac soils formed in loess underlain by clayey Coastal Plain deposits. Other soil forming factors, mainly relief, have caused different kinds of soil to form in similar kinds of parent material.

The remaining thickness of each of the original three layers of loess depends on the thickness of the original deposits and the amount of soil lost by erosion. Memphis soils formed on the western side of the county in places where Peorian Loess was more than 5 feet thick. Lexington soils formed in other well drained positions where the loess was 2 to 4 feet thick and where the lower part of the solum consists of or is underlain by loamy or sandy Coastal Plain deposits. The Providence soils, which have a fragipan, also formed where the loess was 2 to 4 feet thick. The lower part of the solum consists of material from old soils that formed in Loveland Loess or Coastal Plain sediments. Loring and Grenada soils, which have a fragipan, formed in loess, and the upper part formed definitely in Peorian Loess. The lower part may have formed in Roxana or Loveland Loess. In the Grenada soils a nearly impervious fragipan resulted in a temporarily perched water table that greatly influenced the properties of the soils.

Material washed from the upland loess and Coastal Plain deposits accumulated on the bottom lands as alluvium. This alluvium was fairly uniform. Consequently, except in small spots that are sandy, differences in the soils that formed in alluvium are mainly the result of differences in relief or position.

Climate

The humid, temperate climate of Madison County is characteristic of the climate of the southeastern part of the United States. The climate varies so little within the county that it does not cause differences in soils. The climate, however, has strongly affected soil formation. Generally, the older soils in Madison County are typical of those formed under a humid, temperate climate. They are strongly weathered, highly leached, and acid, and they have low fertility.

The high rainfall causes intense leaching. The soluble

TABLE 10.—*Estimated soil and water features*

[Absence of an entry indicates the feature is not a concern. See text for description of symbols and such terms as brief, rare, perched. The symbol > means more than]

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Feet		
Arents: Ar. Too variable to rate.							
Calhoun: Ca. For Henry part, see Henry series.	D	None			0–1	Apparent	December to April.
Calloway: Co	C	None			1–2	Perched	December to April.
Collins: Cs	C	Frequent	Brief	December to April.	2–5	Apparent	December to April.
Dulac: DuB, DuB3, DuC3, DuD3	C	None			1–2	Perched	December to April.
Eustis: EuE	A	None			>10		
Falaya: Fa	D	Frequent	Brief	December to April.	1–2	Apparent	December to April.
Grenada: GrA, GrB, GrB3, GrC3	C	None			1½–3	Perched	December to April.
Henry. Mapped only in a complex with Calhoun soils.	D	None			0–1	Perched	December to April.
Iuka: Iu	C	Frequent	Brief	December to April.	2–3	Apparent	December to April.
Lexington: LeB, LeB3, LeC, LeC3, LeD, LeD3, LeE, LgC, LmE3. Urban land part of LgC is too variable to rate. For Smithdale part of LmE3, see Smithdale series.	B	None			>10		
Loring: LoB, LoB3, LoC3	C	None			2–3	Perched	December to April.
Mantachie: Ma	C	Occasional	Brief	December to April.	1–1½	Apparent	December to April.
Memphis: MeA, MeB, MeB2, MeC3.	B	None			>10		
Ochlockonee: Oc	B	Frequent	Brief	December to April.	2–5	Apparent	December to April.
Providence: PrB, PrC3, PrD3	C	None			1½–3	Perched	December to April.
Smithdale: SmE, SmF	B	None					
Sweatman: SwD, SwE	C	None					
Vicksburg: Vk	B	Rare	Brief	January to April.	2½–5	Apparent and perched.	December to April.
Waverly: Wa, Wf	D	Frequent	Long to very long.	November to June.	0–1	Apparent	November to June.

and colloidal materials move downward. Some accumulate in the lower layers, and others move out of the soil. Weathering and translocation of materials is nearly continuous because the soil is frozen for only short periods and to shallow depths.

Living organisms

Native plants have greatly affected soil development in Madison County. The activity of animals has been less important. Soil drainage and aeration have influenced the kind of vegetation and organisms that are active in formation of a soil at any given location in Madison County.

A dense stand of forest originally covered Madison County. On the well drained soils, the dominant trees probably were oak, hickory, yellow-poplar, and shortleaf pine. Chestnut trees probably were plentiful, but they were destroyed by the blight. The poorly drained areas had water-tolerant oaks, sycamore, beech, black willow, gum, ash, maple, and cypress.

Fungi and micro-organisms also had a strong influence on soil formation. The greatest activity of earthworms and other small animals was in the upper few inches of the soil. In modern times man has strongly affected the upper 6 to 10 inches of the soil by plowing and adding chemicals.

Relief

Relief affected the formation of soils and caused differences in soils in several ways. Even in areas that received the same amount of rainfall, slope influenced the amount of water that ran off, accumulated on, or entered the soil. This affected the amount of soil that washed away. More soil was lost on steep slopes because runoff was greater. Also, this affected the thickness of the loess blanket that remained at any given point. Much of the soil material lost from the hills accumulated on the first bottoms in the county.

Because less water entered the soils on steep slopes than entered the soils on the flats, less water was available for plant growth. As a result, native plants on steeper soils differed from those on more nearly level soils. The vegetation even differed in places where water accumulated. As drainage varied from place to place, so did aeration and the environment of plant roots, micro-organisms, and chemical activity. These differences in drainage caused differences in soils.

Smithdale, Sweatman, and Lexington soils have the steeper slopes. Memphis, Lexington, Dulac, Loring, and Grenada soils have gentle slopes and are on the uplands. Calloway, Calhoun, and Henry soils occupy the nearly level areas and the depressions on the uplands.

Vicksburg, Collins, Ochlockonee, and Iuka soils are on the higher positions on the first bottoms, generally next to the stream channels. Waverly soils are in the lowest positions. Falaya and Mantachie soils occupy the intermediate positions.

Even though relief or position on the landscape had great influence on soil drainage and aeration, other factors related to relief have been important.

Time

The length of time that a soil has formed, or the age of a soil, is important. The soils in Madison County range from very young to old. Some soils on the bottom lands that receive sediment during each flood differ greatly from those that have been forming for centuries. One criterion for judging the age of a soil is the degree of soil horizon development. The soils on the first bottoms have weakly developed soil horizons. In many places these soils have thin horizontal layers that have changed little since deposition. All the soils on the uplands have strongly developed horizons.

Classification of the Soils

Soils are classified so that we can more easily remember their significant characteristics, assemble knowledge about them, see their relationships to each other and to the whole environment, and develop principles that help us to understand their behavior and response to use. First through classification, and then through the use of soil maps, we can apply our knowledge of soils to specific fields and other tracts of land.

The soil classification system currently used was developed in the early sixties (*3*), and it was adopted by the National Cooperative Soil Survey in 1965 (*5*). This system is under continual study. Readers interested in the development of the system should refer to the latest literature available.

The current system consists of 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 measureable or observable, 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 classification, particularly in families, may change as more information becomes available.

Table 11 shows the classification of each soil series in Madison County according to the current system. The categories of this system are defined briefly in the following paragraphs.

ORDER: Soils are grouped in orders according to the properties that seem to have resulted from the same processes acting to about the same degree on parent material. Ten soil orders are recognized in the current system: Entisols, Inceptisols, Aridisols, Mollisols, Spodosols, Alfisols, Ultisols, Oxisols, Histosols, and Vertisols. Entisols, Alfisols, and Ultisols are in Madison County.

Entisols are recent soils in which there has been little soil development. Alfisols contain accumulated aluminum and iron, have argillic horizons, and have a base saturation of more than 35 percent. Ultisols also have accumulated aluminum and iron, have argillic horizons, and have a base saturation of less than 35 percent.

SUBORDER: Each order is divided into suborders based mainly on soil characteristics that indicate genetic similarity. A suborder has a narrower climatic range than an order. The criteria for suborders reflect either the presence or absence of waterlogging or soil differences resulting from climate or vegetation.

GREAT GROUP: Each suborder is divided into great groups on the basis of uniformity in kind and sequence of genetic horizons. The great group is not shown in table 11 because the name of the great group is the same as the last word in the name of the subgroup.

SUBGROUP: Each great group is divided into subgroups, one representing the central (typic) concept of the group, and other subgroups having mostly the prop-

TABLE 11.—*Classification of soil series*

Series	Family	Subgroup	Order
Calhoun	Fine-silty, mixed, thermic	Typic Glossaqualfs	Alfisols.
Calloway	Fine-silty, mixed, thermic	Glossaquic Fragiudalfs	Alfisols.
Collins	Coarse-silty, mixed, acid, thermic	Aquic Udifluvents	Entisols.
Dulac	Fine-silty, mixed, thermic	Typic Fragiudalfs	Alfisols.
Eustis [1]	Sandy, siliceous, thermic	Psammentic Paleudults	Ultisols.
Falaya	Coarse-silty, mixed, acid, thermic	Aeric Fluvaquents	Entisols.
Grenada	Fine-silty, mixed, thermic	Glossic Fragiudalfs	Alfisols.
Iuka	Coarse-loamy, siliceous, acid, thermic	Aquic Udifluvents	Entisols.
Henry	Coarse-silty, mixed, thermic	Typic Fragiaqualfs	Alfisols.
Lexington	Fine-silty, mixed, thermic	Typic Paleudalfs	Alfisols.
Loring	Fine-silty, mixed, thermic	Typic Fragiudalfs	Alfisols.
Mantachie [2]	Fine-loamy, siliceous, acid, thermic	Aeric Fluvaquents	Entisols.
Memphis	Fine-silty, mixed, thermic	Typic Hapludalfs	Alfisols.
Ochlockonee	Coarse-loamy, siliceous, acid, thermic	Typic Udifluvents	Entisols.
Providence	Fine-silty, mixed, thermic	Typic Fragiudalfs	Alfisols.
Smithdale	Fine-loamy, siliceous, thermic	Typic Paleudults	Ultisols.
Sweatman	Clayey, mixed, thermic	Typic Hapludults	Ultisols.
Vicksburg	Coarse-silty, mixed, acid, thermic	Typic Udifluvents	Entisols.
Waverly	Coarse-silty, mixed, acid, thermic	Typic Fluvaquents	Entisols.

[1] The Eustis soils in Madison County are taxadjunct to the Eustis series. They typically have a thicker A horizon than is defined in the range for the Eustis series. Behavior, use, and management of these soils are similar to that of the soils in the Eustis series.

[2] The Mantachie soils in Madison County are taxadjunct to the Mantachie series. These soils typically have coarser textures at depths between 11 and 38 inches than is defined in the range for the Mantachie series. Behavior, use, and management of these soils are similar to that of the soils in the Mantachie series.

erties of one great group but also one or more properties of another great group.

FAMILY: Families are established within subgroups, mainly on the basis of properties important to plant growth. Some of the properties are texture, mineralogy, reaction, soil temperature, permeability, consistence, and thickness of horizons.

SERIES: The series has the narrowest range of characteristics of the categories in the classification system. It is explained in the section "How This Survey Was Made."

Descriptions of the Soil Series

On the following pages each soil series in the survey area is described in detail. The series descriptions are presented in alphabetic order by series name.

For each series, some facts about the soils and their parent material are presented first. Then a pedon, a small three-dimensional area of soil typical of the soil series in the survey area, is described. The detailed descriptions of each soil horizon follow standards in the Soil Survey Manual (*4*). Unless otherwise noted, colors described are for moist soil.

Following the pedon description is the range of important characteristics of the soil series mapped in this survey area. Phases, or mapping units, of each soil series are described in the section "Detailed Soil Map."

Calhoun Series

The Calhoun series consists of poorly drained soils that formed in loess. These soils are in depressions on broad ridgetops and on low benches next to the flood plains of larger streams. They are strongly acid or very strongly acid. Slopes range from 0 to 2 percent.

Representative profile of Calhoun silt loam:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; weak medium granular structure; very friable; strongly acid.

A21g—8 to 13 inches; light gray (10YR 6/1) silt loam; common medium light yellowish brown (10YR 6/4) mottles; weak coarse granular structure; very friable; strongly acid; clear smooth boundary.

A22g—13 to 19 inches; light gray (10YR 6/1) silt loam; few medium light yellowish brown (10YR 6/4) and brownish yellow (10YR 6/8) mottles; weak medium granular structure; very friable; few medium dark concretions; strongly acid; clear smooth boundary.

B21tg—19 to 36 inches; light gray (10YR 6/1) silt loam that has tongues of light gray (10YR 6/1) coarse silt loam ½ inch thick; few brownish yellow (10YR 6/8) and strong brown (7.5YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; common clay films on subangular blocky peds; few medium dark concretions; strongly acid; clear smooth boundary.

B22tg—36 to 50 inches; light gray (10YR 6/1) silty clay loam; few medium dark brown (7.5YR 4/4) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; friable; common thin clay films on subangular blocky peds; light gray silt coatings; strongly acid; clear smooth boundary.

B23tg—50 to 72 inches; mottled gray (10YR 5/1) and dark brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; friable; few thin clay films; strongly acid.

The Ap horizon ranges from 6 to 10 inches in thickness. The A horizon ranges from 12 to 24 inches in thickness. In places where woods remain, the A horizon is very dark grayish brown in the upper 1 inch to 3 inches.

The B horizon is silt loam or silty clay loom.

Calloway Series

The Calloway series consists of somewhat poorly drained soils that formed in loess. These soils are mostly in slight depressions on the broad ridgetops and the low benches next to the flood plains of streams. A few areas are on flood plains. These soils have a fragipan. They are strongly

acid or very strongly acid in the upper part and strongly acid in the lower part. Slopes range from 0 to 2 percent.

Representative profile of Calloway silt loam:

Ap—0 to 7 inches; brown (10YR 5/3) silt loam; weak medium granular structure; very friable; strongly acid; abrupt smooth boundary.

B2—7 to 14 inches; yellowish brown (10YR 5/4) silt loam; few medium grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable; strongly acid; clear smooth boundary.

B3—14 to 21 inches; yellowish brown (10YR 5/4) silt loam; common fine gray (10YR 5/1) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine dark concretions; very strongly acid; clear smooth boundary.

A'2—21 to 26 inches; light gray (10YR 7/1) silt loam; few fine yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; weak medium granular blocky structure; very friable; many fine and medium pores; common medium dark concretions; very strongly acid; clear wavy boundary.

B'x—26 to 45 inches; mottled gray (10YR 6/1) and strong brown (7.5YR 5/6) silt loam; weak coarse prismatic structure parting to moderate medium subangular blocky; ½- to 1-inch thick tongues of light gray (10YR 6/1); friable silt surrounds yellowish brown firm brittle prisms 4 to 6 inches, in diameter; common clay films on subangular blocky peds; common small and medium dark-colored concretions; very strongly acid; gradual smooth boundary.

B'3—45 to 60 inches; mottled dark brown (7.5YR 4/4) and light gray (10YR 7/1) silt loam; massive to weak medium subangular blocky structure; friable; strongly acid; clear smooth boundary.

IIB2—60 to 72 inches; dark brown (7.5YR 4/4 to 7.5YR 3/2) silt loam; many coarse light gray (10YR 7/1) mottles; weak medium subangular blocky structure; friable; strongly acid.

The Ap horizon ranges from 6 to 10 inches in thickness. It is brown, dark grayish brown, or grayish brown.

Depth to the fragipan ranges from 18 to 30 inches.

Collins Series

The Collins series consists of moderately well drained soils that formed in alluvium. These soils are mainly on flood plains of streams, they are also in narrow drainageways. They are strongly acid or very strongly acid. Slopes range from 0 to 2 percent.

Representative profile of Collins silt loam:

Ap—0 to 8 inches; brown (10YR 4/3) silt loam; weak medium granular structure; very friable; strongly acid; abrupt smooth boundary.

C1—8 to 19 inches; brown (10YR 4/3) silt loam; common medium grayish brown (10YR 5/2) mottles; massive; common thin horizontal pale brown (10YR 6/3) bedding planes; friable; strongly acid; clear smooth boundary.

C2—19 to 28 inches; brown (10YR 4/3) silt loam; common medium grayish brown (10YR 5/2) mottles; structureless; common ⅛- to ¼-inch thick pale brown (10YR 6/3) bedding planes; friable; strongly acid; gradual smooth boundary.

C3g—28 to 47 inches; grayish brown (10YR 5/2) silt loam; common medium brown (10YR 4/3) mottles; massive; friable; common medium black stains; strongly acid; gradual smooth boundary.

Bb—47 to 72 inches; gray (10YR 5/1) silt loam; common medium brown (10YR 4/3), yellowish brown (10YR 5/6), and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; common medium black stains and dark concretions; very strongly acid.

The Ap horizon ranges from 6 to 9 inches in thickness.

Depth to the grayish brown or gray layer ranges from 20 to 30 inches.

Dulac Series

The Dulac series consists of moderately well drained soils that formed in 30 to 55 inches of loess over 15 to 40 inches of clayey Coastal Plain sediment. These soils have a fragipan. They are very strongly acid or strongly acid throughout. Slopes range from 2 to 12 percent.

Representative profile of Dulac silt loam, 2 to 5 percent slopes:

Ap—0 to 6 inches; brown (10YR 5/3) silt loam; weak fine granular structure; friable; strongly acid; abrupt smooth boundary.

B21t—6 to 20 inches; strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common thin clay films; strongly acid; abrupt smooth boundary.

B22t—20 to 23 inches; strong brown (7.5YR 5/6) silt loam; common large yellowish brown (10YR 5/4) and medium light gray (10YR 6/1) mottles; friable; few thin clay films; very strongly acid; clear smooth boundary.

Bx—23 to 37 inches; mottled yellowish brown (10YR 5/4), strong brown (7.5YR 5/6), and light gray (10YR 6/1) silt loam; weak coarse prismatic structure parting to moderate medium subangular blocky; prisms coated with light gray (10YR 6/1) silt; very firm and brittle in 90 percent of the soil mass; common thin clay films; very strongly acid; clear smooth boundary.

IIB—37 to 60 inches; yellowish red (5YR 4/6) clay; common medium dark gray (10YR 4/1) and light gray (10YR 6/1) mottles; strong medium subangular blocky structure; firm, plastic and sticky when wet; many clay films; very strongly acid; clear smooth boundary.

IIC—60 to 72 inches; gray (10YR 5/1) clay; many coarse strong brown (7.5YR 5/6), yellowish red (5YR 4/6), and red (2.5YR 4/6) mottles; massive; firm, plastic and sticky when wet; few dark gray shaly clay fragments; very strongly acid.

The Ap horizon ranges from 4 to 9 inches in thickness. The A horizon is strong brown in severely eroded areas, and it is very dark brown in the upper 1 inch to 3 inches in places where woods remain.

The B21t is silt loam or silty clay loam. The B22t horizon is strong brown or yellowish brown. The IIB horizon ranges from yellowish red to gray. It is clay or silty clay. Depth to the fragipan ranges from 16 to 30 inches.

Eustis Series

The Eustis series consists of excessively drained soils that formed in sandy Coastal Plain sediment and in eolian deposits next to the Forked Deer River bottom. These soils are on hillsides. They are strongly acid or very strongly acid. Slopes range from 12 to 35 percent.

Representative profile of Eustis sandy loam, 12 to 35 percent slopes:

A1—0 to 3 inches; very dark grayish brown (10YR 3/2) sandy loam; weak fine granular structure; very friable; strongly acid; clear smooth boundary.

A21-3 to 8 inches; brown (10YR 5/3) sandy loam; weak fine granular structure; very friable; strongly acid; clear smooth boundary.

A22—8 to 45 inches; yellowish brown (10YR 5/4) loamy sand; single grained; very friable or loose; strongly acid; clear smooth boundary.

B2&A2—45 to 72 inches; alternating 2-inch layers of yellowish brown (10YR 5/4) loamy sand; single grained; loose; ½-inch layers of yellowish red (5YR 5/6) sandy loam; weak fine subangular blocky structure to massive; very friable; strongly acid.

The A horizon ranges from 3½ feet to more than 6 feet in thickness in places.

The sandy loam layers in the B2&A2 horizon are yellowish red or red; the loamy sand layers are light yellowish brown, pale brown, very pale brown, or colorless. The laminated B2 and A2

layers are absent in places. Where these layers are absent, a red sandy loam B horizon is below a depth of 5 feet.

The Eustis soils in Madison County have an A horizon that is thicker than that defined in the range of the Eustis series.

Falaya Series

The Falaya series consists of somewhat poorly drained soils that formed in alluvium derived from loess. These soils are strongly acid or very strongly acid. Slopes range from 0 to 2 percent.

Representative profile of Falaya silt loam:

Ap—0 to 8 inches; brown (10YR 4/3) silt loam; weak medium granular structure; very friable; very strongly acid; abrupt smooth boundary.

C1—8 to 15 inches; brown (10YR 4/3) silt loam; few medium light gray (10YR 6/1) mottles and black stains; weak thin platy structure to massive; friable; very strongly acid; clear smooth boundary.

C2g—15 to 28 inches; gray (10YR 5/1) silt loam; many medium brown (10YR 4/3) and dark brown (7.5YR 4/4) mottles; few dark-colored stains; weak thin platy structure to massive; friable; very strongly acid; gradual smooth boundary.

C3g—28 to 45 inches; light gray (10YR 6/1) silt loam; common medium dark grayish brown mottles; common dark-colored stains; massive; friable; common soft dark-colored segregations; very strongly acid; gradual smooth boundary.

A2gb—45 to 60 inches; light gray (10YR 7/1) silt loam; common medium yellowish brown mottles; common black stains; weak medium granular structure to massive; friable; few small black concretions; very strongly acid; clear smooth boundary.

Bgb—60 to 72 inches; light gray (10YR 7/1) silt loam; common medium yellowish brown mottles; weak medium subangular blocky structure; friable; few small black concretions; very strongly acid; clear smooth boundary.

The A horizon ranges from 6 to 10 inches in thickness in plowed areas. In places where woods remain, it ranges from 1 inch to 3 inches in thickness and is very dark grayish brown.

The C horizon has thin horizontal bands or bedding planes to a depth of 20 inches or more.

Depth to the A2gb and Bgb horizons ranges from 20 to more than 72 inches. The depth to a fragipan, if present, is more than 40 inches.

Grenada Series

The Grenada series consists of moderately well drained soils that formed in loess. These soils have a fragipan. They are strongly acid or very strongly acid. Slopes range from 0 to 8 percent.

Representative profile of Grenada silt loam, 2 to 5 percent slopes:

Ap—0 to 8 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; very friable; strongly acid; abrupt smooth boundary.

B21—8 to 19 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; few thin clay films; few small pores; common small soft concretions; strongly acid; clear smooth boundary.

B22—19 to 23 inches; yellowish brown (10YR 5/4) silt loam; common medium pale brown (10YR 6/3) and grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; common small pores; common black concretions; strongly acid; clear wavy boundary.

A'2—23 to 29 inches; light brownish gray (2.5Y 6/2) silt loam; common medium yellowish brown (10YR 5/4) and strong brown (7.5YR 5/6) mottles; weak medium granular structure; very friable; common fine and medium pores; common medium dark-colored concretions; few medium brittle dark brown subangular blocky peds; abrupt irregular boundary.

B'x1—29 to 45 inches; yellowish brown (10YR 5/6) silt loam; many medium grayish brown (10YR 5/2), dark brown (7.5YR 4/4), and light brownish gray (10YR 6/2) mottles; strong coarse prismatic structure parting to moderate medium subangular blocky; ½- to 1-inch thick tongues of light brownish gray (2.5Y 6/2); friable silt loam surrounds firm brittle prisms 4 to 6 inches in diameter; common clay films on subangular blocky peds; few small dark-colored soft concretions; very strongly acid; gradual smooth boundary.

B'x2—45 to 63 inches; brown (7.5YR 5/4) silt loam; common medium grayish brown (10YR 5/2), yellowish brown (10YR 5/4), and strong brown (7.5YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; prisms coated with light brownish gray (2.5YR 6/2) silt; firm and brittle; common clay films on subangular blocky peds; very strongly acid; clear smooth boundary.

C—63 to 72 inches; dark brown (7.5YR 4/4) silt loam; massive; friable; strongly acid.

The A horizon ranges from 6 to 8 inches in thickness.

Depth to the fragipan ranges from 18 to 36 inches, and the fragipan ranges from 18 to 36 inches in thickness.

The C horizon is brown, dark brown, or yellowish brown. In places it has few to many mottles in various shades of gray.

Henry Series

The Henry series consists of poorly drained soils that formed in loess. These soils are in depressions on the broad uplands and on the low benches next to the flood plains of streams. A few areas are on the flood plains. These soils have a fragipan. They are strongly acid or very strongly acid. Slopes range from 0 to 2 percent.

Representative profile of Henry silt loam in an area of Calhoun and Henry silt loams:

Ap—0 to 7 inches; grayish brown (10YR 5/2) silt loam; weak medium granular structure; very friable; few small dark-colored concretions; very strongly acid; abrupt smooth boundary.

A21g—7 to 12 inches; gray (10YR 6/1) silt loam; weak medium granular structure; very friable; few small dark-colored concretions; many medium pores; very strongly acid; clear smooth boundary.

A22g—12 to 19 inches; gray (10YR 6/1) silt loam; few medium strong brown (7.5YR 5/6) mottles; weak medium granular structure; very friable; many medium pores; very strongly acid; clear irregular boundary.

Bx1—19 to 36 inches; gray (10YR 5/1) silt loam; common medium yellowish brown (10YR 5/6) and dark brown (7.5YR 4/4) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; prisms are heavy silt loam and are surrounded by 1-inch thick tongues of light gray silt that become thinner as depth increases and are only silt coatings on prism faces in the lower part of this layer; prisms are firm and brittle in 90 percent of the soil mass; tongues are very friable; common clay films on subangular blocky peds; very strongly acid; gradual smooth boundary.

Bx2—36 to 50 inches; grayish brown (10YR 5/2) silt loam; common medium yellowish brown (10YR 5/6) and dark brown (7.5YR 4/4) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; prisms are coated with light gray silt; firm brittle in 70 percent of the soil mass; common thin clay films on the subangular blocky peds; common small dark-colored concretions; very strongly acid; clear smooth boundary.

B3—50 to 72 inches; mottled grayish brown (10YR 5/2), strong brown (7.5YR 5/6), and dark brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; friable; common medium soft dark-colored concretions and segregations; strongly acid.

The A horizon ranges from 18 to 30 inches in total thickness. In places where woods remain, it consists of 1 inch to 3 inches of

dark grayish brown very friable silt loam over 16 to 27 inches of grayish brown or gray very friable silt loam. The Ap horizon on plowed areas is grayish brown, dark grayish brown, or brown. It ranges from 6 to 10 inches in thickness.

Depth to the fragipan ranges from 18 to 37 inches.

Iuka Series

The Iuka series consists of moderately well drained soils on first bottoms. These soils formed in sediment that washed from the nearby uplands. They are strongly acid or very strongly acid. Slopes are from 0 to 2 percent.

Representative profile of Iuka fine sandy loam:

Ap—0 to 8 inches; brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable; strongly acid.

C1—8 to 17 inches; brown (10YR 4/3) fine sandy loam; few medium light brownish gray (10YR 6/2) mottles; massive; few thin pale brown (10YR 6/3) horizontal bands; very friable; strongly acid; clear smooth boundary.

C2—17 to 26 inches; brown (10YR 4/3) fine sandy loam; common medium grayish brown (10YR 5/2) mottles; massive; few thin pale brown (10YR 6/3) horizontal bands; very friable; strongly acid; clear smooth boundary.

C3—26 to 33 inches; brown (10YR 4/3) fine sandy loam; many medium light gray (10YR 6/1) mottles and black stains; massive; few thin pale brown (10YR 6/3) horizontal bands; very friable; strongly acid; clear smooth boundary.

C4—33 to 50 inches; brown (10YR 4/3) silt loam; many coarse light gray (10YR 7/1) mottles; common coarse black stains; massive; very friable; strongly acid; abrupt smooth boundary.

A2gb—50 to 58 inches; light gray (10YR 6/1) silt loam; common medium dark grayish brown (10YR 4/2) and yellowish brown (10YR 5/6) mottles and black stains; weak fine granular structure to massive; friable; few black concretions; strongly acid; clear smooth boundary.

Bgb—58 to 72 inches; light gray (10YR 7/1) silt loam; common medium yellowish brown (10YR 5/6) and dark grayish brown (10YR 4/2) mottles; many black stains; weak medium subangular blocky structure; friable; few black concretions; slightly acid.

The A horizon ranges from 6 to 10 inches in thickness.

The C horizon has thin horizontal bands or bedding planes in the upper 2 to 3 feet. It is a fine sandy loam, loam, or silt loam in alternating layers of two or more of these textures. Between the depths of 10 and 40 inches, the profile is less than 18 percent clay and ranges from 15 to 70 percent sand, excluding very fine sand. The profile is lightly mottled in various shades of gray to a depth of 20 inches. It is profusely mottled below a depth of 20 inches.

Lexington Series

The Lexington series consists of well drained soils that formed in loess and loamy Coastal Plain sediment. These soils are medium acid to very strongly acid. Slopes range from 2 to 30 percent.

Representative profile of Lexington silt loam, 2 to 5 percent slopes:

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; many fine roots; strongly acid; abrupt smooth boundary.

B21t—7 to 22 inches; reddish brown (5YR 5/4) silty clay loam; moderate medium subangular blocky structure; friable; thin clay films on vertical and horizontal ped faces; common fine roots; strongly acid; clear smooth boundary.

B22t—22 to 34 inches; reddish brown (5YR 4/4) silt loam; moderate medium and coarse subangular blocky structure; friable; thin patchy clay films; strongly acid; clear smooth boundary.

B23t—34 to 38 inches; dark brown (7.5YR 4/4) silt loam; weak medium and coarse subangular blocky structure; friable; thin patchy clay films; strongly acid; clear smooth boundary.

IIB24t—38 to 50 inches; dark brown (7.5YR 4/4) sandy loam; weak medium and coarse subangular blocky structure, very friable; few thin patchy clay films; few brownish yellow (10YR 6/6) skeletans; strongly acid; clear smooth boundary.

IIA'2&IIB'2t—50 to 72 inches; alternating 1- to 3-inch layers of yellow (10YR 7/6) loamy sand; single grained; loose; ¼- to 1-inch layers of reddish brown (5Y 4/4) sandy loam; weak medium and fine subangular blocky structure; very friable to loose; few patchy clay films; strongly acid.

The A horizon ranges from 5 to 9 inches in thickness. It is commonly brown or dark brown. It is friable or very friable. In places where woods remain, it is very dark brown in the upper 1 inch to 3 inches.

The B horizon ranges from 22 to 46 inches in thickness. It is reddish brown, dark brown, dark yellowish brown, or strong brown. The IIB horizon begins between depths of 27 and 55 inches and is 6 to 30 inches thick. It is reddish brown, dark brown, strong brown, or yellowish red and has few or common brownish yellow or yellow skeletans. The IIB horizon is sandy loam or loam. Alternating IIA'2 and IIB'2t layers commonly begin between depths of 33 and 72 inches. These layers are absent in places.

Loring Series

The Loring series consists of moderately well drained soils that formed in loess. These soils are on the uplands and generally occupy the higher positions. They have a fragipan. They are strongly acid. Slopes range from 2 to 8 percent.

Representative profile of Loring silt loam, 2 to 5 percent slopes:

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; strongly acid; abrupt smooth boundary.

B21t—7 to 16 inches; dark brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; many thin clay films; strongly acid; clear smooth boundary.

B22t—16 to 24 inches; strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common thin clay films; few black stains on some ped faces; strongly acid; clear smooth boundary.

B23t—24 to 35 inches; strong brown (7.5YR 5/6) silt loam; few medium light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable; few thin clay films; strongly acid; clear smooth boundary.

Bx—35 to 47 inches; dark brown (10YR 4/3) silt loam; common medium light brownish gray (10YR 6/2) mottles and yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; prisms coated with light gray (10YR 6/1) silt; firm in place; brittle in about 70 percent of the soil mass; common thin clay films on subangular blocky peds; common fine dark-colored concretions; strongly acid; clear smooth boundary.

C—47 to 65 inches; dark brown (7.5YR 4/4) silt loam; common medium light brownish gray (10YR 6/2) mottles; massive; friable; strongly acid.

IIB'2t—65 to 72 inches; red (2.5YR 4/6) silty clay loam; strong medium subangular blocky structure; friable; slightly plastic when wet; many clay films; very strongly acid.

The Ap horizon is 6 to 8 inches thick. It is commonly brown or yellowish brown.

The B22t and B23t horizons are strong brown, dark yellowish brown, or yellowish brown.

Depth to the fragipan ranges from 22 to 37 inches. The fragipan in places is very dark brown and has mottles in various shades of gray.

The C horizon ranges from 12 to 36 inches in thickness. The IIB'2t horizon is a silty clay loam or clay loam. It is at a depth between 60 inches to more than 72 inches.

Mantachie Series

The Mantachie series consists of somewhat poorly drained soils that formed in sediment washed from the uplands. These soils are on first bottoms. They are strongly acid or very strongly acid. Slopes are 0 to 2 percent.

Representative profile of Mantachie fine sandy loam:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak medium granular structure; very friable; strongly acid; abrupt smooth boundary.

C1—8 to 13 inches; dark grayish brown (10YR 4/2) sandy loam; common medium gray (10YR 5/1) mottles; massive; very friable; very strongly acid; clear smooth boundary.

C2g—13 to 25 inches; light gray (10YR 6/1) sandy loam; common fine and medium yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; massive; very friable; very strongly acid; clear smooth boundary.

C3g—25 to 31 inches; light gray (10YR 6/1) sandy loam that has thin strata of strong brown (7.5YR 5/6) sandy loam; few medium yellowish brown (10YR 5/6) mottles; massive; very friable; sandy loam strata are loose; very strongly acid; abrupt smooth boundary.

C4g—31 to 38 inches; light gray (10YR 6/1 to 7/1) sandy loam; common medium brown (10YR 4/3) and yellowish brown (10YR 5/6) mottles; single grained; loose; strongly acid; abrupt smooth boundary.

A2gb—38 to 55 inches; light gray (10YR 7/1) silt loam; common medium and coarse yellowish brown (10YR 5/6 to 5/8) mottles; very weak coarse granular structure; friable; very strongly acid; clear smooth boundary.

Bgb—55 to 72 inches; light gray (10YR 7/1) silt loam; common medium strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; very strongly acid.

The Ap horizon is brown or dark grayish brown. It ranges from 6 to 10 inches in thickness.

The C horizon is sandy loam, loam, or silt loam. It is commonly in alternating layers of two or more of these textures. Between the depths of 10 and 40 inches, the profile is 15 to 70 percent sand, excluding very fine sand. Depth to the A2g horizon ranges from 30 inches to more than 72 inches.

The Mantachie soils in other survey areas are 18 to 36 percent clay. These soils in Madison County have less than 18 percent clay. Otherwise, they are within the range of characteristics that define the Mantachie series.

Memphis Series

The Memphis series consists of deep, well drained soils that formed in loess 5 feet or more in thickness. These soils are on uplands. They are strongly acid or very strongly acid throughout. Slopes range from 0 to 8 percent.

Representative profile of Memphis silt loam, 2 to 5 percent slopes:

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; strongly acid; abrupt smooth boundary.

B21t—7 to 19 inches; dark brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; many thin clay films; common black coatings on some vertical ped faces; few fine pores; strongly acid; gradual smooth boundary.

B22t—19 to 37 inches; dark brown (7.5YR 4/4) silt loam; moderate medium subangular blocky structure; friable; common clay films; common black coatings on vertical ped faces; few fine pores; strongly acid; gradual smooth boundary.

B3—37 to 52 inches; dark brown (7.5YR 4/4) silt loam; weak medium coarse subangular blocky structure; friable; common clay films mostly on vertical ped faces; few black coatings on vertical ped faces; few fine pores; strongly acid; gradual smooth boundary.

C—52 to 72 inches; dark brown (7.5YR 4/4) silt loam; few medium pale brown (10YR 6/3) mottles; massive; strongly acid.

The A horizon ranges from 4 to 10 inches in thickness. It is brown, dark brown, or very dark brown.

The B21t is silty clay loam or silt loam. Pale brown silt coatings are on some vertical ped faces in the lower part of the B22t horizon and throughout the B3 horizon. These coatings are not conspicuous when the soil is moist or wet. In places these soils have a few gray mottles below a depth of 30 inches.

The C horizon is underlain by a brown, dark brown, reddish brown, or yellowish red fine sandy loam, sandy loam, or sandy clay loam below a depth of 60 inches in places.

Ochlockonee Series

The Ochlockonee series consists of well drained soils. These soils formed in sediment that washed from the surrounding uplands. They are on the first bottoms. They are strongly acid. Slopes range from 0 to 2 percent.

Representative profile of Ochlockonee fine sandy loam:

Ap—0 to 8 inches; brown (10YR 4/3) fine sandy loam; weak medium granular structure; very friable; strongly acid; abrupt smooth boundary.

C1—8 to 22 inches; brown (10YR 4/3) sandy loam; structureless; very friable; strongly acid; abrupt smooth boundary.

C2—22 to 31 inches; brownish yellow (10YR 6/6) sandy loam; structureless; very friable or loose; strongly acid; abrupt smooth boundary.

C3—31 to 46 inches; yellowish brown (10YR 5/6) silt loam; many coarse strong brown (7.5YR 5/6) and light gray (10YR 6/1) mottles; massive; friable; strongly acid; gradual smooth boundary.

C4—46 to 72 inches; strong brown (7.5YR 5/6) silt loam; many medium light gray (10YR 6/1) mottles; massive; friable; strongly acid.

The Ap horizon ranges from 6 to 10 inches in thickness. This soil is sandy loam, loam, or silt loam between the depths of 10 and 40 inches, or it is in alternating layers of two or more of these textures. The sand content between the depths of 10 and 40 inches averages from 15 to 70 percent. It commonly is near the upper limit.

The Ochlockonee soils are free of gray or grayish brown mottles to a depth of 20 inches. They have no layers that are predominantely gray to a depth of 30 inches.

Providence Series

The Providence series consists of moderately well drained soils that formed in loess over loamy Coastal Plain sediments. These soils have a fragipan. They are strongly acid or very strongly acid. Slopes range from 2 to 12 percent.

Representative profile of Providence silt loam, 2 to 5 percent slopes:

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

B21t—6 to 23 inches; brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; common clay films; strongly acid; clear smooth boundary.

B22t—23 to 30 inches; brown (7.5YR 4/4) silt loam; common medium grayish brown mottles; moderate medium subangular blocky structure; friable; common clay films; common pale brown silt coatings on ped faces; strongly acid; gradual smooth boundary.

Bx—30 to 45 inches; dark brown (7.5YR 4/4) silt loam; common medium grayish brown (10YR 5/2) and yellowish brown (10YR 5/4) mottles; weak medium and coarse prisms have pale brown (10YR 6/3) silt coatings and many black stains; prismatic structure parting to moderate

medium subangular blocky; firm brittle in 70 percent of the soil mass; common clay films on subangular blocky peds; very strongly acid; gradual smooth boundary.

IIB2t—45 to 72 inches; red (2.5YR 4/6) clay loam; strong medium and fine angular blocky structure; friable, slightly plastic when wet; many dark red clay films; very strongly acid.

The Ap horizon ranges from 5 to 10 inches in thickness. It is dark brown where erosion has been severe. In areas where woods remain, the upper part of the A horizon is 3 inches of very dark brown, very friable silt loam.

The Bt horizon is silt loam or silty clay loam. The B21t and B22t horizons are brown, strong brown, or yellowish brown. Depth to the fragipan ranges from 18 to 36 inches. The IIB2t horizon is clay loam, sandy clay loam, or sandy loam.

Smithdale Series

The Smithdale series consists of deep, well drained soils that formed in loamy Coastal Plain sediments. These soils are strongly acid or very strongly acid. Slopes range from 10 to 30 percent.

Representative profile of Smithdale sandy loam, 20 to 30 percent slopes in an area of Smithdale soils, 20 to 30 percent slopes:

A1—0 to 3 inches; dark brown (10YR 3/3) fine sandy loam; weak fine crumb structure; very friable; strongly acid; abrupt smooth boundary.

A2—3 to 14 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak medium granular structure; very friable; very strongly acid; clear smooth boundary.

B1—14 to 21 inches; dark brown (7.5YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable; very strongly acid; clear smooth boundary.

B21t—21 to 31 inches; yellowish red (5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; few thin clay films; very strongly acid; gradual smooth boundary.

B22t—31 to 36 inches; yellowish red (5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; common thin clay films; very strongly acid; gradual smooth boundary.

B23t—36 to 72 inches; red (2.5YR 4/6) sandy clay loam; weak medium subangular blocky structure; friable; few thin clay films; very strongly acid.

The A horizon ranges from 4 to 18 inches in thickness. It is fine sandy loam or sandy loam. The A2 horizon is light yellowish brown or brown. Where the Ap horizon is present, it is commonly brown or dark brown. It is sandy clay loam.

The Bt horizon is clay loam, sandy clay loam, or loam. It is yellowish red or red.

Sweatman Series

The Sweatman series consists of well drained soils that formed in clayey Coastal Plain sediment. These soils are very strongly acid. Slopes range from 5 to 25 percent.

Representative profile of Sweatman silt loam, 12 to 25 percent slopes in an area of Sweatman soils, 12 to 25 percent slopes:

Ap—0 to 6 inches; brown (10YR 5/3) silt loam; weak coarse granular structure; friable; very strongly acid; clear smooth boundary.

B21t—6 to 12 inches; yellowish red (5YR 5/6) silty clay; moderate medium subangular blocky structure; firm, plastic and sticky when wet; common thin clay films; very strongly acid; gradual smooth boundary.

B22t—12 to 25 inches; yellowish red (5YR 5/6) clay; strong fine and medium angular blocky structure; firm, plastic and sticky when wet; common thin clay films; few slickensides; very strongly acid; clear smooth boundary.

B23t—25 to 36 inches; yellowish red (5YR 4/6) clay; common coarse strong brown (7.5YR 5/6) and light gray (10YR 6/1) mottles; moderate medium angular blocky structure; firm, plastic and sticky when wet; few clay films; few slickensides; very strongly acid; clear smooth boundary.

C1—36 to 45 inches; strong brown (7.5YR 5/6) clay; common medium light gray (10YR 6/1) mottles; massive; firm plastic and sticky when wet; gray shaly clay fragments about 2 inches in diameter and about ½ inch in thickness are about 20 percent, by volume; very strongly acid; clear smooth boundary.

C2—45 to 72 inches; gray (10YR 5/1) disc-shaped shaly clay fragments ⅛ to 1 inch in thickness and 1 inch to 3 inches in diameter coated with strong brown and yellowish red clay is about 80 percent, by volume, mixed with a strong brown clay that is massive; firm, plastic and sticky wet.

The Ap horizon ranges from 4 to 6 inches in thickness. It is silt loam or fine sandy loam where erosion has not been severe.

The B horizon ranges from 20 to 50 inches in thickness. It is yellowish red or red and is clay or silty clay.

Depth to the shaly clay ranges from 24 to 56 inches.

Vicksburg Series

The Vicksburg series consists of well drained soils that formed in loamy alluvium that recently washed from the nearby uplands. These soils are commonly on narrow first bottoms next to the small streams. They are strongly acid or very strongly acid. Slopes range from 0 to 2 percent.

Representative profile of Vicksburg silt loam:

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; very friable; strongly acid; abrupt smooth boundary.

C1—7 to 28 inches; dark brown (10YR 4/3) silt loam; weak thin platy structure to massive; very friable; few thin pale brown (10YR 6/3) bedding planes; strongly acid; gradual smooth boundary.

C2—28 to 43 inches; brown (10YR 5/3) silt loam; few medium gray (10YR 5/1) and common medium dark brown (7.5YR 3/2) mottles; weak thin platy structure to massive; friable; strongly acid; clear smooth boundary.

A2b—43 to 50 inches; light brownish gray (10YR 6/2) silt loam; few medium yellowish brown (10YR 5/4) mottles; weak medium granular structure; friable; common fine and medium pores; very strongly acid; clear smooth boundary.

Bb—50 to 72 inches; yellowish brown (10YR 5/6) silt loam; many medium gray (10YR 5/1) mottles; weak medium subangular blocky structure; friable; very strongly acid.

The Ap horizon ranges from 6 to 10 inches in thickness. The A2b horizon is at a depth of 40 inches to more than 72 inches.

The Bb horizon, where present, is yellowish brown, dark brown, strong brown, or gray. It is silt loam, loam, silty clay loam, or sandy clay loam.

The C horizon is brown to a depth of 30 inches or more. It is free of gray mottles to a depth of 20 inches or more. The upper 40 inches of the C horizon is less than 18 percent clay and less than 15 percent sand.

Waverly Series

The Waverly series consists of poorly drained soils that formed in alluvium. These soils are in the lower positions, mainly on the wider first bottoms along the larger streams. The soils are strongly acid or very strongly acid. Slopes range from 0 to 2 percent.

Representative profile of Waverly silt loam:

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

B1g—6 to 15 inches; light gray (10YR 6/1) silt loam; common medium yellowish brown (10YR 5/4) and few medium

TABLE 12.—*Temperature and precipitation at Jackson*

[Period of record, 1931–60]

Month	Temperature			Precipitation
	Average daily maximum	Average daily minimum	Average	Average total
	°F	°F	°F	*Inches*
January	49.6	30.1	39.9	6.00
February	53.1	32.7	42.9	4.91
March	60.7	38.9	49.8	5.44
April	71.5	48.7	60.1	4.66
May	80.3	57.0	68.7	3.97
June	88.0	65.0	76.5	4.08
July	90.6	67.9	79.3	4.46
August	90.3	66.7	78.5	3.28
September	84.3	59.5	71.9	3.39
October	75.0	47.8	61.4	2.34
November	61.0	37.7	49.4	4.11
December	51.3	32.0	41.7	4.37
Year	71.3	48.7	60.0	51.01

strong brown (7.5YR 5/6) mottles; very weak subangular blocky structure to massive; friable; very strongly acid; clear smooth boundary.

B2g—15 to 38 inches; light gray (10YR 6/1) silt loam; common medium yellowish brown (10YR 5/4) and few medium strong brown (7.5YR 5/6) mottles; very weak medium subangular blocky structure to massive; friable; few medium and fine dark-colored concretions; very strongly acid; clear smooth boundary.

A2gb—38 to 55 inches; light gray (10YR 6/1) silt loam; few medium dark grayish brown (10YR 4/2) and yellowish brown (10YR 5/6) mottles; weak medium granular structure; friable; few fine red segregations; common medium dark-colored concretions; very strongly acid; clear smooth boundary.

Bbg—55 to 72 inches; light gray (10YR 6/1 to N 6/0) silt loam or silty clay loam; common fine strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; slightly firm; common medium dark-colored concretions; very strongly acid.

The Ap horizon ranges from 6 to 8 inches in thickness and is absent in wooded areas. These soils are gray in all layers between the depths of 8 and 30 inches. Depth to the A2gb horizon ranges from 36 inches to more than 72 inches.

The Bbg horizon, where present, is silt loam, silty clay loam, or sandy clay loam. In places it is firm and brittle.

The upper 40 inches of the profile has slightly less than 18 percent clay and less than 15 percent sand.

General Nature of the County

This section provides general information about the history and development of Madison County. It also gives information about farming, industry and commerce, physiography and drainage, and climate.

History and Development

Madison County, which was named for President James Madison (*6*), was established December 17, 1821. Originally, Madison County covered an area of 625 square miles. The boundary of Madison County was changed in 1871 when Crockett County was established. It was changed again in 1879 when Chester County was established.

In 1970 the population of Madison County was 65,727. Jackson, the largest town and the county seat, had a population of 39,996. The 1970 population in the other incorporated towns was: Adair, 51; Denmark, 61; and Medon, 136. Other settlements in the county are Beech Bluff, Bemis, Five Points, Huntersville, Leighton, Malesus, Mercer, Oakfield, Pinson, Providence, and Spring Creek.

Farming

Farming has always been an important source of income in Madison County. It was the chief source of income from the time of the early settlers until about 1950. Slightly less than 5 percent of the population is now engaged in farming.

According to the 1969 Census of Agriculture, there were 1,696 farms in Madison County. Of this number, 116 were less than 10 acres, 851 were from 10 to 99 acres, 621 were from 100 to 499 acres, 77 were from 500 to 999 acres, 26 were from 1,000 to 1,999 acres, and 5 were more than 2,000 acres. In 1969 there were 274,184 acres in farms, and the average size farm was 161.2 acres.

Farms used for producing row crops and raising livestock are common. The row crops are mainly cotton, soybeans, and corn. The acreage in corn is normally low; the acreage of cotton and soybeans fluctuates from year to year and depends on acreage allotments and market prices. Hogs and beef cattle are the main types of livestock raised on these farms. Dairy farms, small vegetable farms, fruit orchards, and ornamental plant nurseries are also in the county.

Industry and Commerce

Industry is important to the economy of Madison County. It has increased in importance more rapidly in recent years. In December 1972 Madison County had 53 plants located in and near the City of Jackson. Each plant employed 25 persons or more, and the total employed was 8,364.

TABLE 13.—*Average dates of last freezing temperatures in spring and first in fall*

Temperature	Average date of last in spring	Average date of first in fall	Frost-free period in days
32° F	April 6	October 23	200
28° F	March 25	November 5	225
24° F	March 5	November 21	261
20° F	February 21	December 6	288
16° F	February 3	December 28	328

Jackson is a trade center and wholesale distribution center for much of western Tennessee. Between 1960 and 1972, several shopping centers were constructed in Jackson.

Physiography and Drainage

Madison County consists of very gently rolling to hilly uplands that have been dissected by the Forked Deer River and smaller streams. Slopes are mild in the northwestern part of the county and are rather steep in the eastern part of the county. The elevation is 310 feet above mean sea level on the Forked Deer River bottoms and the Hatchie River bottoms. The elevation rises to at least 634 feet above mean sea level on the hills.

The drainage system in Madison County is complete. Surface water collects in small streams and flows into progressively larger streams. Drainage flows into the Middle Fork or the South Fork of the Forked Deer River or into the Hatchie River before it finally leaves Madison County.

Climate[4]

The climate of Madison County generally is temperate, but there are pronounced seasonal variations in both temperature and precipitation. Weather changes are influenced by weather fronts and associated centers of high and low pressure that move across the country. This activity is least late in spring and in summer, somewhat greater in fall, and greatest in winter and early in spring.

Precipitation is fairly well distributed, but it varies greatly during the growing season from year to year (table 12). Nearly 60 percent of the annual amount falls during winter and spring. Local showers and thunderstorms are most frequent in summer, when thunderstorms occur on an average of about 8 days each month. On a yearly basis, the average number of days with thunderstorms is about 55. The lightest precipitation, which occurs in fall, is brought about by the maximum occurrence of rain-suppressing, slow-moving high pressure systems. During the warm season, an average of one or more dry spells occur each year and a more serious drought can be expected about once every 6 or 7 years. On the other hand, there are sometimes wet periods and periods of excessive rainfall. A rainfall of 4.5 inches in 12 hours can be expected to occur once about every 10 years, 3.5 inches in 2 hours once every 25 years, and 1.5 inches in 1 hour once every 2 years. Annual free-water evaporation, such as that from shallow lakes and farm ponds, averages 39 inches, which is 12 inches less than the average annual precipitation. Mean daily moisture loss from moist soils with good and actively growing plant cover at Jackson is estimated at .08 inch in April, increasing to .17 to .19 inch in summer, and then dropping to .08 inch in October. The rates do not vary appreciably throughout western Tennessee.

Snowfall is quite variable from year to year. Some winters have little or no snowfall. The greatest annual total for the period of this summary was 17.0 inches in 1948; the years that had little or no snowfall were in 1961, 1957, 1956, and 1953. Heavy snowstorms are infrequent, and snow seldom remains on the ground for more than a few days. Average dates of last freezing temperatures in spring and first in fall are given in table 13.

Severe storms are infrequent at Jackson. During the period 1916–65, only four tornadoes were observed in Madison County. Because the county is located inland, damage from tropical storms is rare. They occur only about once in 18 years, and hailstorms occur about twice a year. The storm hazard here is no greater than in surrounding areas and is less than in many parts of the country.

The average temperatures are moderate at Jackson, and the difference between January and July averages about 39 degrees. While both summer and winter are temperate, spring and fall temperatures are about ideal for outdoor work and recreation. There are also many mild periods in winter, and occasional periods of mild, dry weather replace stretches of warm humid weather in summer.

Prevailing winds are from a southerly direction throughout most of the year; however, winds from a northern quadrant, in association with cold winter air currents from Canada, frequently prevail. Average windspeed is lowest from July through October, about 8 miles per hour; highest in January through April, about 11 miles per hour; and about 9 to 10 miles per hour in May, June, November, and December.

Relative humidity rises and falls in a manner opposite that of temperature during a typical day; the highest humidity usually occurs with the lowest temperature and the lowest humidity usually with the highest temperature. Humidity at 6 a.m. and noon, respectively, averages about 82 percent and 66 percent in January; 81 percent and 52 percent in April; 86 percent and 56 percent in July; and 86 percent and 51 percent in October.

Possible sunshine averages about 45 percent in January, 61 percent in April, 69 percent in July, and 70 percent in October.

[4] JOHN VAIKSNORAS, climatologist for Tennessee, National Weather Service, U.S. Department of Commerce, furnished a summary of data used in preparation of this section.

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Glossary

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

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	More than 9

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coat, clay skin.

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

Loose.—Noncoherent when dry or moist; does not hold together in a mass.
Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.
Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.
Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.
Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.
Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.
Soft.—When dry, breaks into powder or individual grains under very slight pressure.
Cemented.—Hard; little affected by moistening.

Cutbanks cave. Unstable walls of cuts made by earthmoving equipment. The soil sloughs easily.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.
Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.
Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.
Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.
Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.
Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.
Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients, as for example in "hillpeats" and "climatic moors."

Excess fines. Excess silt and clay. The soil does not provide a source of gravel or sand for construction purposes.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soil are as follows:

O horizon.—An organic layer, fresh and decaying plant residue, at the surface of a mineral soil.
A horizon.—The mineral horizon, formed or forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon most of which was originally part of a B horizon.
A2 horizon.—A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.
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 a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Leaching. The removal of soluble material from soil or other material by percolating water.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

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

Low strength. Inadequate strength for supporting loads.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—few, common, and many; size—fine, medium, and coarse; and contrast—faint, distinct, and prominent. The size measurements are of the diameter along the greatest dimension. Fine indicates less than 5 millimeters (about 0.2 inch); medium, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and coarse, more than 15 millimeters (about 0.6 inch).

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

Parent material. The great variety of unconsolidated organic and mineral material in which soil forms. Consolidated bedrock is not yet parent material by this concept.

Percs slowly. The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are very slow (less than 0.06 inch), slow (0.06 to 0.20 inch), moderately slow (0.2 to 0.6 inch), moderate (0.6 to 2.0 inches), moderately rapid (2.0 to 6.0 inches), rapid (6.0 to 20 inches), and very rapid (more than 20 inches).

pH value. (See Reaction, soil). A numerical designation of acidity and alkalinity in soil.

Piping. Moving water forms subsurface tunnels or pipelike cavities in the soil.

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

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	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

Relief. The elevations or inequalities of a land surface, considered collectively.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Second bottom. The first terrace above the normal flood plain of a stream.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

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

Soil. A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are—platy (laminated), prismatic (vertical axis of aggregates longer than horizontal), columnar (prisms with rounded tops), blocky (angular or subangular), and granular. Structureless soils are either single grained (each grain by itself, as in dune sand) or massive (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

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

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea. A stream terrace is frequently called a second bottom, in contrast with a flood plain, and is seldom subject to overflow. A marine terrace, generally wide, was deposited by the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

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

Topsoil (engineering). Presumably a fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.

Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Water table, perched. A water table standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

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