United States
Department of
Agriculture

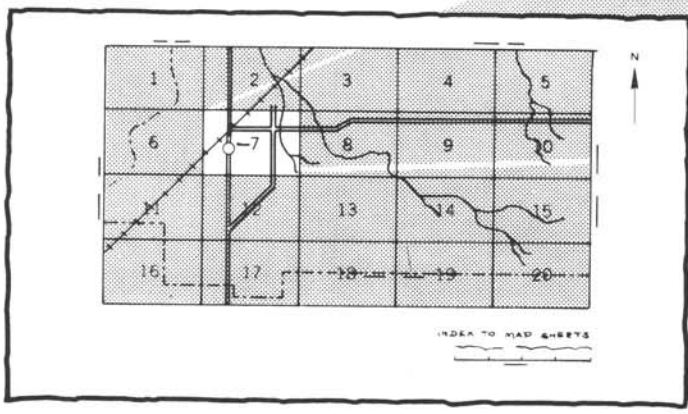
Soil
Conservation
Service

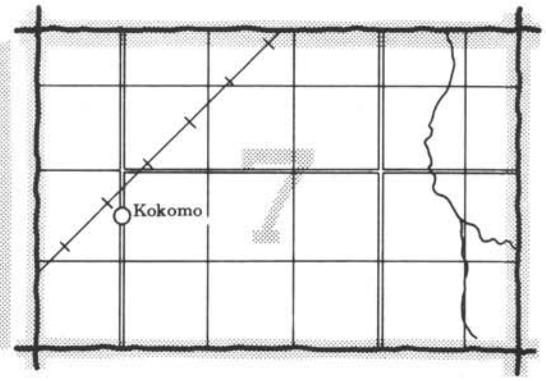
In Cooperation with
Mississippi Agricultural
and Forestry Experiment
Station

Soil Survey of Madison County Mississippi

HOW TO USE

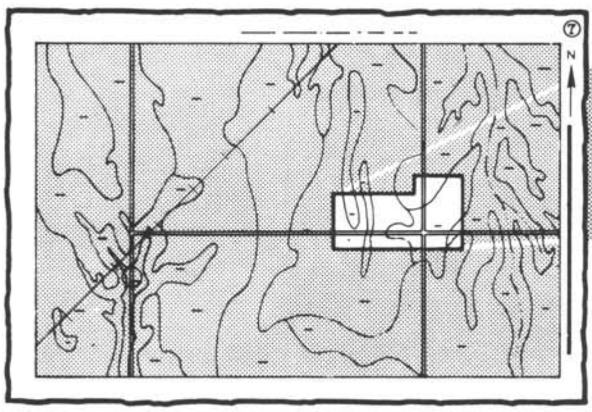
1. Locate your area of interest on the "Index to Map Sheets" (the last page of this publication).

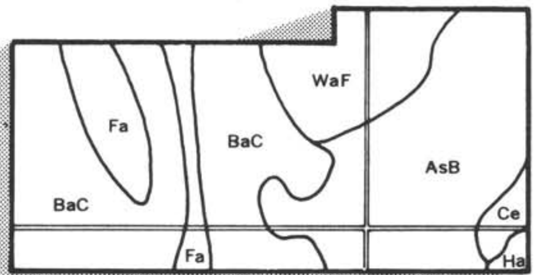




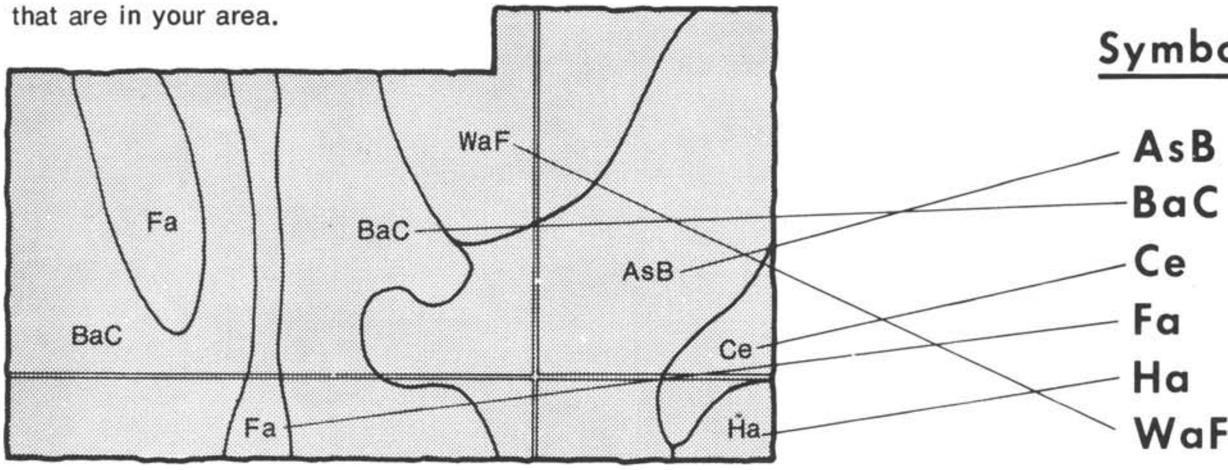
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



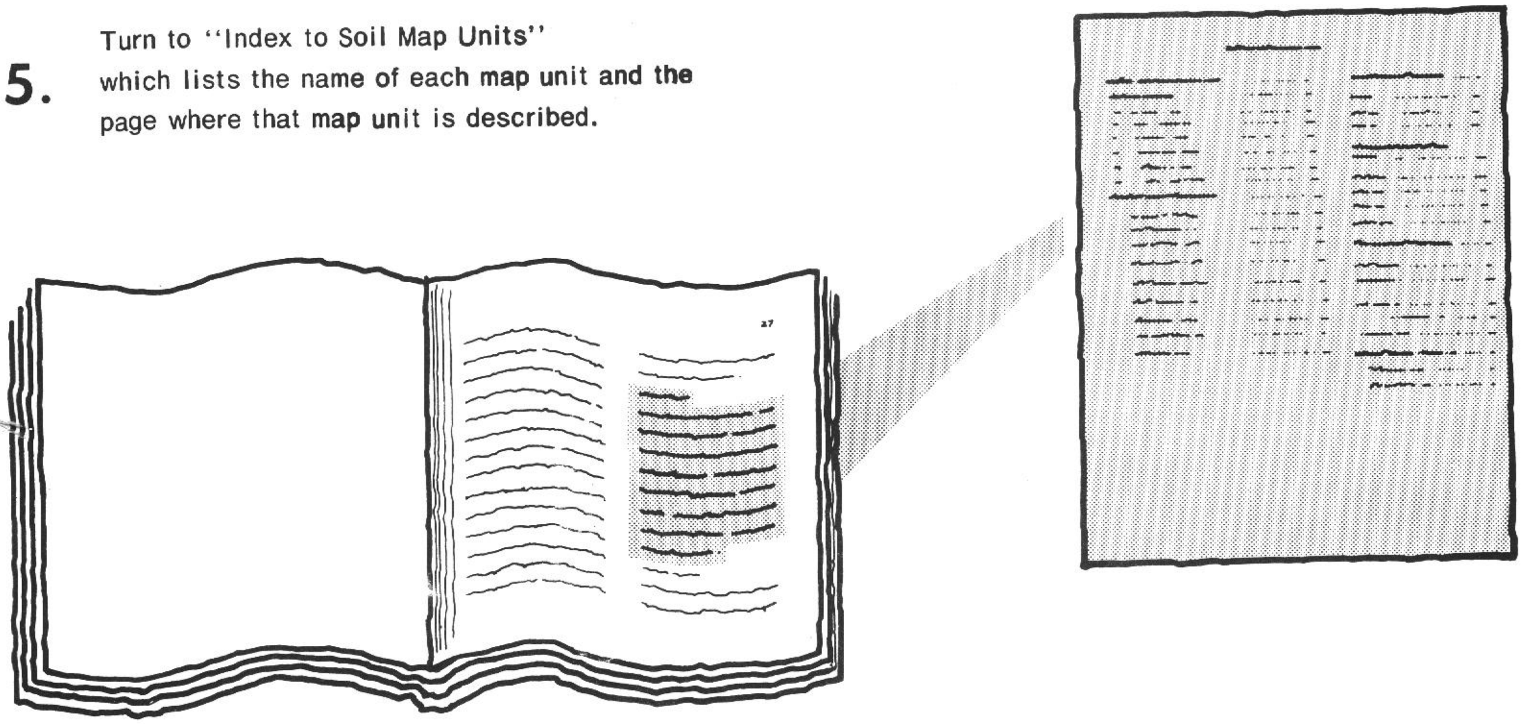


4. List the map unit symbols that are in your area.

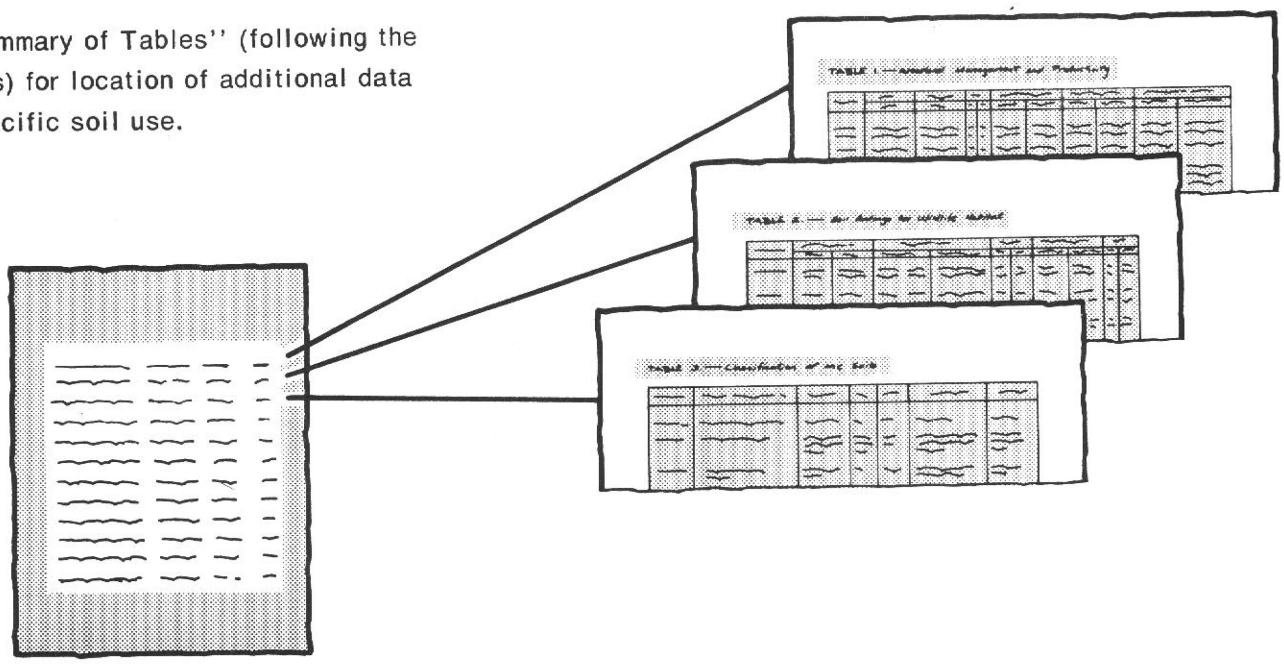


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was performed in the period 1970-1980. Soil names and descriptions were approved in 1980. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1980. This survey was made cooperatively by the Soil Conservation Service and the Mississippi Agricultural and Forestry Experiment Station. It is part of the technical assistance furnished to the Madison County Soil and Water Conservation District.

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

Cover: Historic Madison County Courthouse, constructed in 1858, is on Loring silt loam, 2 to 5 percent slopes, eroded.

Contents

Soil series

Issued February 1984

Index to map units

Summary of tables

Foreword

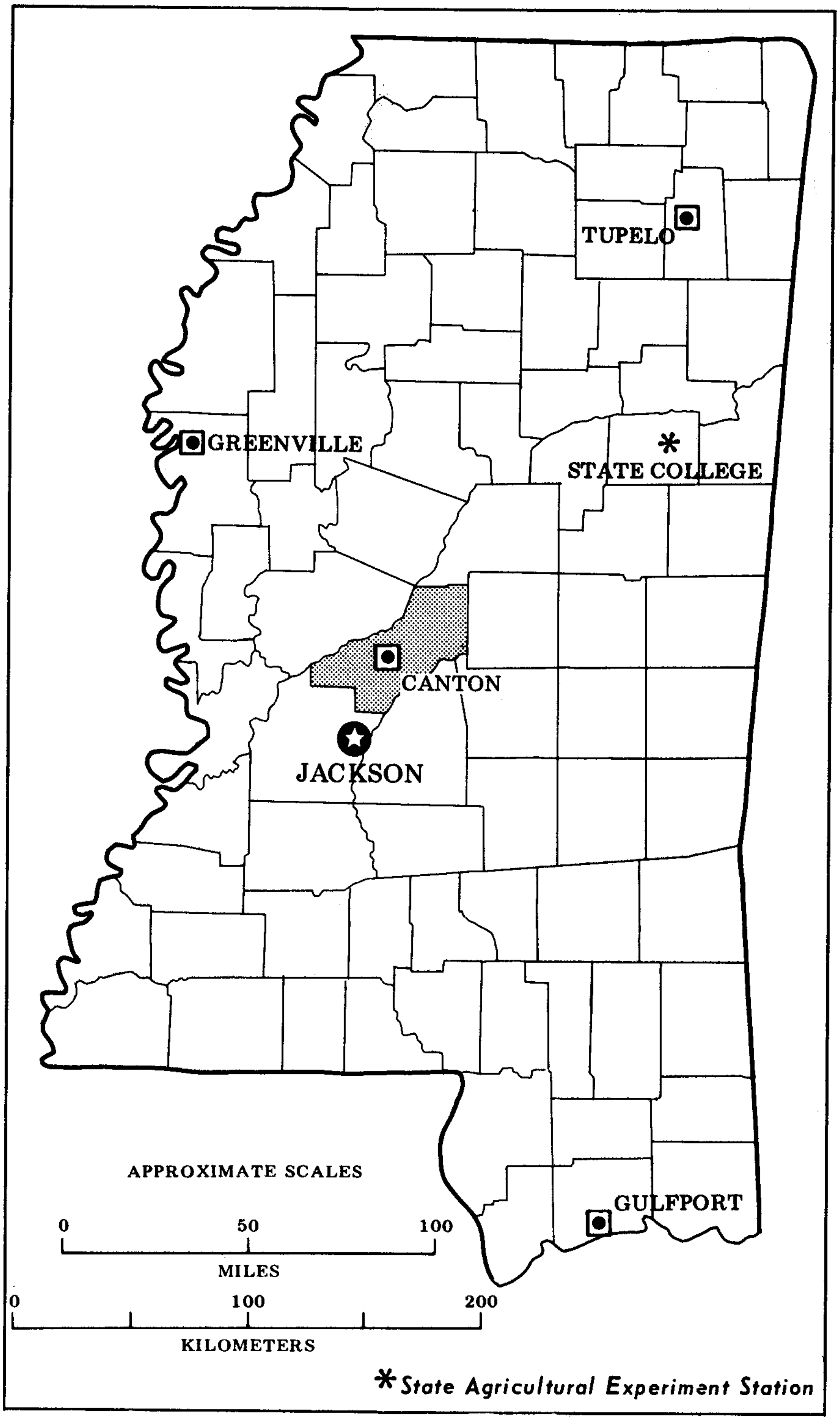
This soil survey contains information that can be used in land-planning programs in Madison County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact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

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

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

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

Billy C. Griffin
State Conservationist
Soil Conservation Service



Location of Madison County in Mississippi.

Soil survey of Madison County, Mississippi

By Frank T. Scott, Soil Conservation Service

Soils surveyed by Frank T. Scott, Rex E. Davis, and Lloyd B. Walton, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service, in cooperation with the Mississippi Agricultural and Forestry Experiment Station

MADISON COUNTY is in the central part of the state. It has an area of about 751 square miles, or 480,640 acres. Canton, the county seat, is near the center of the county. In 1970, the population of the county was 29,737 (*16*).

Madison County lies between two rivers, which flow generally from the northeast to the southwest. Big Black River is the northwestern boundary, and Pearl River is the southeastern boundary of the county. At the upstream end of the county, the rivers are about 22 miles apart; they are about 16 miles apart near the center and about 22 miles apart in the southwestern part of the county. The Big Black River flows into the Mississippi River, and the Pearl River flows into the Gulf of Mexico.

About one-sixth of the land area of the county is on nearly level flood plains of the rivers and creeks that drain the county. About five-sixths of the land of the county is on uplands that have a dendritic drainage pattern. The upland ridges are nearly level to sloping and the side slopes are mainly strongly sloping to steep.

Farming is a major economic enterprise in the county. The main crops include cotton, corn, and soybeans. Beef cattle and timber are important. Over 40 manufacturing plants are located in the county. Also, many residents of the county work in nearby Jackson, the state capital.

Soil scientists have determined that about 53 different kinds of soils are in Madison County. These soils range widely in texture, natural drainage, and other characteristics.

An older survey of Madison County was published in 1920 (*8*). The present survey updates the earlier survey and provides additional information and larger maps that show the soils in greater detail.

Description, names, and delineations of soils in this soil survey do not fully agree with those on soil maps for adjacent counties. Differences are the result of better knowlege of soils, modification of series concepts, intensity of mapping, or the extent of soils within the survey.

General nature of the county

This section provides general information about the county. It discusses briefly the climate, history, landscape resource, water resources, agriculture, and geology of the area.

Climate

Prepared by the National Climatic Center, Asheville, N.C.

Madison County has long, hot summers because moist tropical air from the Gulf of Mexico covers the area continuously. Winters are cool with only a rare cold wave. Precipitation is fairly heavy throughout the year, and prolonged droughts are rare. Summer precipitation, mainly afternoon thundershowers, is adequate for all crops.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Canton, Miss., in the period 1951 to 1973. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 47° F, and the average daily minimum temperature is 35°. The lowest temperature on record, which occurred at Canton on January 12, 1962, is -5°. In summer the average

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Growing degree days are shown in table 3. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50° F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 52 inches. Of this, 26 inches, or 50 percent, usually falls in April through September, The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 20 inches. The heaviest 1-day rainfall during the period of record was 5.6 inches at Canton on April 29, 1953. Thunderstorms occur on about 60 days each year, and most occur in summer.

Average seasonal snowfall is 2 inches. The greatest snow depth at any one time during the period of record was 8 inches. Seldom is there at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 90 percent. The sun shines 65 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 9 miles per hour, in spring.

History

In 1820, the large area that included what is now Madison County was ceded to the United States by the Choctaw Indians in the Treaty of Doak's Stand. On January 29, 1828, Madison County was established by the Mississippi Legislature and named for James Madison, fourth president of the United States. The county was originally part of Hinds County. The city of Canton was incorporated in 1836 (*6*).

The county is joined on the north by Attala County, on the east by Leake County, on the southeast by Rankin County, on the south by Hinds County, and on the west by Yazoo County.

Landscape resource

Ernest E. Dorrill, III, landscape architect, Soil Conservation Service, helped prepare this section.

The landscape resource has three aspects: ecological, social, and visual. The ecological aspect is determined by the processes that have formed and shaped the landscape in its entirety. The composition and topography of the soils are basic to this aspect of the landscape resource. The social resource is the usefulness of the landscape for economic and cultural purposes. The visual resource is the classifiable appearance of the landscape (*14*).

The visual resource can be described and measured by four elements: landform, water, vegetation, and structures. These elements and their pattern determine the visual diversity of a landscape (*15*). A landscape that has a measurable slope, height, and shape can be compared and rated with other landscapes in the same geographic area. In the "General soil map units" section, each map unit, which is distinctive in that it makes up a landscape, has been rated for visual diversity and the visual contrast that changes in land use have on the landscape.

The visual quality of the landscape is affected by land use, which is influenced by soil characteristics. Visual diversity ratings, therefore, can be used in conservation planning and in establishing a desirable continuity of landscape elements.

The quality of the landscape resource should be considered along with soil capability in planning farmland or urban use. Some tillage methods may create a hazard of erosion and a decline in visual quality. Planting crops on soils not suitable for row crops and then leaving the soil unprotected in winter could result in deep rills and gullies. Sand and silt from these eroding soils could clog streams and result in a decrease in visual quality. Urban structures, such as roads, highways, and utilities, alter the appearance of the landscape.

Water resources

The sources of water for household use and for livestock generally are adequate. Most of the water used in the household is from shallow or deep wells. There are several community water systems in the county. The water used by livestock is mainly from perennial streams, manmade ponds, and springs. In winter, the flow in most of the intermittent streams is large enough to water livestock.

The Ross Barnett Reservoir, a large impoundment on the Pearl River, is used for fishing, boating, skiing, and swimming. Lake Lorman, Lake Cavalier, and a few other large lakes are also used for recreation.

Agriculture

Since the earliest settlers came to Madison County, cotton has been the main cash crop. The settlers grew enough vegetables and produced enough beef and pork to supply their needs. In recent years, soybeans have become an important cash crop.

In 1974 there were 898 farms in the county; the average farm size was 343 acres (*17*).

The total yields of principal crops harvested in 1974 were cotton, 40,031 bales; corn, 55,821 bushels; sorghum for grain and seed, 74,321 bushels; and soybeans, 475,962 bushels. The livestock on farms was temperature is 80°, and the average daily maximum temperature is 92°. The highest recorded temperature, which occurred on August 30, 1951, is 104°.

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Geology

Madison County is crossed from northwest to southeast by three major physiographic belts: the North Central Hills, which are underlain by Cockfield sands and clays, in the northeast; Jackson Prairie, which is on the massive Yazoo Clay, in the center and in the southwest; and the Vicksburg Hills, which are carved from Oligocene limestones, marls, clays, and sands, in the southwest and in the extreme south. A minor fourth belt, the Loess Hills, which is a blanket of windblown silt that is eroded, is in the northwest.

The topography in the central and southwestern part of Madison County is gently sloping to undulating. In the extreme southwest corner, the landscape is mainly hills that have steep side slopes and narrow valleys. In the eastern and northern part, the topography ranges from undulating to strongly sloping and hilly. In the northeastern part, the landscape is steep and mainly consists of hills that have narrow ridgetops and valleys. Some of the highest areas in the county are in the northeastern part. The highest elevation is about 475 feet above sea level, near Greenwood Cemetery. The lowest elevation is about 140 feet, near Big Black River where it flows into Hinds County.

Madison County is drained chiefly by the Big Black River, which flows southwesterly. About 4 percent of the county, in the extreme southeastern side, drains southeasterly into the Pearl River. Drainage in the northern portion of the county is westerly into the Big Black River from Doaks Creek and its branches. Bear Creek drains most of the south-central part into the Big Black River. The western side of the county drains northwesterly into the Big Black River chiefly via Panther Creek, Persimmon Creek, Town Creek, Bogue Chitto Creek, and smaller creeks.

Materials of several formations are present in the county. From the youngest to the oldest, the major formations are recent alluvium; Loess Hills; Forest Hill Formations of the Vicksburg Hills; Yazoo Formation; and Cockfield Formation (*5*).

The Cockfield Formation in the eastern and northeastern part of the county is Eocene in age and consists mostly of silty clays, silty sands, and lignite.

The Yazoo Formation is also Eocene in age and consists of blue-green limy clay. This formation is in the central and southwestern part of the county. Yazoo Clay is unstable. It has a high shrink-swell potential and causes shifting of building foundations. This highly expansive characteristic can cause serious problems unless proper design and construction are used.

Vicksburg Hills, in the southwestern and extreme southern part of the county, are Oligocene limestones, marls, clays, and sands.

The Loess Hills in the northwestern part of the county are high in silt content. They are Pleistocene in age.

The recent silty alluvium is on the Big Black River flood plain and lesser stream valleys throughout the county. The Pearl River flood plain in the southeastern part of the county consists of silty and sandy recent alluvium.

Many individual beds of clays, sands, or silts are exposed along roadbanks and streambanks. Erosion and slipping are evident.

Small and large petrified logs are exposed by erosion in Forest Hill Formation sands and silts about 2 miles southwest of Flora. These logs are believed to have been deposited by flooding during deposition of silts and sands because no stumps have been observed (fig. 1).

The topography of the county is relative to the underlying geology. Formations crop out in physiographic belts that have a general trend from northwest to southeast. The regional dip is approximately 25 feet per mile to the west and southwest. This regional dip is greatly altered by a structure uplift at nearby Jackson. This uplift, the Jackson Dome, causes all the beds to dip away from its crest.

Several oil wells are in Madison County.

How this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General soil map units" and "Detailed soil map units."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those

Figure 1.—Logs, now petrified, from fir, maple, and spruce trees in an area of Memphis-Udorthents complex, gullied.

characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers, woodland managers, engineers, planners, developers and builders, home buyers, and others.

General soil map units

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

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

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

The eleven general soil map units make up about 97.6 percent of the total acreage in the county. The remaining 2.4 percent is areas of water greater than 40 acres.

Descriptions of the general soil map units follow.

Well drained to poorly drained silty and loamy soils; on flood plains and stream terraces

The soils of the five general soil map units in this group are on flood plains and terraces of the large streams. The major soils are the silty Ariel, Calhoun, Cascilla, Gillsburg, Oaklimeter, and Riedtown soils; and the loamy Columbus and Daleville soils. These soils are well drained to poorly drained. Slopes range from 0 to 2 percent. This group makes up about 15.4 percent of the county.

1. Ariel-Oaklimeter-Gillsburg

Nearly level, well drained, moderately well drained, and somewhat poorly drained silty soils; on flood plains

The landscape of this unit is characterized by very little relief. It has nearly level, broad flood plains along streams that are in the central part of the county. Slopes range from 0 to 2 percent. Streams are mostly intermittent, but a few are permanent and have winding courses. Occasional flooding occurs in winter and early in spring. Soils in this unit are mostly used for crops or pasture; some areas are in woodland. Structures are few. Based on the pattern of these landscape elements, visual variety of this unit is moderate. Most land use changes will create patterns of moderately low contrast on the landscape.

This map unit makes up about 6 percent of the county. It is about 45 percent Ariel soils, 25 percent Oaklimeter soils, 20 percent Gillsburg soils, and 10 percent minor soils.

The well drained Ariel soils are on broad flood plains near streams. These soils formed in silty alluvium.

The moderately well drained Oaklimeter soils are in intermediate positions on broad flood plains. These soils formed in silty alluvium.

The somewhat poorly drained Gillsburg soils are in slightly lower positions on flood plains. These soils formed in silty alluvium.

The minor soils, all on flood plains, are the moderately well drained Adler and Riedtown soils and the well drained Morganfield soils.

These soils are well suited to crops, pasture, and woodland. Wetness and flooding are the main limitations for farming and most other uses. A good drainage system is needed in places; some drainage systems have been installed.

Flooding and wetness are severe limitations for urban uses.

The potential is good for use of these soils as habitat for openland and woodland wildlife. For use as habitat for wetland wildlife, Ariel soils have very poor potential, Oaklimeter soils have poor potential, and Gillsburg soils have fair potential.

2. Oaklimeter-Ariel-Gillsburg

Nearly level, moderately well drained, well drained, and somewhat poorly drained silty soils; on flood plains

The landscape of this unit is characterized by very little relief. It has broad, nearly level flood plains of Big Black River and Doaks Creek. Slopes range from 0 to 2 percent. Flooding for long periods is frequent. Depressions, stream channels, and old river runs are common. Some channels have standing water except during droughts. Most of the soils in this unit are used as woodland, which consists mainly of bottom land hardwoods. Some pine trees are at higher elevations. The landscape pattern is broken by logging roads and rights-of-way for utilities. Based on the pattern of these landscape elements, visual diversity is low. Most land use changes will create patterns of moderate contrast on the landscape.

This map unit makes up about 6 percent of the county. It is about 38 percent Oaklimeter soils, 31 percent Ariel soils, 25 percent Gillsburg soils, and 6 percent minor soils.

The moderately well drained Oaklimeter soils are in intermediate positions on broad flood plains. These soils formed in silty alluvium.

The well drained Ariel soils are on broad flood plains near streams. These soils formed in silty alluvium.

The somewhat poorly drained Gillsburg soils are in slightly lower positions on flood plains. These soils formed in silty alluvium.

The minor soils, all on flood plains, are the moderately well drained Adler soils, the somewhat poorly drained McRaven soils, and the moderately well drained Riedtown soils.

The soils of this map unit are poorly suited to row crops commonly grown in the county because of flooding. Oaklimeter, Ariel, and Gillsburg soils are well suited to woodland. In the summer, a few areas of these soils are used for pasture.

These soils are suited to grasses and legumes for hay or pasture.

These soils have severe limitations for urban uses because of frequent flooding and wetness.

These soils have good potential for use as habitat for woodland wildlife and fair potential for use as habitat for openland wildlife. For use as habitat for wetland wildlife, Oaklimeter soils have poor potential, Ariel soils have very poor potential, and Gillsburg soils have fair potential.

3. Riedtown-Ariel

Nearly level, moderately well drained and well drained silty soils; on flood plains

The landscape of this unit is characterized by very little relief. It has nearly level, low, broad flood plains and occurs along streams in the western part of the county. Slopes range from 0 to 2 percent. Streams are mostly intermittent. The soils in this unit are subject to occasional flooding, generally in winter and early in spring. The soils are mostly used for crops or pasture; some acreage is in woodland. Structures are few. Based on the pattern of these landscape elements, visual diversity is moderate. Most land use changes will create patterns of moderate contrast on the landscape.

This map unit makes up about 1 percent of the county. It is about 45 percent Riedtown, 35 percent Ariel soils, and 20 percent minor soils.

The moderately well drained Riedtown soils are in slightly lower positions on broad flood plains. These soils formed in silty alluvium.

The well drained Ariel soils are on broad flood plains near streams. These soils formed in silty alluvium.

The minor soils are the moderately well drained Adler soils, well drained Morganfield soils, and the moderately well drained Oaklimeter soils, all on flood plains.

Riedtown and Ariel soils are well suited to crops and pasture. Wetness and occasional flooding are the main limitations for farming. A good drainage system is needed. Some areas have artificial drainage.

Riedtown and Ariel soils are well suited to woodland.

These soils have severe limitations for urban uses because of seasonal flooding and wetness.

The potential of these soils for use as habitat for openland and woodland wildlife is good. The potential for use as habitat for wetland wildlife on Riedtown soils is poor, and on Ariel soils, it is very poor.

4. Columbus-Daleville

Nearly level, moderately well drained and poorly drained loamy soils; on stream terraces and flood plains

The landscape of this unit is characterized by flood plains and low terraces of the Pearl River, upstream from the Ross Barnett Reservoir. This unit is in the southeastern part of the county. Slopes range from 0 to 2 percent. The landscape is marked by narrow drainageways and depressional areas. Numerous old river runs and oxbow lakes are within the flood plains. The soils of this unit are entirely in forest and have bottom land hardwoods on the flood plains and hardwood and pine trees on terraces. These soils are frequently flooded. Based on the pattern of these landscape elements, visual diversity is low. Most land use changes will create patterns of high contrast on the landscape.

This map unit makes up about 2 percent of the county. It is about 55 percent Columbus soils, 30 percent Daleville soils, and 15 percent minor soils.

The moderately well drained Columbus soils are on low stream terraces and flood plains. These soils formed in loamy sediment.

The poorly drained Daleville soils are on low areas of stream terraces and flood plains. These soils formed in loamy sediment.

The minor soils are the somewhat poorly drained Bude soils on uplands and stream terraces, the well drained Lexington soils and the moderately well drained Providence soils on uplands, and a well drained soil that has a coarse-loamy subsoil on stream terraces.

Columbus and Daleville soils are poorly suited to row crops commonly grown in the county and are moderately suited to grasses and legumes for hay or pasture. Flooding and wetness are the main limitations for farming and for most other uses.

Columbus and Daleville soils are well suited to woodland.

These soils have severe limitations for urban uses because of wetness and flooding.

Potential for use of Columbus soils as habitat for openland wildlife is good, but it is fair on Daleville soils. These soils have good potential for use as habitat for woodland wildlife. The potential for use of Daleville soils as habitat for wetland wildlife is good, but it is very poor on Columbus soils.

5. Cascilla-Calhoun

Nearly level, well drained and poorly drained silty soils; on flood plains and stream terraces

The landscape of this unit is characterized by low relief. It has broad, nearly level flood plains and low terraces. This unit includes the narrow sloughs and old channels of the Pearl River. Slopes range from 0 to 2 percent. The soils of this unit are entirely in forest that is mixed hardwoods and pine. Structures are few. The soils are subject to flooding several times during the year. Based on the pattern of these landscape elements, visual diversity is low. Most land use changes will create patterns of high contrast on the landscape.

This map unit makes up about 0.4 percent of the county. It is about 60 percent Cascilla soils, 25 percent Calhoun soils, and 15 percent minor soils.

The well drained Cascilla soils are on broad flood plains and natural levees of major streams. These soils formed in silty alluvium.

The poorly drained Calhoun soils are on nearly level wet areas and in depressions on stream terraces. These soils formed in silty material.

The minor soils are the well drained Lexington soils and a somewhat poorly drained soil that has a fine-silty subsoil on stream terraces.

Cascilla and Calhoun soils are poorly suited to row crops commonly grown in the county and are suited to grasses and legumes for hay or pasture. Flooding and wetness are the main limitations for farming and for most other uses.

Cascilla soils are well suited and Calhoun soils are moderately suited to woodland. The use of equipment is limited by wetness and flooding.

These soils have severe limitations for urban uses because of wetness and flooding.

Potential of Cascilla soils for use as habitat for openland wildlife is fair, but it is poor on Calhoun soils. For use as habitat for woodland wildlife, Cascilla soils have good potential and Calhoun soils have fair potential. The potential of Calhoun soils for use as habitat for wetland wildlife is good, but it is very poor on Cascilla soils.

Well drained to somewhat poorly drained silty and loamy soils; on uplands and stream terraces

The soils of the four general soil map units in this group are on nearly level to gently sloping ridges and sloping to steep side slopes. The major soils are the moderately well drained Byram soils that have a fragipan underlain with plastic clay that is at a depth between 4 and 6 feet. The somewhat poorly drained silty Calloway soils have a fragipan. The moderately well drained silty Grenada, Loring, and Providence soils have a fragipan. The silty Memphis soils and the loamy Smithdale soils are well drained. Slopes range from 0 to 30 percent. This group makes up about 71.2 percent of the county.

6. Loring-Grenada-Calloway

Nearly level to strongly sloping, moderately well drained and somewhat poorly drained silty soils that have a fragipan; on uplands and stream terraces

The landscape of this unit is characterized by varied relief. It has broad, nearly level and gently sloping ridgetops and sloping to strongly sloping side slopes that are dissected by short drainageways and by narrow flood plains. The unit is in the northwestern, central, southern, and western parts of the county. Slopes range from 0 to 12 percent. The soils are used primarily for crops and pasture; a small acreage is in woodland. Ponds are numerous. Based on the pattern of these landscape elements, visual diversity is moderate to high. Most land use changes will create patterns of low contrast on the landscape.

This map unit makes up about 32 percent of the county. It is about 66 percent Loring soils, 9 percent Grenada soils, 7 percent Calloway soils, and 18 percent minor soils.

Loring soils are on ridges and side slopes of uplands and stream terraces. These soils are moderately well drained and have a fragipan. They formed in silty material.

Grenada soils are on uplands and stream terraces. These soils are moderately well drained and have a fragipan. They formed in silty material.

Calloway soils are on stream terraces and uplands. These soils are somewhat poorly drained and have a fragipan. They formed in silty material.

The minor soils are the well drained Ariel and the moderately well drained Oaklimeter soils on flood plains, the poorly drained Calhoun soils in small depressions on the uplands, and the moderately well drained Providence soils on ridges and side slopes.

Most of the soils in this unit are used for crops or pasture. A small acreage is in woodland. Loring, Grenada, and Calloway soils on nearly level and gently sloping ridges are well suited to crops and pasture. On sloping hillsides, these soils are moderately suited to crops and pasture. The steepness of slopes and hazard of erosion are the main limitations for farming and other uses.

These soils are moderately suited to woodland.

Loring and Grenada soils have moderate limitations for urban uses because of wetness. Calloway soils have severe limitations for urban uses because of wetness.

These soils have severe limitations for local roads and streets because of low strength.

Potential of these soils for use as habitat for openland wildlife is good. The potential of the nearly level Calloway soils for use as habitat for wetland wildlife is fair, but it is very poor on Loring and Grenada soils on uplands.

7. Loring-Memphis

Gently sloping to moderately steep, moderately well drained silty soils that have a fragipan and well drained silty soils that do not have a fragipan; on uplands and stream terraces

The landscape of this unit is characterized by varied relief. It has moderately broad, gently sloping to sloping ridgetops and strongly sloping to moderately steep side slopes. The unit is in the southwestern part of the county. Slopes range from 2 to 17 percent. The landscape is dissected by short drainageways and by narrow flood plains along intermittent streams. The soil is used for crops or pasture where slopes are not too steep; areas with steeper slopes are in woodland. Structures are visually apparent. Based on the pattern of these landscape elements, visual diversity is moderate. Most land use changes will create patterns of moderately low contrast on the landscape.

This map unit makes up about 2 percent of the county. It is about 45 percent Loring soils, 30 percent Memphis soils, and 25 percent minor soils.

The moderately well drained Loring soils are on ridges and side slopes of uplands and stream terraces. These soils have a fragipan. They formed in silty material.

The well drained Memphis soils are on ridges and side slopes of uplands and stream terraces. These soils formed in silty material.

The minor soils are the Adler, Morganfield, and Riedtown soils on flood plains and the moderately well drained Grenada soils that have a fragipan on uplands and stream terraces.

Most of the acreage of this map unit is used for crops or pasture. Some acreage is in woodland. The Loring and Memphis soils that are nearly level or gently sloping are well suited to crops or pasture. Sloping areas of these soils are moderately suited. Erosion and steepness of slopes are the main limitations for row crops.

Loring and Memphis soils are moderately suited to woodland. Calloway soils are well suited to woodland.

The nearly level or gently sloping Loring soils have moderate limitations for urban uses because of wetness. The nearly level and gently sloping Memphis soils have slight limitations for urban uses. Both Loring and Memphis soils have severe limitations for local roads and streets because of low strength of the soils and the moderately steep slopes.

The potential of Loring and Memphis soils as habitat for openland wildlife is good except on steep slopes where it is poor. The potential as habitat for woodland wildlife is good, and it is very poor for wetland wildlife.

8. Byram-Loring

Gently sloping to strongly sloping, moderately well drained silty soils that have a fragipan; on uplands and stream terraces

The landscape of this unit is characterized by moderate relief. It has broad, gently sloping ridgetops and sloping side slopes. This unit is located in the southern and southeastern parts of the county. Slopes range from 2 to 12 percent. Narrow flood plains extend into this map unit. The soils are used mostly for crops or pasture; a small acreage is in woodland and urban use. Farm ponds and structures are numerous. Based on the pattern of these landscape elements, visual diversity is high. Most land use changes will create patterns of moderate contrast on the landscape.

This unit makes up about 8 percent of the county. It is about 45 percent Byram soils, 35 percent Loring soils, and 20 percent minor soils.

Byram soils are on upland ridges and side slopes. These soils are moderately well drained and have a fragipan. They formed in a mantle of silty material and underlying clayey deposits.

Loring soils are on ridges and side slopes of uplands and stream terraces. These soils are moderately well drained and have a fragipan. They formed in silty material.

The minor soils are the well drained Ariel soils and the moderately well drained Oaklimeter soils on flood plains and the moderately well drained Loring and Siwell soils on ridgetops and side slopes.

Most of the acreage of these soils is used for crops or pasture. A small acreage is in woodland or urban use. The nearly level or gently sloping Byram and Loring soils are well suited to crops and pasture; sloping areas of these soils are moderately suited. The steepness of slopes and hazard of erosion are the main limitations for farming.

Byram and Loring soils are moderately suited to use as woodland.

The nearly level and gently sloping Byram soils have moderate limitations for urban uses because of wetness and the high shrink-swell potential in the lower part of the subsoil. The nearly level and gently sloping Loring soils have moderate limitations for urban uses because of wetness. The low strength of Loring soils is a severe limitation for local roads and streets.

Potential of Byram and Loring soils for use as habitat for wetland wildlife is very poor. The potential as habitat for openland wildlife and for woodland wildlife is good.

9. Providence-Smithdale

Gently sloping to steep, moderately well drained silty soils that have a fragipan and well drained loamy soils *that do not have a fragipan; on upland ridges and side slopes*

The landscape of this unit is characterized by varied relief. It has gently sloping to sloping ridgetops and strongly sloping to steep side slopes. The unit is in the eastern and southwestern parts of the county. Slopes range mainly from 2 to 30 percent. Slopes are dissected by drainageways and narrow flood plains along intermittent streams. The soils are used for crops, pasture, or as woodland. Structures and farm ponds are numerous. Based on the pattern of the landscape elements, visual diversity is moderate to high. Most land use changes will create patterns of low contrast on the landscape.

This map unit makes up about 29 percent of the county. It is about 60 percent Providence soils, 10 percent Smithdale soils, and 30 percent minor soils.

Providence soils are on ridges and side slopes of uplands and stream terraces. These soils are moderately well drained and have a fragipan. They formed in a mantle of silty material and underlying loamy material.

Smithdale soils are well drained and are on hilly uplands. These soils formed in loamy material.

The minor soils are the well drained Ariel soils, the moderately well drained Oaklimeter soils, and the somewhat poorly drained Gillsburg soils on flood plains; the poorly drained Calhoun soils on low uplands and stream terraces; the moderately well drained Loring soils on uplands and stream terraces; and the moderately well drained Tippah soils on uplands.

About half of the acreage of these soils is used for crops or pasture; the rest is in woodland. The gently sloping Providence soils are well suited to crops and pasture. Erosion is a limitation if these soils are used for row crops. Smithdale soils are poorly suited to row crops commonly grown in the county because of steep slopes and the hazard of erosion. Steep areas are poorly suited to grasses and legumes. The soils of this unit are suited to woodland. Limitations to woodland management are slight.

Providence soils on gently sloping ridges have moderate limitations for urban uses because of wetness. Low strength of Providence soils is a severe limitation for streets and roads. Smithdale soils have severe limitations for urban uses because of steep slopes.

Potential of these soils for use as habitat for wetland wildlife is very poor. The potential for use as habitat for openland wildlife is good on these soils, but it is only fair where slopes are more than 17 percent. Potential is good for use as habitat for woodland wildlife.

Well drained and moderately well drained silty and loamy soils; on uplands

The soils of the two general soil map units in this group are on gently sloping to sloping ridges and strongly sloping to steep side slopes. The major soils are the silty, moderately well drained Loring and Providence soils that have a fragipan; the silty, well drained Memphis soils; and the loamy, well drained Smithdale soils. The landscape is dominantly hilly. Slopes range from 2 to 30 percent. This group makes up about 11 percent of the county.

10. Smithdale-Providence

Gently sloping to steep, well drained loamy soils that do not have a fragipan and moderately well drained silty soils that have a fragipan; on upland ridgetops and side slopes

The landscape is characterized by prominent relief. It has dissected uplands that have narrow, gently sloping to sloping ridgetops separated by strongly sloping to steep hillsides. This unit is in the northeastern part of the county. Slopes range from 2 to 30 percent. The drainage system has branched, well defined intermittent streams winding through narrow flood plains. Most of the acreage of these soils is in woodland that is a mixture of hardwood and pine. A few acres on flood plains are used for crops or pasture. Structures are numerous. Based on the pattern of these landscape elements, visual diversity is moderate to low. Most land use changes will create patterns of high contrast on the landscape.

This map unit makes up about 8 percent of the county. It is about 32 percent Smithdale soils, 30 percent Providence soils, and 38 percent minor soils.

The well drained Smithdale soils are on hilly uplands. These soils formed in loamy material.

The moderately well drained Providence soils are on ridges and side slopes of uplands and stream terraces. These soils have a fragipan. They formed in a mantle of silty material and underlying loamy material.

The minor soils are the well drained Ariel soils, the somewhat poorly drained Gillsburg soils, and the moderately well drained Oaklimeter soils; all are on flood plains.

The Smithdale soils are poorly suited to row crops and grasses and legumes. Steep slopes and the erosion hazard are the main limitations to farming and most other uses. This unit is moderately suited to woodland. Limitations to woodland management are slight.

Smithdale soils have severe limitations for urban uses because of steep slopes. The low strength of Providence soils on ridgetops is a severe limitation to local streets and roads.

Potential of these soils for use as habitat for wetland wildlife is very poor. The potential for use as habitat for openland and woodland wildlife is good. Where slopes are more than 17 percent, potential for openland wildlife is only fair.

11. Memphis-Loring

Sloping to steep, well drained silty soils that do not have a fragipan and moderately well drained silty soils that *have a fragipan; on uplands and stream terraces*

The landscape of this unit is characterized by prominent relief. It has narrow winding, sloping ridgetops and strongly sloping to steep hillsides. This unit is in the extreme western part of the county. Slopes range from 5 to 40 percent. Many short drainageways are notched into the hillsides. Intermittent creeks flow in winding courses through narrow flood plains. Land use is primarily woodland in which hardwoods are predominant. A few acres on flood plains and on ridgetops are used for pasture or crops. Structures are few. Based on the pattern of these landscape elements, visual diversity is moderate to low. Most land use changes will create patterns of high contrast on the landscape.

This map unit makes up about 3 percent of the county. It is about 65 percent Memphis soils, 25 percent Loring soils, and 10 percent minor soils.

The well drained Memphis soils are on ridges and side slopes of uplands and stream terraces. These soils formed in silty material.

The moderately well drained Loring soils are on ridges and side slopes of uplands and stream terraces. These soils have a fragipan. They formed in silty material.

The minor soils are the moderately well drained Adler and Riedtown soils and the well drained Morganfield soils; all are on flood plains.

Most of the acreage of these soils is in woodland. A small acreage is used for crops or pasture where slopes are favorable. Steep slopes and the severe hazard of erosion are the main limitations to farming and most other uses. Memphis soils are well suited and Loring soils are moderately suited to woodland. Limitations to woodland management are slight.

Memphis soils on sloping ridges have slight to moderate limitations for urban uses but have severe limitations on steep slopes. Loring soils have moderate limitations for urban uses mainly because of wetness. Low strength of Loring soils is a severe limitation to streets and roads.

Potential of these soils for use as habitat for wetland wildlife is very poor. The potential for use as habitat for openland and woodland wildlife is good on Loring and Memphis soils, but the potential for openland wildlife is poor on steep slopes of more than 17 percent.

Detailed soil map units

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

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

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

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

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Loring silt loam, 0 to 2 percent slopes, is one of several phases in the Loring series.

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

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. An example is Providence-Lexington complex, 8 to 12 percent slopes, eroded.

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

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

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Descriptions of the detailed soil map units follow.

Ad—Adler silt loam. This is a nearly level, moderately well drained soil that formed in silty alluvium on flood plains. This soil is subject to occasional flooding for brief periods late in winter and early in spring. Slopes range from 0 to 2 percent.

Typically, the surface layer is brown silt loam about 6 inches thick. The underlying material to a depth of 60 inches is silt loam. To about 15 inches, it is yellowish brown; to 28 inches, it is yellowish brown mottled in shades of brown and gray; to 34 inches, it is grayish brown that has yellowish brown mottles; and below that layer the underlying material is mottled in shades of gray and brown.

This soil ranges from medium acid to neutral throughout except where the surface has been limed. Permeability is moderate. Available water capacity is high. Runoff is slow, and erosion is a slight hazard. The high water table is 2 to 3 feet below the surface in winter and early in spring. The root zone is deep and easily penetrated by plant roots. The surface layer is easy to keep in good tilth, but it tends to crust. A plowpan will form if the soil is tilled when it is wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Morganfield and Riedtown soils that are in slightly higher positions of the flood plain than this Adler soil.

Most areas of this Adler soil are used for crops or pasture; a small acreage is in woodland. This soil is well suited to row crops (fig. 2), small grains, and truck crops. Seasonal wetness and flooding are the main limitations. Flooding seldom occurs during the growing season.

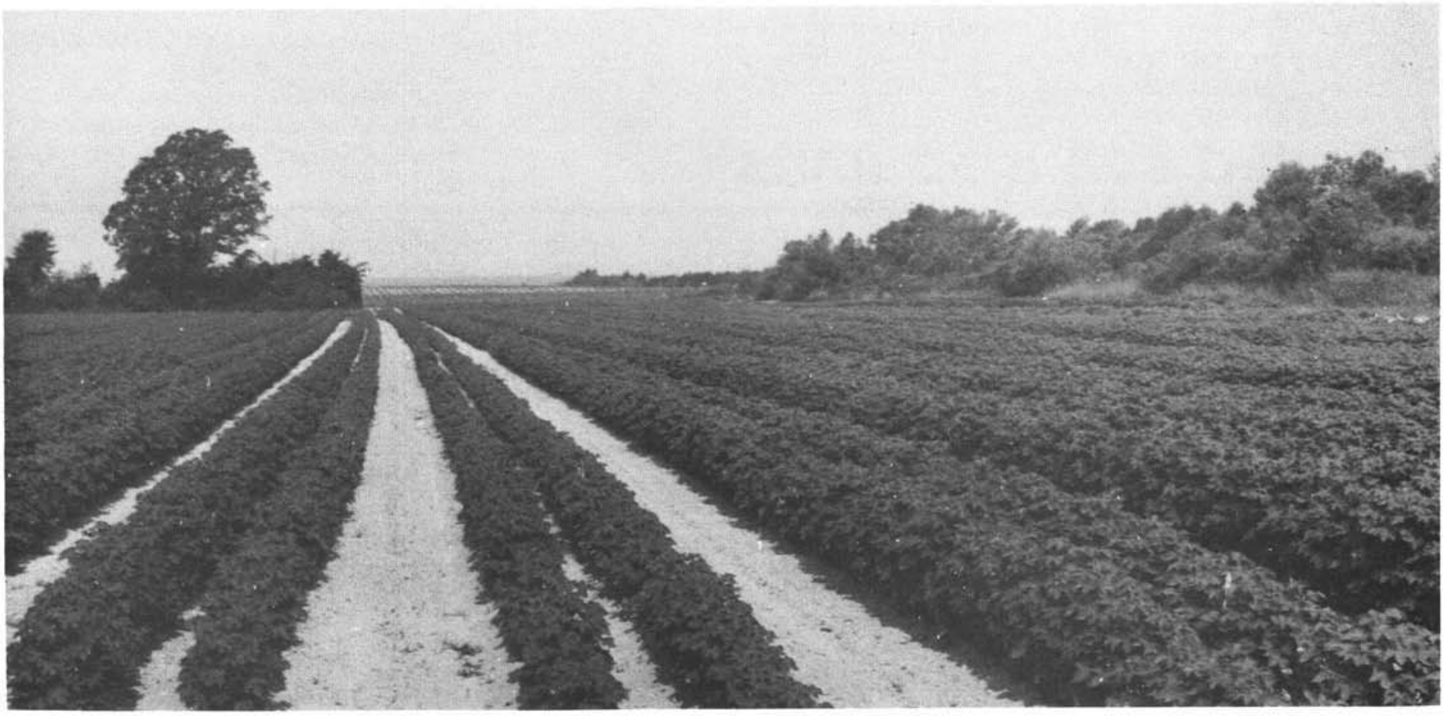

Figure 2.—Skip row cotton on Adler silt loam.

Plant rows should be arranged and surface field ditches constructed to remove excess surface water. Returning crop residue to the soil helps maintain fertility and tilth and reduces crusting and packing. Preparing the seedbed and cultivating are sometimes delayed in the spring because of wetness and flooding.

This soil is well suited to grasses and legumes for pasture or hay. Livestock overgrazing or grazing when the soil is too wet will cause compaction, slow infiltration, and poor tilth. Proper stocking, pasture rotation, weed and brush control, and restricted use during wet periods help to maintain the pasture and keep the soil in good condition.

This soil is well suited to eastern cottonwood, willow oak, water oak, green ash, sweetgum, yellow-poplar, and American sycamore. Plant competition is a moderate limitation; other limitations are slight.

This soil has severe limitations for urban uses, mainly flooding and seasonal wetness. Flooding and wetness are severe limitations for use of this soil as septic tank absorption fields.

This Adler soil is in capability subclass IIw and in woodland suitability group 1o4.

Ar—Ariel silt loam. This is a nearly level, well drained soil that formed in silty alluvium on broad flood plains. This soil is subject to occasional flooding for brief periods late in winter and early in spring. Slopes range from 0 to 2 percent.

Typically, the surface layer is dark brown silt loam about 6 inches thick. The subsoil extends to a depth of 72 inches or more. To about 25 inches, it is silt loam that is dark yellowish brown in the upper part and dark brown in the lower part; to about 32 inches, it is silt loam mottled in shades of brown and gray; to about 52 inches, it is dark yellowish brown silt loam that has gray mottles; and to a depth of 72 inches, it is silt loam mottled in shades of brown and gray.

This soil is very strongly acid or strongly acid throughout except where the surface has been limed. Permeability is moderately slow. Available water capacity is high. Runoff is slow, and erosion is a slight hazard. The high water table is 2 to 3 feet below the surface in winter and early in spring. The root zone is deep and easily penetrated by plant roots. The surface layer is easy to keep in good tilth, but it tends to crust. A plowpan will form if the soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Oaklimeter and Gillsburg soils in slightly higher positions on flood plains than this Ariel soil.

Most areas of this Ariel soil are used for crops or pasture; a small acreage is in woodland. This soil is well suited to row crops, small grains, and truck crops.

Seasonal wetness and flooding are limitations. Flooding seldom occurs during the growing season. Plant rows should be arranged and surface field ditches constructed to remove excess surface water. Returning crop residue to the soil helps maintain fertility and tilth and reduces crusting and packing. Preparing the seedbed and cultivating are sometimes delayed in the spring because of wetness and flooding.

This soil is well suited to grasses and legumes for pasture or hay. Livestock overgrazing or grazing when the soil is too wet will cause compaction, slow infiltration, and poor tilth. Proper stocking, pasture rotation, weed and brush control, and restricted use during wet periods help to maintain the pasture and soil in good condition.

This soil is well suited to cherrybark oak, eastern cottonwood, water oak, yellow-poplar, sweetgum, and loblolly pine. Plant competition is a moderate limitation; other limitations are slight.

This soil has severe limitations for urban uses, mainly flooding and seasonal wetness. Flooding, wetness, and the moderately slow permeability of the lower part of the subsoil are severe limitations for use of this soil as septic tank absorption fields.

This Ariel soil is in capability subclass IIw and in woodland suitability group 1o7.

Bb—Bonn silt loam. This is a nearly level, poorly drained soil that is high in exchangeable sodium. The soil formed in silty material. It is on broad, low terraces and in small depressions and on flood plains. This soil is subject to occasional flooding for brief periods late in winter and early in spring. Slopes range from 0 to 1 percent.

Typically, the surface layer is gray silt loam about 4 inches thick. The subsurface layer to a depth of about 23 inches is light gray silt loam mottled in shades of brown in the upper part and is gray mottled in shades of brown in the lower part. The subsoil extends to a depth of 55 inches or more. To about 38 inches, it is light brownish gray silty clay loam mottled in shades of brown; to about 46 inches, it is grayish brown silty clay loam mottled in shades of brown; and to about 55 inches, it is yellowish brown silt loam mottled in shades of gray. The underlying material to a depth of 72 inches is light brownish gray silt loam mottled in shades of brown.

The surface layer ranges from very strongly acid to medium acid except where the surface has been limed. The lower part of the subsoil ranges from very strongly acid to neutral, and the underlying material ranges from neutral to strongly alkaline. Permeability is slow. Available water capacity is low to moderate. Runoff is slow, and ponding is common in low places. Erosion is a slight hazard. A high water table is at a depth of 2 feet or less in wet seasons, and the upper part of the subsoil is waterlogged and poorly aerated for long periods. The slowly permeable subsoil restricts roots and limits the amount of water available to plants.

Included in mapping are small areas of Calloway soils in slightly higher positions on terraces or uplands than this Bonn soil.

Most areas of this soil are used as woodland. The soil is poorly suited to row crops, small grains, and truck crops because of low productivity. Wetness, the high sodium content, flooding, and ponding are severe limitations.

This soil is poorly suited to pasture or hay; however, grasses and legumes will grow. Wetness limits the choice of plants and the period of cutting or grazing.

This soil is poorly suited to most trees for commercial production. Low productivity, equipment use limitations caused by seasonal wetness, and seedling mortality are severe limitations to management of woodland.

This soil has severe limitations for urban use and for use as septic tank absorption fields, mainly because of flooding and wetness.

This Bonn soil is in capability subclass IVs and in woodland suitability group 5t0.

Bc—Bruno-Ariel complex. This complex consists of small nearly level areas of Bruno and Ariel soils on flood plains that are so intermingled that mapping them separately was not practical. The excessively drained Bruno soil formed in sandy alluvium. The well drained Ariel soil formed in silty alluvium. The Bruno soil is on natural levees, and the Ariel soil is in lower positions behind the levees. Individual areas range from about 20 to 130 acres. This unit is subject to occasional flooding for brief periods from late in winter through early in spring before crops are planted. In some years, flooding causes crops to be damaged. Slopes range from 0 to 2 percent.

Bruno soil makes up about 65 percent of each map unit. Typically, the surface layer is brown sandy loam about 5 inches thick. The layer below that to a depth of about 10 inches is pale brown sandy loam. The layer below that to a depth of about 40 inches is stratified brown and dark yellowish brown loamy sand, loam, and sand. The layer below that to a depth of 65 inches is silt loam mottled in shades of gray and brown.

Bruno soil ranges from strongly acid to mildly alkaline throughout. Permeability is rapid. Available water capacity is low. Runoff is slow, and erosion is a slight hazard. The high water table is 4 to 6 feet below the surface in winter and early in spring. These soils have a deep rooting zone. The soils have good tilth and are easily tilled within a wide range of moisture content.

Ariel soil makes up about 30 percent of each map unit. Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches or more. To a depth of about 24 inches, it is yellowish brown silt loam; to 29 inches, it is silt loam mottled in shades of brown; to about 48 inches, it is dark brown and yellowish brown silt loam mottled in shades of gray;

and below that, it is gray silt loam mottled in shades of brown.

Ariel soil is very strongly acid or strongly acid throughout except where the surface has been limed. Permeability is moderately slow. Available water capacity is high. Runoff is slow, and erosion is a slight hazard. The high water table is 2 to 3 feet below the surface during winter and early in spring. The rooting zone is deep and easily penetrated by plant roots. The surface layer is easy to keep in good tilth but tends to crust. A plowpan will form if the soil is tilled when wet. Chiseling or subsoiling can break up plowpans.

Other soils included in mapping are small areas of Oaklimeter soils in lower positions on the flood plain. These make up about 5 percent of the map unit.

About half of the acreage in this complex is used for crops and pasture, and the remainder is in woodland. Bruno soil is moderately suited to row crops, small grains, and truck crops; but it is droughty during dry summer months causing plants to undergo moisture stress. Ariel soil is well suited to these crops. However, flooding and seasonal wetness are limitations. Flooding seldom occurs during the growing season. Plant rows should be arranged and surface field ditches constructed to remove excess surface water. Returning crop residue to the soil helps maintain fertility and tilth and reduces crusting and packing.

The soils in this complex are suited to grasses and legumes for hay or pasture. Proper stocking, controlled grazing, and weed and brush control help maintain tilth and reduce compaction.

The Bruno soil of this complex is well suited to river birch, sweetgum, and yellow-poplar as well as chestnut, cherrybark, willow, Shumard, and water oaks. Bruno soil has moderate equipment use limitations, moderate seedling mortality, and moderate plant competition. Ariel soil is well suited to cherrybark oak, water oak, eastern cottonwood, loblolly pine, sweetgum, and yellow-poplar. Plant competition is a moderate limitation; other limitations are slight.

Flooding and wetness are severe limitations for urban uses. Flooding is a severe limitation for use of this soil as septic tank absorption fields.

Bruno soil is in capability subclass IIIs and in woodland suitability group 2s5. Ariel soil is in capability subclass IIw and in woodland suitability group 1o7.

BdA—Bude silt loam, 0 to 2 percent slopes. This is a nearly level, somewhat poorly drained soil that has a fragipan. This soil formed in a mantle of silty material and underlying loamy material on uplands and stream terraces. Slopes range from 0 to 2 percent.

Typically, the surface layer is dark brown silt loam about 7 inches thick. The subsoil extends to a depth of 62 inches or more. To a depth of about 23 inches, it is yellowish brown silt loam mottled in shades of brown. Below that layer is a fragipan. To a depth of 27 inches, it is silt loam mottled in shades of brown and gray; to 36 inches, it is light brownish gray silty clay loam mottled in shades of brown; and the lower part of the fragipan is silt loam mottled in shades of brown, gray, and yellow.

This soil ranges from very strongly acid to medium acid throughout except where the surface has been limed. Permeability is moderate in the upper part of the subsoil and slow in the fragipan. Available water capacity is moderate. Runoff is slow, and erosion is a slight hazard. The water table is perched above the fragipan within 1/2 foot to 1 1/2 feet of the surface in wet seasons. The fragipan restricts plant roots and limits the amount of water available to plants. The surface layer has good tilth and is easily tilled within a wide range of moisture content. The surface has a tendency to crust and pack after hard rains. A plowpan forms if the soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Providence soils on slightly higher areas of uplands and terraces. Also included are small areas of Daleville soils in depressions of terraces and flood plains.

Most areas of this Bude soil are used for crops or pasture. A small acreage is in woodland. This soil is well suited to row crops, truck crops, and small grains. Plant row arrangement, grassed waterways, and surface field ditches are needed to remove excess surface water. Returning crop residue to the soil helps maintain fertility and tilth and reduces crusting and packing.

This soil is well suited to grasses and legumes for pasture or hay. Livestock overgrazing or grazing when the soil is too wet will cause surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help to keep the pasture and soil in good condition.

This soil is well suited to cherrybark oak, Shumard oak, loblolly pine, yellow-poplar, and sweetgum. Limitations for the use of equipment and plant competition are moderate; other limitations are slight.

This soil has severe limitations for urban use. Low strength for streets and roads and seasonal wetness are the major limitations. Proper design and careful installation will help offset these limitations. Wetness and the slow permeability in the fragipan are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Bude soil is in capability subclass IIw and in woodland suitability group 2w8.

BrB2—Byram silt loam, 2 to 5 percent slopes, eroded. This is a gently sloping, moderately well drained soil that has a fragipan. The soil formed in a mantle of silty material and underlying clayey deposits on uplands.

Typically, the surface layer is brown silt loam about 5 inches thick. The subsoil extends to a depth of 56 inches or more. To a depth of about 20 inches, it is strong brown and yellowish brown silty clay loam. Below that layer to a depth of 44 inches is a fragipan that is yellowish brown silt loam mottled in shades of gray and brown. Below the fragipan to a depth of about 56 inches is yellowish brown silty clay loam that has gray mottles. The underlying material to a depth of 72 inches is light olive brown silty clay that has gray mottles.

In most areas of this eroded soil, part of the original surface layer has been removed by erosion, and tillage has mixed the remaining topsoil and subsoil. In some small areas, all of the plow layer is the original topsoil, and in other areas, the plow layer is mainly subsoil material. Some areas of this soil have a few rills and shallow gullies.

The surface layer and upper part of the subsoil range from very strongly acid to medium acid except where the surface has been limed. The lower part of the subsoil ranges from medium acid to neutral, and the underlying material ranges from slightly acid to moderately alkaline. Permeability is moderate above the fragipan, moderately slow through the fragipan, and very slow through the underlying clayey material. Available water capacity is moderate. Runoff is medium. Erosion is a moderate hazard. A water table is perched above the fragipan within 1 1/2 to 2 1/2 feet of the surface in wet seasons. The fragipan restricts the roots and limits the amount of water available to plants. This soil has good tilth and can be tilled within a wide range of moisture conditions, but the surface tends to crust and pack after hard rains. A plowpan forms if the soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Loring and Siwell soils in positions similar to those of this Byram soil.

Most areas of this Byram soil are used for pasture or crops; a small acreage is in woodland. This soil is well suited to row crops, truck crops, and small grains. Conservation tillage, contour farming, terraces, and grassed waterways slow runoff and help control erosion. Returning crop residue to the soil helps maintain fertility and tilth and reduces crusting and packing.

This soil is well suited to grasses and legumes for pasture or hay; the plant cover helps slow runoff and control erosion. Livestock overgrazing or grazing when the soil is too wet will cause surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help to keep the pasture and soil in good condition.

This soil is moderately suited to cherrybark oak, loblolly pine, white oak, southern red oak, and sweetgum. Plant competition is a moderate limitation; other limitations are slight.

This soil has moderate limitations for urban use. Low strength for streets and roads and seasonal wetness are the major limitations. Soils with slopes greater than 4 percent have moderate limitations for use as sites for small commercial buildings. The subsoil and underlying clayey material shrinks and swells with changes in moisture content. Proper design and careful installation will help offset these limitations. Wetness and the moderately slow permeability in the fragipan are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Byram soil is in capability subclass IIe and in woodland suitability group 3o7.

BrC2—Byram silt loam, 5 to 8 percent slopes, eroded. This is a sloping, moderately well drained soil that has a fragipan. The soil formed in a mantle of silty material and underlying clayey deposits on uplands.

Typically, the surface layer is dark grayish brown silt loam about 4 inches thick. The subsoil extends to a depth of 52 inches or more. To a depth of about 19 inches, it is silt loam that grades from strong brown in the upper part to yellowish brown below. To a depth of 44 inches, it is a fragipan of silt loam that is dark yellowish brown and yellowish brown mottled in shades of gray and brown. Below the fragipan to about 52 inches, the subsoil is yellowish brown silt loam mottled in shades of brown and gray. The underlying material to a depth of 70 inches is olive clay mottled in shades of brown and gray.

In most areas of this eroded soil, part of the original surface layer has been removed by erosion, and tillage has mixed the remaining topsoil and subsoil. In some small areas, all of the plow layer is the original topsoil, and in other areas, the plow layer is mainly subsoil material. Some areas of this soil have a few rills and shallow gullies.

The surface layer and upper part of the subsoil range from very strongly acid to medium acid except where the surface has been limed. The lower part of the subsoil ranges from medium acid to neutral, and the underlying material ranges from slightly acid to moderately alkaline. Permeability is moderate above the fragipan, moderately slow through the fragipan, and very slow through the underlying clayey material. Available water capacity is moderate. Runoff is medium. Erosion is a moderate hazard. A high water table is perched above the fragipan within 1 1/2 to 2 1/2 feet of the surface in wet seasons. The fragipan restricts the roots and limits the amount of water available to plants. This soil has good tilth and can be tilled within a wide range of moisture conditions, but it tends to crust and pack after hard rains. A plowpan forms if the soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Loring and Siwell soils on ridges and side slopes of terraces and uplands. Also included are a few small areas of eroded Tippah soils on uplands.

Most areas of this Byram soil are used for pasture or crops except for the remaining acreage that is in woodland. This soil is moderately suited to row crops, truck crops, and small grains. The hazard of erosion and runoff increase if row crops are grown. Conservation tillage, contour farming, terraces, grassed waterways, and cropping systems that include grasses and legumes help slow runoff and control erosion. Returning crop residue to the soil helps maintain fertility and tilth and reduces crusting and packing.

This soil is moderately suited to grasses and legumes for pasture or hay; the plant cover helps slow runoff and control erosion. Livestock overgrazing or grazing when the soil is too wet will cause surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help to keep the pasture and soil in good condition. Smoothing and shaping of gullies are needed in a few places.

This soil is moderately suited to cherrybark oak, southern red oak, loblolly pine, shortleaf pine, sweetgum, and white oak. Plant competition is a moderate limitation; other limitations are slight.

This soil has moderate limitations for urban use. Low strength for streets and roads, seasonal wetness, and steepness of slopes for small commercial buildings are the major limitations. Also, the subsoil and underlying clayey material shrinks and swells with changes in moisture content. Proper design and careful installation will help offset these limitations. Wetness and the moderately slow permeability in the fragipan are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Byram soil is in capability subclass IIIe and in woodland suitability group 3o7.

BrC3—Byram silt loam, 5 to 8 percent slopes, severely eroded. This is a sloping, moderately well drained soil that has a fragipan. This soil formed in a mantle of silty material and underlying clayey deposits.

Typically, the surface layer is brown silt loam about 3 inches thick. The subsoil extends to a depth of about 56 inches. The upper part to a depth of about 18 inches is strong brown silty clay loam and yellowish brown silt loam; to about 21 inches, it is yellowish brown silt loam that has grayish and yellowish mottles. The lower part to a depth of about 56 inches is a fragipan of yellowish brown silt loam that is mottled in shades of brown and gray. The underlying material to about 62 inches is yellowish brown silty clay loam. To a depth of 70 inches, it is olive clay mottled in shades of brown, red, and gray.

In most areas of this severely eroded soil, the original surface layer has been lost through erosion, and the plow layer is subsoil material. In some small areas, the surface layer is a mixture of topsoil and subsoil. Rills and shallow gullies are common, and in a few places, deep gullies that are not crossable with farm machinery have formed.

The surface layer and upper part of the subsoil range from very strongly acid to medium acid except where the surface has been limed. The lower part of the subsoil ranges from medium acid to neutral, and the underlying material ranges from slightly acid to moderately alkaline. Permeability is moderate above the fragipan, moderately slow through the fragipan, and very slow through the underlying clayey material. Available water capacity is moderate. Runoff is medium to rapid. Erosion is a severe hazard. A high water table is perched above the fragipan within 1 1/2 to 2 1/2 feet of the surface in wet seasons. The fragipan restricts the roots and limits the amount of water available to plants.

Included in mapping are small areas of Loring and Siwell soils in positions similar to those of the Byram soil.

Most areas of this Byram soil are used for pasture or crops. A small acreage is in woodland. This soil is poorly suited to row crops, truck crops, and small grains because of the hazard of erosion. Further loss by erosion is probable if cultivated crops are grown. These soils are better suited to a permanent vegetative cover of grasses and legumes or to use as woodland.

This soil is moderately suited to grasses and legumes for pasture or hay; the plant cover helps slow runoff and control erosion. Smoothing and shaping of gullies are needed. Livestock overgrazing or grazing when the soil is too wet will cause surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help to keep the pasture and soil in good condition.

This soil is moderately suited to cherrybark oak, southern red oak, loblolly pine, shortleaf pine, sweetgum, and white oak. Plant competition is a moderate limitation; other limitations are slight.

This soil has moderate limitations for urban use. Low strength of the soil for streets and roads, steepness of slopes for small commercial buildings, and seasonal wetness are the major limitations. Also, the subsoil and underlying clayey material shrinks and swells with changes in moisture content. Proper design and careful installation will help offset these limitations. Wetness and the moderately slow permeability in the fragipan are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Byram soil is in capability subclass IVe and in woodland suitability group 3o7.

BrD3—Byram silt loam, 8 to 12 percent slopes, severely eroded. This is a strongly sloping, moderately well drained soil that has a fragipan. This soil formed in a mantle of silty material and the underlying clayey deposits on uplands.

Typically, the surface layer is dark brown silt loam about 3 inches thick. The subsoil extends to a depth of about 50 inches or more. The upper part to a depth of about 18 inches is dark brown silty clay loam. To about

32 inches, it is a silt loam fragipan that is strong brown mottled in shades of gray and brown; the lower part, to about 50 inches, is a silt loam fragipan that is yellowish brown mottled in shades of gray. The underlying material to a depth of 60 inches is yellowish brown sticky and plastic clay.

In most areas of this severely eroded soil, the original surface layer has been lost through erosion, and the plow layer is subsoil material. In some small areas, the surface layer is a mixture of topsoil and subsoil. Rills and shallow gullies are common, and in a few areas, deep gullies have formed that are not crossable with farm machinery.

The surface layer and upper part of the subsoil range from very strongly acid to medium acid except where the surface has been limed. The lower part of the subsoil ranges from medium acid to neutral, and the underlying material ranges from slightly acid to moderately alkaline. Permeability is moderate above the fragipan, moderately slow through the fragipan, and very slow through the underlying clayey material. Available water capacity is moderate. Runoff is rapid. Erosion is a severe hazard. A high water table is perched above the fragipan within 1 1/2 to 2 1/2 feet of the surface in wet seasons. The fragipan restricts the roots and limits the amount of water available to plants.

Included in mapping are small areas of Loring and Siwell soils in the same landscape. Also, included are small areas of Byram soils that are not severely eroded.

Most areas of this Byram soil are used for pasture. A small acreage is in woodland. This soil is poorly suited to row crops, truck crops, and small grains because of the hazard of erosion. Further loss by erosion is probable if cultivated crops are grown. These soils are better suited to a permanent vegetative cover of grasses and legumes or trees.

This soil is moderately suited to grasses and legumes for pasture or hay; the plant cover helps slow runoff and control erosion. Smoothing and shaping of gullies are needed. Livestock overgrazing or grazing when the soil is too wet will cause surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help to keep the pasture and soil in good condition.

This soil is moderately suited to cherrybark oak, southern red oak, loblolly pine, shortleaf pine, sweetgum, and white oak. Plant competition is a moderate limitation; other limitations are slight.

This soil has moderate limitations for most urban uses. Low strength of the soil for streets and roads and seasonal wetness are the major limitations. Also, the subsoil and underlying clayey material shrinks and swells with changes in moisture content. Small commercial buildings have severe limitations because of steepness of slopes. Proper design and careful installation will help offset these limitations. Wetness and the moderately slow permeability in the fragipan are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Byram soil is in capability subclass VIe and in woodland suitability group 3o7.

Ca—Calhoun silt loam. This is a nearly level, poorly drained soil that formed in silty material. This soil is on broad upland flats, in small depressions on uplands, and on stream terraces. Slopes range from 0 to 1 percent.

Typically, the surface layer is grayish brown silt loam about 7 inches thick. The subsurface layer to a depth of about 23 inches is gray silt loam mottled in shades of brown. The subsoil extends to a depth of 52 inches. The upper part is gray silty clay loam mottled in shades of brown to about 34 inches; it is light brownish gray silty clay loam mottled in shades of brown to about 44 inches; and the lower part is gray silty clay loam mottled in shades of brown. The underlying material to a depth of about 65 inches is grayish brown silt loam mottled in shades of brown.

The surface layer ranges from very strongly acid to medium acid except where the surface has been limed. The upper part of the subsoil is very strongly acid or strongly acid. The lower part of the subsoil and the underlying material range from very strongly acid to mildly alkaline. Permeability is slow. Available water capacity is high. Runoff is slow, and some areas are ponded in wet seasons. Erosion is a slight hazard. A high water table is about 2 feet below the surface in wet seasons; the subsoil is waterlogged and poorly aerated for long periods. Roots are restricted by the slowly permeable subsoil.

If artificially drained, this soil has good tilth and can be worked within a wide range of moisture conditions, but it tends to crust and pack after hard rains. A plowpan forms easily if the soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Calloway soils on slightly higher elevations.

Most areas of this Calhoun soil are used for crops or pasture. A small acreage is in woodland. If artificially drained, this soil is moderately suited to row crops, truck crops, and small grains. Plant row arrangement, grassed waterways, diversions, and surface field ditches are needed to remove excess surface water. Returning crop residue to the soil helps maintain fertility and tilth and reduces crusting and packing.

This soil is moderately suited to grasses and legumes for pasture or hay. Livestock overgrazing or grazing when the soil is too wet will cause surface compaction and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help to keep the pasture and soil in good condition.

This soil is moderately suited to shortleaf pine, loblolly pine, slash pine, and sweetgum. Equipment use limitations are severe, and seedling mortality is moderate; other limitations are slight.

This soil has severe limitations for urban uses. Low strength of the soil for streets and roads and seasonal wetness are the major limitations. The slow permeability in the subsoil and wetness are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by installing a mound system absorption field.

This Calhoun soil is in capability subclass IIIw and in woodland suitability group 3w9.

CbA—Calloway silt loam, 0 to 1 percent slopes. This is a somewhat poorly drained, nearly level soil that has a fragipan. This soil formed in silty material on broad ridgetops on uplands and terraces along major streams.

Typically, the surface layer below a 1-inch thick layer of partly decomposed leaves and twigs is dark grayish brown silt loam about 1 inch thick. The subsurface layer is grayish brown silt loam that has pockets of yellowish brown to about 6 inches. The subsoil extends to a depth of 60 inches or more. The upper part to a depth of about 19 inches is yellowish brown silt loam that has light gray mottles; to about 30 inches, it is light brownish gray silt loam that has brownish yellow mottles. The lower part of the subsoil is a silt loam fragipan that is grayish brown mottled in shades of yellow in the upper part and in shades of brown and gray in the lower part.

The surface layer and the upper part of the subsoil range from very strongly acid to medium acid except where the surface has been limed. The lower part of the subsoil ranges from strongly acid to neutral. Permeability is moderate in the upper part of the subsoil and slow in the fragipan. Available water capacity is moderate. Runoff is slow, and erosion is a slight hazard. A water table is perched above the fragipan within 1 foot to 2 feet of the surface in wet seasons. The fragipan restricts the roots and limits the amount of water available to plants. The surface layer has good tilth and can be tilled within a medium range of moisture conditions. It tends to crust and pack after hard rains. A plowpan forms easily if the soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in the mapping are small areas of Grenada soils in slightly higher positions and Calhoun soils in broad depressional areas and on nearly level areas.

Most areas of this Calloway soil are used for crops or pasture. A small acreage is used as woodland. This soil is well suited to row crops, truck crops, and small grains. Plant rows should be arranged and surface field ditches constructed to remove excess surface water. Conservation tillage is recommended. Returning crop residue to the soil helps maintain fertility and tilth and reduces crusting and packing.

This soil is well suited to grasses and legumes for hay or pasture. Proper stocking, controlled grazing, and weed and brush control help control erosion, slow runoff, and reduce surface compaction. Restricted use during wet periods helps to keep the pasture and soil in good condition.

This soil is well suited to cherrybark oak, loblolly pine, shortleaf pine, sweetgum, water oak, and yellow-poplar. Wetness is a moderate limitation to use of equipment in managing and harvesting the trees. Also, plant competition is a moderate limitation.

This soil has severe limitations for urban uses. Low strength of the soil for streets and roads and seasonal wetness are the major limitations. Proper design and careful installation will help offset these limitations. The moderately slow permeability in the fragipan and wetness are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Calloway soil is in capability subclass IIw and in woodland suitability group 2w8.

CbB—Calloway silt loam, 1 to 3 percent slopes. This is a gently sloping, somewhat poorly drained soil that has a fragipan. This soil formed in silty material on stream terraces along major streams and uplands.

Typically, the surface layer is grayish brown silt loam about 4 inches thick. The subsurface layer is pale brown silt loam that has brownish and grayish mottles to a depth of 7 inches. The subsoil extends to a depth of 60 inches or more. The upper part to a depth of 21 inches is yellowish brown silt loam mottled in shades of gray and brown; to a depth of about 27 inches, it is light gray silt loam mottled in shades of yellow and brown. The lower part to a depth of 60 inches is a fragipan. The upper part of the fragipan is grayish brown silty clay loam mottled in shades of yellow and brown; the lower part is silt loam mottled in shades of brown and gray.

The surface layer and the upper part of the subsoil range from very strongly acid to medium acid except where the surface has been limed. The lower part of the subsoil ranges from strongly acid to neutral. Permeability is moderate in the upper part of the subsoil and slow in the fragipan. Available water capacity is moderate. Runoff is medium, and erosion is a moderate hazard. A water table is perched above the fragipan within 1 foot to 2 feet of the surface in wet seasons. The fragipan restricts roots and limits the water available to plants. The surface layer has good tilth and can be tilled within a medium range of moisture conditions. The surface tends to crust and pack after hard rains. A plowpan forms easily if the soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Calhoun soils in low depressions and Grenada soils on a slightly higher sloping elevation.

Most areas of this Calloway soil are used for crops or pasture. A small acreage is in woodland. This soil is well suited to row crops, truck crops, and small grains. Plant rows should be arranged on the contour. Conservation tillage, terraces, and grassed waterways are needed to control erosion. Returning crop residue to the soil helps maintain fertility and tilth and reduces crusting and packing.

This soil is well suited to grasses and legumes for hay or pasture. Livestock overgrazing or grazing when the soil is too wet will cause surface compaction. Proper stocking, controlled grazing, and weed and brush control maintain good soil tilth and prevent soil compaction.

This soil is well suited to cherrybark oak, loblolly pine, shortleaf pine, sweetgum, yellow-poplar, and water oak. Equipment use and plant competition are moderate limitations; other limitations are slight.

This soil has severe limitations for urban uses. Low strength for streets and roads and seasonal wetness are the major limitations. Proper design and careful installation will help offset these limitations. The moderately slow permeability in the fragipan and wetness are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Calloway soil is in capability subclass IIe and woodland suitability group 2w8.

CC—Cascilla-Calhoun association. This map unit consists of nearly level, well drained and poorly drained soils that formed in silty material. These soils are on broad flood plains, natural levees, and stream terraces, which are dissected by winding stream channels, shallow sloughs, and oxbow lakes. Debris, such as uprooted trees, and sediment have partly blocked the natural drainage channels, which causes very slow runoff and ponding of water in low places. These soils are subject to frequent flooding for a few hours to several weeks in winter and late in spring. These soils are in a regular and repeating pattern on the landscape. Individual areas of each soil are large enough to map separately, but because of similar present or predicted uses, they were mapped as one unit. Areas are wide and long and range from 600 to 1,000 acres. Slopes range from 0 to 2 percent.

The well drained Cascilla soils are on the higher parts of the flood plain and make up about 60 percent of the map unit. Slopes range from 0 to 2 percent. Typically, the surface layer is very dark grayish brown silt loam about 4 inches thick. The subsoil extends to a depth of about 56 inches or more. To a depth of about 27 inches, it is silt loam that grades from dark brown in the upper part to dark yellowish brown in the lower part; the lower part is yellowish brown silt loam mottled in shades of gray and brown. The underlying material to a depth of about 64 inches is yellowish brown loam mottled in shades of gray. The material below that to a depth of 70 inches is light brownish gray loam mottled in shades of brown.

Cascilla soils are very strongly acid or strongly acid throughout. Permeability is moderate. Available water capacity is high. Runoff is slow, and erosion is a slight hazard. The seasonal high water table is below a depth of 6 feet. The root zone is deep and easily penetrated by plant roots.

The poorly drained Calhoun soils are on broad, low terraces and make up about 25 percent of the map unit. Slopes range from 0 to 1 percent. Typically, the surface layer is dark grayish brown silt loam about 4 inches thick. The subsoil extends to a depth of about 55 inches or more. The upper part to a depth of about 38 inches is light brownish gray silty clay loam mottled in shades of brown; to about 46 inches, it is grayish brown silty clay loam mottled in shades of brown; the lower part to a depth of about 55 inches is yellowish brown silt loam that has grayish mottles. The underlying material to a depth of 72 inches is light brownish gray silt loam that has yellowish brown mottles.

The surface layer of Calhoun soils ranges from very strongly acid to medium acid except where the surface has been limed. The upper part of the subsoil is very strongly acid or strongly acid. The lower part of the subsoil and the underlying material range from very strongly acid to mildly alkaline. Permeability is slow. Available water capacity is high. Runoff is slow, and some areas are ponded in wet seasons. Erosion is a slight hazard. A high water table is within 2 feet of the surface in wet seasons, and the subsoil is waterlogged and poorly aerated for long periods. Roots are restricted by the slow permeability of the subsoil.

Other soils make up about 15 percent of the association. They include small areas of Lexington soils on slightly higher uplands, somewhat poorly drained silty soils in slightly lower positions on the flood plain, and some areas of soils that are subject to flooding for 1 month.

Most of these soils are used as woodland. Some acreage, which is less flood prone, is used for pasture or hay. These soils are poorly suited to row crops, truck crops, and small grains because of wetness and flooding. These limitations can be overcome with a major flood control system and a drainage system.

Wetness and flooding limit the choice of pasture plants and the period of cutting or grazing, and they decrease plant survival; however, these soils are moderately suited to grasses and legumes for hay or pasture. Proper stocking, controlled grazing, and weed and brush control help maintain good tilth and reduce compaction. In some areas, livestock should be moved to a higher elevation when flooding is imminent.

Cascilla soils are well suited and Calhoun soils are moderately suited to cherrybark oak, loblolly pine, water oak, sweetgum, and American sycamore. In addition to these, Cascilla soil is well suited to eastern cottonwood, Nuttall oak, and yellow-poplar. Limitations on Cascilla soils are moderate for equipment use, seedling mortality, and plant competition. On Calhoun soils, equipment use limitations are severe, and seedling mortality is moderate.

These soils have severe limitations for dwelling sites and urban uses because of frequent flooding and seasonal wetness. Flooding and wetness are severe limitations for use of these soils as septic tank absorption fields.

This soil association is in capability subclass Vw. The Cascilla soils are in woodland suitability group 1w7, and the Calhoun soils are in woodland suitability group 3w9.

CD—Columbus-Daleville association. This unit consists of nearly level, moderately well drained and poorly drained soils that formed in loamy sediment. These soils are on broad flood plains and stream terraces, which are dissected by winding stream channels, shallow sloughs, and oxbow lakes. Debris, such as uprooted trees, and sediment have partly blocked the natural drainage channels, which causes frequent flooding of long duration and very slow runoff in low places. These soils are usually flooded for a few hours to several weeks in winter and late in spring. These soils are in a regular and repeating pattern on the landscape. Individual areas of each soil are large enough to map separately, but because of similar present or predicted uses, they were mapped together as one unit. Areas are wide and long and range from 1,000 to 4,000 acres. Slopes range from 0 to 2 percent.

The moderately well drained Columbus soils are on low terraces and make up about 55 percent of the map unit. Typically, the surface layer is dark grayish brown loam about 5 inches thick. The subsoil extends to a depth of about 40 inches or more. To a depth of about 22 inches, it is yellowish brown clay loam; to about 31 inches, it is yellowish brown loam mottled in shades of gray and red; and to a depth of about 40 inches, it is fine sandy loam mottled in shades of brown and gray. The underlying material to a depth of about 55 inches is strong brown loamy sand. The material below that to a depth of 65 inches is mottled, yellowish brown, light brownish gray, or yellowish red loamy sand.

Columbus soils are very strongly acid or strongly acid throughout. Permeability is moderate. Available water capacity is moderate. Runoff is slow, and erosion is a slight hazard. The high water table is within 2 to 3 feet of the surface during winter and early in spring. The root zone is deep and easily penetrated by plant roots.

The poorly drained Daleville soils are on terraces and in the lower parts of the flood plain, especially in old stream runs, depressions, and drainageways. Daleville soils make up about 30 percent of the map unit. Typically, the surface layer to a depth of 4 inches is dark grayish brown sandy loam. The subsurface layer to a depth of about 10 inches is light brownish gray sandy loam mottled in shades of red. The subsoil extends to a depth of 65 inches or more. It is sandy clay loam mottled in shades of gray, brown, and red.

Daleville soils are very strongly acid or strongly acid throughout. Permeability is slow. Available water capacity is high. Runoff is very slow, and erosion is a slight hazard. The high water table is within 1/2 to 1 foot of the surface during winter and early in spring. Roots are restricted by the slowly permeable subsoil.

Other soils make up about 15 percent of the association. They include small areas of well drained Lexington and moderately well drained Providence soils on uplands and higher stream terraces and some soils in low areas that may be flooded for more than 1 month.

Most of these soils are used as woodland. Some areas, which are less flood prone, are used for pasture or hay. The soils are poorly suited to row crops, truck crops, and small grains because of wetness and frequent flooding. These limitations can be overcome with a major flood control system and a drainage system.

Wetness and flooding limit the choice of pasture plants and the period of cutting or grazing, and they decrease plant survival; however, these soils are moderately suited to grasses and legumes for hay or pasture. Proper stocking, controlled grazing, and weed and brush control help maintain good tilth and reduce compaction. In some areas, livestock should be moved to a higher elevation when flooding is imminent.

These soils are well suited to green ash, loblolly pine, Nuttall oak, Shumard oak, sweetgum, water oak, willow oak, and yellow-poplar. On Columbus soil, equipment use limitations are moderate; other limitations are slight. On Daleville soils, the equipment use limitations and seedling mortality are severe; plant competition is a moderate limitation.

These soils have severe limitations for urban uses, mainly flooding and seasonal wetness. Also, flooding and wetness are severe limitations for use of these soils as septic tank absorption fields.

These soils are in capability subclass Vw. Columbus soils are in woodland suitability group 2w8, and Daleville soils are in woodland suitability group 2w9.

Gb—Gillsburg silt loam. This is a nearly level, somewhat poorly drained soil. It formed in silty alluvium on flood plains. This soil is occasionally flooded for a few hours to 2 or 3 days in winter or early in spring before crops are planted. Slopes range from 0 to 2 percent.

Typically, the surface layer is brown silt loam about 5 inches thick. The subsoil extends to a depth of about 72 inches or more. To a depth of about 15 inches it is dark brown silt loam that has grayish brown mottles; to a depth of about 30 inches, it is light brownish gray silt loam that has yellowish brown mottles; to about 48 inches, it is light gray silt loam that has dark yellowish brown mottles; and to 60 inches, it is light brownish gray silt loam that has yellowish brown mottles. The lower part is gray silt loam that has light yellowish brown mottles.

This soil is very strongly acid or strongly acid throughout except where the surface has been limed. Permeability is moderate in the upper part of the subsoil and moderately slow in the lower part. Available water capacity is high. Runoff is slow. Erosion is a slight hazard. From winter through early in spring, the high water table is within 1 foot to 1 1/2 feet of the surface. The root zone is deep and easily penetrated by plant roots. The surface layer is easy to keep in good tilth, but it tends to crust. A plowpan forms if the soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Oaklimeter soils on flood plains. Also included are some small areas of poorly drained silty soils in depressional areas and soils that have a high content of sodium in the subsoil.

Most areas of this soil are used for crops or pasture. A small acreage is in woodland. This soil is well suited to row crops, truck crops, and small grains. Preparing the seedbed and cultivating are sometimes delayed by seasonal wetness and flooding. Surface field ditches are constructed to remove excess surface water. Returning crop residue to the soil helps maintain fertility and tilth; the residue also reduces crusting and packing, which increases water infiltration.

This soil is well suited to grasses and legumes for hay or pasture. Livestock overgrazing or grazing when the soil is too wet will cause surface compaction and poor tilth. Proper stocking, controlled grazing, and weed and brush control help to maintain the pasture and keep the soil in good condition.

This soil is well suited to American sycamore, cherrybark oak, eastern cottonwood, green ash, loblolly pine, sweetgum, yellow-poplar, and water oak. Erosion is a slight hazard; other limitations are moderate.

This soil has severe limitations for urban uses because of seasonal wetness and flooding. Flooding and wetness are severe limitations for use of this soil as septic tank absorption fields.

This Gillsburg soil is in capability subclass IIw and in woodland suitability group 2w8.

GrA—Grenada silt loam, 0 to 2 percent slopes. This is a nearly level, moderately well drained soil that has a fragipan. This soil formed in silty material on broad upland ridges and stream terraces.

Typically, the surface layer is dark brown silt loam about 5 inches thick. The subsoil extends to a depth of about 70 inches or more. The upper part to a depth of 22 inches is dark yellowish brown silt loam that has pale brown mottles below 13 inches; to 25 inches, it is light gray silt loam that has dark yellowish brown mottles. The lower part is a silt loam fragipan that is mottled in shades of brown and gray.

The surface layer and upper part of the subsoil range from very strongly acid to medium acid except where the surface has been limed. The lower part of the subsoil ranges from strongly acid to neutral. Permeability is moderate in the upper part of the subsoil and slow through the fragipan. Available water capacity is moderate. Runoff is slow, and erosion is a slight hazard. A high water table is perched above the fragipan within l 1/2 to 2 1/2 feet of the surface in wet seasons. The fragipan restricts the roots and limits the amount of water available to plants. The surface layer has good tilth and is easily tilled within a wide range of moisture content. The surface tends to crust and pack after hard rains. A plowpan forms easily if this soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Calloway soils in lower terrace positions and Loring soils in slightly higher positions.

Most areas of this soil are used for crops or pasture. A small acreage is in woodland. This soil is well suited to row crops, truck crops, and small grains. Plant row arrangement, grassed waterways, and surface field ditches help remove excess surface water. Returning crop residue to the soil helps maintain fertility and tilth and reduces crusting and packing.

This soil is well suited to pasture or hay. Livestock overgrazing or grazing when the soil is too wet will cause surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotations, deferred grazing, and weed and brush control help to keep the pasture and soil in good condition.

This soil is suited to cherrybark oak, loblolly pine, shortleaf pine, slash pine, southern red oak, Shumard oak, white oak, sweetgum, and water oak. Limitations are slight.

This soil has moderate limitations for most urban uses. Seasonal wetness is a major limitation. Low strength of this soil is a severe limitation for streets and roads. Proper design and careful installation will help offset the limitations. The moderately slow permeability in the fragipan and wetness are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Grenada soil is in capability subclass IIw and in woodland suitability group 3o7.

GrB2—Grenada silt loam, 2 to 5 percent slopes, eroded. This is a gently sloping, moderately well drained soil that has a fragipan. This soil formed in silty material on broad ridgetops on uplands and stream terraces.

Typically, the surface layer is dark brown silt loam about 4 inches thick. The subsoil extends to a depth of 65 inches or more. The upper part to a depth of about 18 inches is yellowish brown silt loam; to a depth of about 23 inches, it is light brownish gray silt loam mottled in shades of brown. The lower part of the subsoil is a silt loam fragipan mottled in shades of gray and brown.

In most areas of this eroded soil, part of the original surface layer has been removed by erosion, and tillage has mixed the remaining topsoil and subsoil. In small areas, all of the plow layer is the original topsoil, and in other areas, the plow layer is mainly subsoil material. Some areas of this soil have a few rills and shallow gullies.

The surface layer and upper part of the subsoil range from very strongly acid to medium acid except where the surface has been limed. The lower part of the subsoil ranges from strongly acid to neutral. Permeability is moderate in the upper part of the subsoil and slow through the fragipan. Available water capacity is moderate. Runoff is medium, and erosion is a moderate hazard. A high water table is perched above the fragipan within 1 1/2 to 2 1/2 feet of the surface in wet seasons. The fragipan restricts the roots and limits the amount of water available to plants. The surface layer has good tilth and is easily tilled within a wide range of moisture content. The surface tends to crust and pack after hard rains. A plowpan forms if the soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Loring and Providence soils on uplands and terraces.

Most areas of this soil are used for crops and pasture. A small acreage is in woodland. This soil is well suited to row crops, truck crops, and small grains. Conservation tillage, contour farming, terraces, and grassed waterways slow runoff and help control erosion. Returning crop residue to the soil helps maintain fertility and tilth and reduces crusting and packing.

This soil is well suited to pasture or hay. The plants help slow runoff and control erosion. Livestock overgrazing or grazing when the soil is too wet will cause surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help to keep the pasture and soil in good condition.

This soil is suited to cherrybark oak, southern red oak, Shumard oak, slash pine, loblolly pine, shortleaf pine, southern red oak, sweetgum, water oak, and white oak. Limitations are slight.

This soil has moderate limitations for most urban uses. Seasonal wetness is a major limitation. The low strength of this soil is a severe limitation for streets and roads. Proper design and careful installation will help offset these limitations. The moderately slow permeability in the fragipan and wetness are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Grenada soil is in capability subclass IIe and in woodland suitability group 3o7.

LoA—Loring silt loam, 0 to 2 percent slopes. This is nearly level, moderately well drained soil that has a fragipan. This soil formed in silty material on terraces and broad ridgetops on uplands.

Typically, the surface layer is yellowish brown silt loam about 7 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part to a depth of about 23 inches is dark brown silt loam; to a depth of about 27 inches, it is yellowish brown silt loam. To a depth of 37 inches, it is a silt loam fragipan mottled in shades of brown and gray. The lower part of the fragipan is yellowish brown silt loam mottled in shades of brown and gray.

The surface layer and upper part of the subsoil range from very strongly acid to medium acid except where the surface has been limed. The underlying material ranges from very strongly acid to slightly acid. Permeability is moderate in the upper part of the subsoil and moderately slow through the fragipan. Available water capacity is moderate. Runoff is slow, and erosion is a slight hazard. A high water table is perched above the fragipan within 2 to 3 feet of the surface in wet seasons. The fragipan restricts roots and limits the amount of water available to plants. The surface layer has good tilth and is easily tilled within a wide range of moisture content. The surface tends to crust and pack after hard rains. A plowpan forms easily if the soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Grenada and Memphis soils, which are intermingled across the landscape on uplands and terraces.

Most areas of this soil are used for crops or pasture. A small acreage is in woodland. This soil is well suited to row crops, truck crops, and small grains. Plant row arrangement, grassed waterways, and surface field ditches help remove excess surface water. Returning crop residue to the soil helps maintain fertility and tilth and reduces crusting and packing.

This soil is well suited to grasses and legumes for pasture or hay. Livestock overgrazing or grazing when the soil is too wet will cause surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help to keep the pasture and soil in good condition.

This soil is suited to cherrybark oak, loblolly pine, yellow-poplar, southern red oak, sweetgum, and water oak. Plant competition is a severe limitation; other limitations are slight.

This soil has moderate limitations for most urban uses. Seasonal wetness is a major limitation. The low strength of this soil is a severe limitation for streets and roads. Proper design and careful installation will help offset these limitations. The moderately slow permeability in the fragipan and wetness are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Loring soil is in capability class IIw and in woodland suitability group 3o7.

LoB2—Loring silt loam, 2 to 5 percent slopes, eroded. This is a gently sloping, moderately well drained soil that has a fragipan. This soil formed in silty material on broad ridgetops on uplands.

Typically, the surface layer is brown silt loam about 4 inches thick. The subsoil extends to a depth of about 52 inches or more. The upper part to a depth of about 30 inches is dark brown silt loam. The lower part of the subsoil is a silt loam fragipan that is dark brown mottled in shades of gray and brown. The underlying material to 70 inches is dark brown silt loam mottled in shades of gray and brown.

In most areas of this eroded soil, part of the original surface layer has been removed by erosion, and tillage has mixed the remaining topsoil and subsoil. In some small areas all of the plow layer is the original topsoil, and in other areas, the plow layer is mainly subsoil material. Some areas of this soil have a few rills and shallow gullies.

The surface layer and the subsoil range from very strongly acid to medium acid except where the surface has been limed. The underlying material ranges from very strongly acid to slightly acid. Permeability is moderate in the upper part of the subsoil and moderately slow through the fragipan. Available water capacity is moderate. Runoff is medium, and erosion is a moderate hazard. A high water table is perched above the fragipan within 2 to 3 feet of the surface in wet seasons. The fragipan restricts the roots and limits the amount of water available to plants. The surface layer has good tilth and is easily tilled within a wide range of moisture content. The surface tends to crust and pack after hard rains. A plowpan forms easily if the soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Grenada, Memphis, and Providence soils, which are intermingled on uplands and terraces.

Most areas of the soil are used for crops or pasture. A small acreage is in woodland. This soil is well suited to row crops, truck crops, and small grains (fig. 3). Conservation tillage, contour farming, terraces, and grassed waterways slow runoff and help control erosion. Returning crop residue to the soil improves soil fertility and tilth and reduces crusting and packing.

Figure 3.—Soybeans on Loring silt loam, 2 to 5 percent slopes, eroded.

This soil is well suited to pasture or hay. The plants help slow runoff and control erosion. Livestock overgrazing or grazing when the soil is too wet will cause surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help to keep the pasture and soil in good condition.

This soil is suited to cherrybark oak, loblolly pine, yellow-poplar, southern red oak, sweetgum, and water oak. Plant competition is a severe limitation; other limitations are slight.

This soil has moderate limitations for most urban uses. Seasonal wetness is a major limitation. The low strength of this soil is a severe limitation for streets and roads. Proper design and careful installation will help offset these limitations. The moderately slow permeability in the fragipan and wetness are severe limitations for use of this soil as septic tank absorption fields. These limitations can be overcome by increasing the size of the absorption field.

This Loring soil is in capability subclass IIe and in woodland suitability group 3o7.

LoC2—Loring silt loam, 5 to 8 percent slopes, eroded. This is a sloping, moderately well drained soil that has a fragipan. This soil formed in silty material on ridgetops and side slopes on uplands.

Typically, the surface layer is yellowish brown silt loam about 4 inches thick. The subsoil extends to a depth of about 65 inches. The upper part to a depth of about 8 inches is yellowish brown silt loam; to a depth of about 30 inches, it is dark brown silty clay loam grading to yellowish brown silt loam that is mottled in shades of gray and brown. The lower part of the subsoil is a silt loam fragipan mottled in shades of brown and gray.

In most areas of this eroded soil, part of the original surface layer has been removed by erosion, and tillage has mixed the remaining topsoil and subsoil. In some small areas, all of the plow layer is the original topsoil, and in other areas, the plow layer is mainly subsoil material. Some areas of this soil have a few rills and shallow gullies.

The surface layer and the subsoil range from very strongly acid to medium acid except where the surface has been limed. Permeability is moderate in the upper part of the subsoil and moderately slow through the fragipan. Available water capacity is moderate. Runoff is medium, and erosion is a moderate hazard. A high water table is perched above the fragipan within 2 to 3 feet of the surface in wet seasons. The fragipan restricts the roots and limits the amount of water available to plants. The surface layer has good tilth and is easily tilled within a wide range of moisture content. The surface tends to crust and pack after hard rains. A plowpan forms easily if the soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Providence and Memphis soils on uplands. Also included are a few small areas of soils that are severely eroded.

Most areas of this Loring soil are used for pasture or crops. The remaining acreage is in woodland. This soil is moderately suited to row crops, truck crops, and small grains (fig. 4). The erosion hazard and runoff are increased if row crops are grown. Conservation tillage, contour farming, terraces, grassed waterways, and cropping systems that include grasses and legumes help slow runoff and control erosion. Returning crop residue to the soil helps maintain fertility and tilth and reduces crusting and packing.

This soil is moderately suited to grasses and legumes for pasture or hay. The plants help slow runoff and control erosion. Livestock overgrazing or grazing when the soil is too wet will cause surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help to keep the pasture and soil in good condition. In a few places, smoothing and shaping of rills and gullies may be needed.

This soil is moderately suited to cherrybark oak, loblolly pine, yellow-poplar, southern red oak, sweetgum, and water oak. Plant competition is a severe limitation; other limitations are slight.

This soil has moderate limitations for most urban uses. Seasonal wetness is a major limitation. The low strength of this soil is a severe limitation for streets and roads. Steepness of slopes is a limitation for small commercial buildings. Proper design and careful installation will help offset these limitations. The moderately slow permeability in the fragipan and wetness are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Loring soil is in capability subclass IIIe and in woodland suitability group 3o7.

LoC3—Loring silt loam, 5 to 8 percent slopes, severely eroded. This is a sloping, moderately well drained soil that has a fragipan. This soil formed in silty material on ridgetops and side slopes on uplands.

Typically, the surface layer is yellowish brown silt loam about 3 inches thick. The subsoil extends to a depth of 62 inches or more. To a depth of about 26 inches, it is dark brown silty clay loam and silt loam. A fragipan of silt loam is below that layer. To a depth of about 34 inches, it is strong brown mottled in shades of brown and gray; to a depth of 42 inches, it is mottled brown and gray; and to about 62 inches, the fragipan is dark brown mottled in shades of gray and brown.

In most areas of this severely eroded soil, the original surface layer has been lost through erosion, and the plow layer is subsoil material. However, in some small areas, the surface layer is a mixture of topsoil and subsoil. Rills and shallow gullies are common. In a few

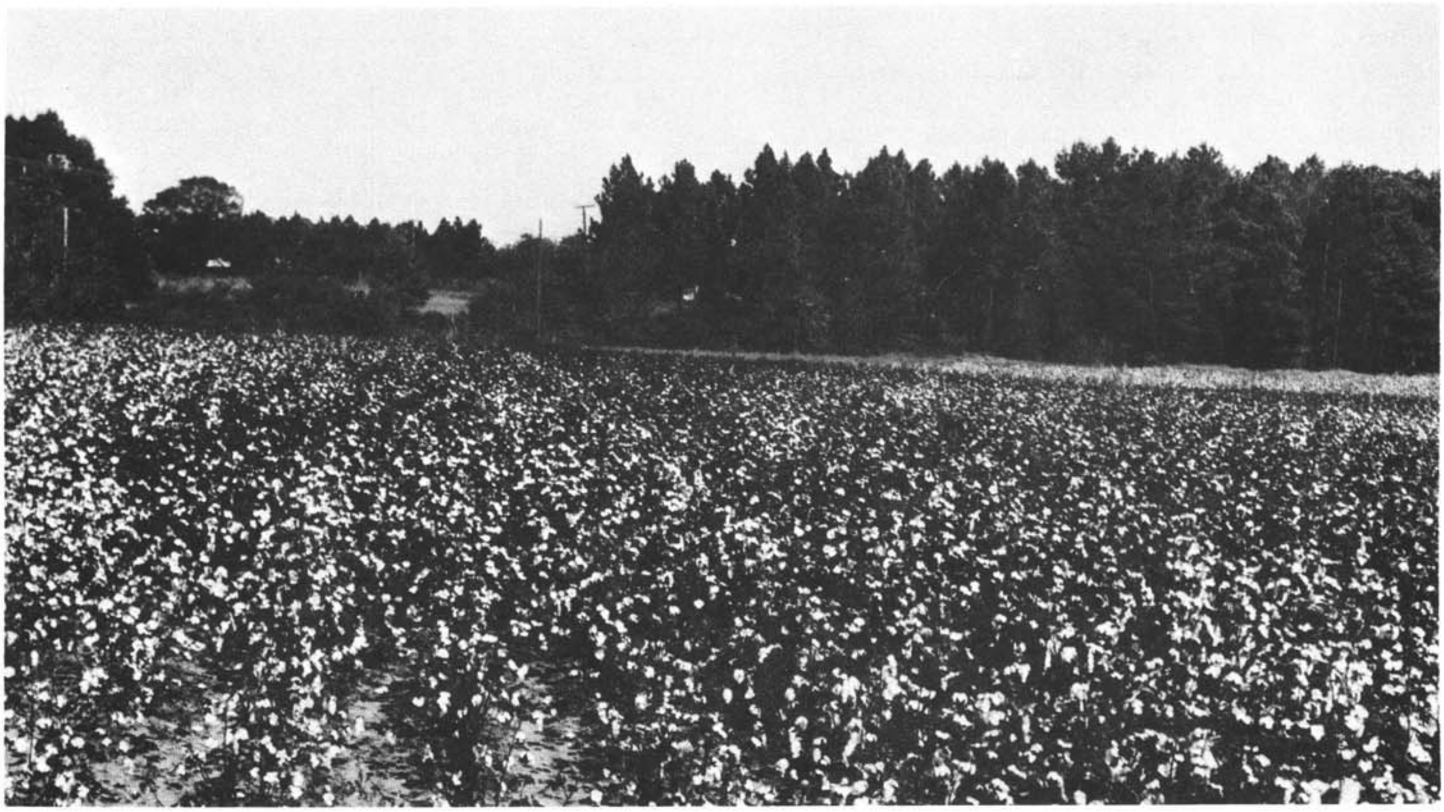

Figure 4.—Cotton fully open on Loring silt loam, 5 to 8 percent slopes, eroded.

areas of this soil, a few deep gullies that are not crossable with farm machinery have formed.

The surface layer and the subsoil range from very strongly acid to medium acid except where the surface has been limed. Permeability is moderate in the upper part of the subsoil and moderately slow through the fragipan. Available water capacity is moderate. Runoff is medium to rapid, and erosion is a severe hazard. A high water table is perched above the fragipan within 2 to 3 feet of the surface in wet seasons. The fragipan restricts the roots and limits the amount of water available to plants.

Included in mapping are small areas of Providence and Memphis soils on uplands and terraces.

Most areas of this Loring soil are used for pasture or crops. A small acreage is in woodland. This soil is poorly suited to row crops, truck crops, and small grains because of the hazard of erosion. Further loss by erosion is possible if cultivated crops are grown. These soils are better suited to a permanent vegetative cover of grasses and legumes or trees.

This soil is moderately suited to grasses and legumes for pasture or hay. The plants help slow runoff and control erosion. Smoothing and shaping of gullies may be needed in a few places. Livestock overgrazing or grazing when the soil is too wet will cause surface compaction, excessive runoff, and poor tilth. Proper stocking rates, pasture rotation, deferred grazing, and weed and brush control help to keep the pasture and soil in good condition.

This soil is moderately suited to cherrybark oak, loblolly pine, yellow-poplar, southern red oak, sweetgum, and water oak. Plant competition is a severe limitation; other limitations are slight.

This soil has moderate limitations for most urban uses. Seasonal wetness is a major limitation. The low strength of this soil is a severe limitation for streets and roads. Steepness of slopes is a limitation for small commercial buildings. Proper design and careful installation will help offset these limitations. The moderately slow permeability in the fragipan and wetness are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Loring soil is in capability subclass IVe and in woodland suitability group 3o7.

LoD2—Loring silt loam, 8 to 12 percent slopes, eroded. This is a strongly sloping, moderately well drained soil that has a fragipan. This soil formed in silty material on ridgetops and side slopes on uplands.

Typically, the surface layer is dark grayish brown silt loam about 5 inches thick. The subsoil extends to a depth of about 70 inches. To a depth of about 32 inches, it is yellowish brown and dark brown silt loam. Below that layer is a silt loam fragipan that is dark yellowish brown mottled in shades of gray that grade to yellowish brown as depth increases.

In most areas of this eroded soil, part of the original surface layer has been removed by erosion, and tillage has mixed the remaining topsoil and subsoil. In some small areas, all of the plow layer is the original topsoil, and in other areas, the plow layer is mainly subsoil material. Some areas of this soil have a few rills and shallow gullies.

The surface layer and the subsoil range from very strongly acid to medium acid except where the surface has been limed. Permeability is moderate in the upper part of the subsoil and moderately slow through the fragipan. The available water capacity is moderate. Runoff is rapid, and erosion is a severe hazard. A high water table is perched above the fragipan within 2 to 3 feet of the surface in wet seasons. The fragipan restricts roots and limits the amount of water available to plants.

Included in mapping are small areas of Memphis and Providence soils in positions similar to those of this Loring soil on uplands and terraces. Also included are some small areas of soils that are severely eroded.

Most areas of this Loring soil are used for pasture or woodland; a small acreage is used for crops. This soil is poorly suited to row crops, truck crops, and small grains. The erosion hazard and runoff are increased if row crops are grown. These soils are better suited to a permanent vegetative cover of grasses and legumes or trees.

This soil is moderately suited to grasses and legumes for pasture or hay. The plants help slow runoff and control erosion. Livestock overgrazing or grazing when the soil is too wet will cause surface compaction, excessive runoff, and poor tilth. Smoothing and shaping of gullies is needed in a few places. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help to keep the pasture and soil in good condition.

This soil is moderately suited to cherrybark oak, loblolly pine, yellow-poplar, southern red oak, sweetgum, and water oak. Plant competition is a severe limitation; other limitations are slight.

This soil has severe limitations for most urban uses. Low strength of this soil for streets and roads, steepness of slopes for small commercial buildings, and seasonal wetness are the major limitations. Limitations are moderate for dwellings without basements. Proper design and careful installation will help offset these limitations. The moderately slow permeability in the fragipan and wetness are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Loring soil is in capability subclass IVe and in woodland suitability group 3o7.

LoD3—Loring silt loam, 8 to 12 percent slopes, severely eroded. This is a strongly sloping, moderately well drained soil that has a fragipan. This soil formed in silty material on ridgetops and side slopes on uplands.

Typically, the surface layer is dark brown silt loam about 3 inches thick. The subsoil extends to a depth of about 66 inches. To a depth of about 22 inches, it is dark brown silt loam. A fragipan of silt loam is below that layer. To a depth of about 36 inches, it is dark brown mottled in shades of gray and brown; to about 66 inches, the fragipan is strong brown and yellowish brown mottled in shades of gray and brown.

In most areas of this severely eroded soil, the original surface layer has been lost through erosion, and the plow layer is subsoil material. However, in some small areas, the surface layer is a mixture of topsoil and subsoil. Rills and shallow gullies are common, and in a few areas, a few deep gullies that are not crossable with farm machinery have formed.

The surface layer and the subsoil range from very strongly acid to medium acid except where the surface has been limed. Permeability is moderate in the upper part of the subsoil and moderately slow through the fragipan. Available water capacity is moderate. Runoff is rapid, and erosion is a severe hazard. A high water table is perched above the fragipan within 2 to 3 feet of the surface in wet seasons. The fragipan restricts roots and limits the amount of water available to plants.

Included in mapping are small areas of Memphis and Providence soils in positions similar to those of this Loring soil on uplands and terraces; also, small areas of soils that are not severely eroded are included.

Most areas of this soil are used for pasture or crops. A small acreage is in woodland. This soil is poorly suited to row crops, truck crops, and small grains because of the hazard of erosion. Further loss of soil by erosion is possible if cultivated crops are grown. These soils are better suited to a permanent vegetative cover of grasses and legumes or trees.

This soil is moderately suited to grasses and legumes for pasture or hay. The plant cover helps slow runoff and control erosion. The main limitations are steepness of slopes and shallow gullies. Smoothing and shaping of gullies is needed in a few places. Livestock overgrazing or grazing when the soil is too wet will cause surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help to keep the pasture and soil in good condition.

This soil is suited to cherrybark oak, loblolly pine, yellow-poplar, southern red oak, sweetgum, and water oak. Plant competition is a severe limitation; other limitations are slight.

This soil has moderate limitations for most urban uses. The low strength of this soil for streets and roads, steepness of slopes for small commercial buildings, and seasonal wetness are the major limitations. Limitations are moderate for dwellings without basements. Proper design and careful installation will help offset these limitations. The moderately slow permeability in the fragipan and wetness are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Loring soil is in capability subclass VIe and in woodland suitability group 3o7.

Mc—McRaven silt loam. This is a nearly level, somewhat poorly drained soil that formed in silty alluvium on broad flood plains. The soil is subject to occasional flooding for a few hours to 2 or 3 days in winter and early in spring in some years. Slopes range from 0 to 2 percent.

Typically, the surface layer is dark brown silt loam about 7 inches thick. The subsoil extends to a depth of about 70 inches or more. The upper part to a depth of about 15 inches is dark brown silt loam that has grayish brown mottles; to about 30 inches, it is grayish brown silt loam that has yellowish brown mottles; and the lower part is gray and light brownish gray silt loam mottled in shades of brown.

This soil ranges from medium acid to neutral in the surface layer and upper part of the subsoil and is slightly acid to mildly alkaline in the lower part of the subsoil. Permeability is moderate. Available water capacity is high. Runoff is slow, and erosion is a slight hazard. A high water table is within 1 foot to 1 1/2 feet of the surface during winter and early in spring. The rooting zone is deep and is easily penetrated by plant roots. The surface layer is fairly easy to keep in good tilth but tends to crust. A plowpan forms if the soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Adler and Riedtown soils on flood plains.

Most areas of this soil are used for crops and pasture. A small acreage is in woodland. This soil is well suited to row crops, truck crops, and small grains. Seasonal wetness and flooding are limitations. Plant rows should be arranged and surface field ditches installed to remove excess surface water. Returning crop residue to the soil helps maintain fertility and tilth and reduces crusting and packing.

This soil is well suited to grasses and legumes for hay or pasture. Livestock overgrazing or grazing when the soil is too wet will cause surface compaction. Proper stocking, controlled grazing, and weed and brush control help to maintain the soil and pasture in good condition.

This soil is well suited to eastern cottonwood, cherrybark oak, water oak, willow oak, green ash, sweetgum, and American sycamore. Plant competition and the use of equipment are moderate limitations; other limitations are slight.

This soil has severe limitations for urban uses, mainly flooding and wetness. Also, flooding and wetness are severe limitations for use of this soil as septic tank absorption fields.

This McRaven soil is in capability subclass IIw and in woodland suitability group 1w5.

MeA—Memphis silt loam, 0 to 2 percent slopes. This is a nearly level, well drained soil that formed in silty material on broad slopes on uplands and terraces.

Typically, the surface layer is dark brown silt loam about 6 inches thick. The subsoil extends to a depth of about 52 inches or more. To a depth of about 24 inches, it is dark brown silty clay loam; below that layer, it is dark brown silt loam.

This soil ranges from very strongly acid to medium acid throughout except where the surface has been limed. Permeability is moderate. Available water capacity is high. Runoff is slow, and erosion is a slight hazard. The high water table is more than 6 feet below the surface. The rooting zone is deep and easily penetrated by plant roots. The surface layer has good tilth and is easily tilled within a wide range of moisture conditions. The surface tends to crust and pack after hard rains. A plowpan forms if this soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Grenada and Loring soils on uplands and terraces.

Almost all areas of this Memphis soil are used for crops or pasture. The remainder is in woodland. This soil is well suited to row crops, truck crops, and small grains. If cultivated crops are grown, plant row arrangement to remove surface water and conservation tillage help control erosion. Returning crop residue to the soil helps maintain good tilth and reduce crusting.

This soil is well suited to grasses and legumes for hay or pasture. Proper stocking, controlled grazing, and weed and brush control are needed. Restricted use during wet periods help to keep the pasture and soil in good condition.

This soil is well suited to cherrybark oak, loblolly pine, water oak, sweetgum, and yellow-poplar. Limitations are slight.

This soil has slight limitations for urban uses. Low strength of this soil for roads and streets is a severe limitation. The limitations for use of this soil as septic tank absorption fields are slight.

This Memphis soil is in capability class I and in woodland suitability group 2o7.

MeB2—Memphis silt loam, 2 to 5 percent slopes, eroded. This is a gently sloping, well drained soil that formed in silty material on broad slopes on uplands and terraces.

Typically, the surface layer is dark brown silt loam about 6 inches thick. The subsoil extends to a depth of about 65 inches. To a depth of about 26 inches, it is dark brown silty clay loam; below that layer, it is dark brown silt loam.

In most areas of this eroded soil, part of the original surface layer has been removed by erosion, and tillage has mixed the remaining topsoil and subsoil. In some small areas, all of the plow layer is the original topsoil, and in other areas, the plow layer is mainly subsoil material. Some areas of this soil have a few rills and shallow gullies.

This soil ranges from very strongly acid to medium acid throughout except where the surface has been limed. Permeability is moderate. Available water capacity is high. Runoff is slow to medium, and erosion is a moderate hazard. The high water table is more than 6 feet below the surface. The rooting zone is deep and easily penetrated by plant roots. The surface layer has good tilth and is easily tilled within a wide range of moisture conditions. The surface tends to crust and pack after hard rains. A plowpan forms if this soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Grenada and Loring soils on uplands and terraces. Also, included are small severely eroded areas that have a surface texture of silty clay loam.

Almost all areas of this soil are used for crops or pasture. The remainder is in woodland. This soil is well suited to row crops, truck crops, and small grains. Conservation tillage, contour farming, terraces, grassed waterways, and cropping systems that include grasses and legumes slow runoff and help control erosion. Returning crop residue to the soil helps maintain fertility and good tilth and reduces crusting.

This soil is well suited to grasses and legumes for hay or pasture. Proper stocking, controlled grazing, and weed and brush control are needed as well as restricted use during wet periods to help keep the pasture and soil in good condition.

This soil is well suited to cherrybark oak, loblolly pine, water oak, sweetgum, and yellow-poplar. Limitations are slight.

This soil has slight limitations for urban uses. The low strength of the soil for roads and streets is a severe limitation. The limitations are slight for use of this soil as septic tank absorption fields.

The Memphis soil is in capability subclass IIe and in woodland suitability group 2o7.

MeC2—Memphis silt loam, 5 to 8 percent slopes, eroded. This sloping, well drained soil formed in silty material on broad slopes on uplands and terraces.

Typically, the surface layer is dark brown silt loam about 4 inches thick. The subsoil extends to a depth of about 66 inches. To a depth of about 26 inches, it is dark brown silty clay loam; to about 40 inches, it is dark brown silt loam; and below that layer, it is dark yellowish brown silt loam.

in most areas of this eroded soil, part of the original surface layer has been removed by erosion, and tillage has mixed the remaining topsoil and subsoil. In some small areas, all of the plow layer is the original topsoil, and in other areas, the plow layer is mainly subsoil material. Some areas of this soil have a few rills and shallow gullies.

This soil ranges from very strongly acid to medium acid throughout except where the surface has been limed. Permeability is moderate. Available water capacity is high. Runoff is medium, and erosion is a moderate hazard. The high water table is more than 6 feet below the surface. The rooting zone is deep and easily penetrated by plant roots. The surface layer has good tilth and is easily tilled within a wide range of moisture conditions. The surface tends to crust and pack after hard rains. A plowpan forms if this soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Loring soils on uplands. Also, included are small areas of severely eroded Memphis soils on uplands.

Most areas of this soil are used for pasture or crops. The remainder is in woodland. This soil is moderately suited to row crops, truck crops, and small grains. The erosion hazard and runoff are increased if row crops are grown. Conservation tillage, contour farming, terraces, grassed waterways, and cropping systems that include grasses and legumes help slow runoff and control erosion. Returning crop residue to the soil helps maintain fertility and tilth and reduces crusting and packing.

This soil is well suited to grasses and legumes for hay or pasture (fig. 5). The plant cover helps slow runoff and control erosion. Smoothing and shaping of gullies are needed in a few places. Proper stocking, controlled grazing, and weed and brush control are needed as well as restricted use during wet periods to keep the pasture and soil in good condition.

This soil is well suited to cherrybark oak, loblolly pine, water oak, sweetgum, and yellow-poplar. Limitations are slight.

This soil has slight limitations for most urban uses. Low strength of the soil for roads and streets is a severe limitation. Steepness of slopes is a moderate limitation for small commercial buildings. The limitations are slight for use of this soil as septic tank absorption fields.

This Memphis soil is in capability subclass IIIe and in woodland suitability group 2o7.

MeD2—Memphis silt loam, 8 to 12 percent slopes, eroded. This is a strongly sloping, well drained soil that formed in silty material on ridges and side slopes on uplands.

Typically, the surface layer is dark brown silt loam about 4 inches thick. The subsoil extends to a depth of

Figure 5.—Farm pond on Memphis silt loam, 5 to 8 percent slopes, eroded. The pond provides water for livestock and is used for fishing.

about 64 inches. To about 22 inches, it is dark brown silty clay loam; to about 34 inches, it is dark brown silt loam; and the lower part is dark yellowish brown silt loam.

In most areas of this eroded soil, part of the original surface layer has been removed by erosion, and tillage has mixed the remaining topsoil and subsoil. In some small areas, all of the plow layer is the original topsoil, and in other areas, the plow layer is mainly subsoil material. Some areas of this soil have a few rills and shallow gullies.

This soil ranges from very strongly acid to medium acid throughout except where the surface has been limed. Permeability is moderate. Available water capacity is high. Runoff is rapid, and erosion is a severe hazard. The high water table is more than 6 feet below the surface. The root zone is deep and is easily penetrated by plant roots.

Included in mapping are small areas of Loring and Providence soils on uplands. Also included are small areas of severely eroded Memphis soils on uplands.

Most areas of this soil are used for pasture; a few acres are used for crops or as woodland. This soil is poorly suited to row crops, truck crops, and small grains because of the severe erosion hazard. If cultivated crops are grown, terraces, contour strip cropping, conservation tillage, grassed waterways, contour farming, and cropping systems that include grasses and legumes are needed to help control runoff and erosion. Smoothing of rills and shaping of shallow gullies may be necessary before cultivation. Returning crop residue to the soil helps maintain fertility and tilth and increases water infiltration.

This soil is moderately suited to grasses and legumes for hay or pasture. The plant cover helps control erosion. Overgrazing by livestock increases the erosion hazard and runoff. Proper stocking, controlled grazing, and weed and brush control help slow runoff and reduce erosion.

This soil is well suited to cherrybark oak, loblolly pine, sweetgum, water oak, and yellow-poplar. Limitations are slight.

This soil has moderate limitations for most urban uses because of steepness of slopes. Low strength of the soil for local roads and streets and steepness of slopes for small commercial building locations are severe limitations. Slope is a moderate limitation for use of this soil as septic tank absorption fields. This limitation can be partly overcome by installing field lines on the contour.

This Memphis soil is in capability subclass IVe and in woodland suitability group 2o7.

MeD3—Memphis silt loam, 8 to 12 percent slopes, severely eroded. This is a strongly sloping, well drained soil that formed in silty material on ridges and side slopes on uplands.

Typically, the surface layer is brown silt loam about 3 inches thick. The subsoil that extends to a depth of about 65 inches or more is dark brown silt loam.

In most areas of this severely eroded soil, the original surface layer has been lost through erosion, and the plow layer is subsoil material. However, in some small areas, the surface layer is a mixture of topsoil and subsoil. Rills and shallow gullies are common. In a few areas of this soil, a few deep gullies that are not crossable with farm machinery have formed.

This soil ranges from very strongly acid to medium acid throughout except where the surface layer has been limed. Permeability is moderate. Available water capacity is high. Runoff is rapid, and erosion is a severe hazard. The high water table is more than 6 feet below the surface. The root zone is deep and easily penetrated by plant roots.

Included in mapping are small areas of Loring and Providence soils on uplands. Also included are small areas of eroded Memphis soil on uplands.

Most areas of this soil are used for pasture. A small acreage is in woodland. This soil is poorly suited to row crops, truck crops, and small grains because of the severe erosion hazard, rapid runoff, and steepness of slope. These soils are better suited to a permanent vegetative cover of grasses and legumes or trees.

This soil is moderately suited to grasses and legumes for hay or pasture. The pasture plants help control erosion. Smoothing and shaping gullies help make mowing and other production practices easier. Overgrazing by livestock causes excessive runoff and increases the erosion hazard. Proper stocking, controlled grazing, and weed and brush control help slow runoff and reduce the erosion hazard.

This soil is well suited to cherrybark oak, loblolly pine, sweetgum, water oak, and yellow-poplar. Limitations are slight.

This soil has moderate limitations for most urban uses because of steepness of slopes. The low strength of the soil is a severe limitation for local roads and streets. Steepness of slope is a severe limitation for small commercial buildings. Slope is a moderate limitation for use of this soil as septic tank absorption fields. This limitation can be partly overcome by installing field lines on the contour.

This Memphis soil is in capability subclass VIe and in woodland suitability group 2o7.

MeF2—Memphis silt loam, 12 to 40 percent slopes, eroded. This is a moderately steep to steep, well drained soil that formed in silty material on hillsides in uplands.

Typically, the surface layer is brown silt loam about 4 inches thick. The subsoil extends to a depth of about 65 inches or more. To a depth of about 27 inches, it is dark brown silty clay loam; to a depth of about 40 inches, it is strong brown silt loam; and below that layer, it is yellowish brown silt loam.

In most areas of this eroded soil, part of the original surface layer has been removed by erosion, and tillage has mixed the remaining topsoil and subsoil. In some small areas, all of the plow layer is the original topsoil, and in other areas, the plow layer is mainly subsoil material. Some areas of this soil have a few rills and shallow gullies.

Reaction of this soil ranges from very strongly acid to medium acid throughout except where the surface has been limed. Permeability is moderate. Available water capacity is high. Runoff is rapid, and erosion is a severe hazard. The high water table is more than 6 feet below the surface. The rooting zone is deep and easily penetrated by plant roots.

Included in the mapping are small areas of Loring soils on uplands. Also included are severely eroded areas of soil.

Most areas of this soil are used for pasture and woodland. A small acreage is used for crops. This soil is poorly suited to row crops, truck crops, and small grains because of steep slopes and the hazard of erosion. These soils are better suited to a permanent vegetative cover of grasses and legumes or trees.

This soil is moderately suited to grasses and legumes for hay or pasture. The plants help control erosion. Overgrazing by livestock increases the hazard of erosion, runoff, and surface compaction. Proper stocking, controlled grazing, and weed and brush control will help to control erosion, slow runoff, and keep the soil and pasture in good condition.

This soil is well suited to cherrybark oak, sweetgum, loblolly pine, water oak, and yellow-poplar. Plant competition is a moderate limitation, and erosion is a moderate hazard; other limitations are slight.

Steepness of slopes is a severe limitation for most urban uses. The steepness of slopes is a severe limitation for use of this soil as septic tank absorption fields. This limitation can be partly overcome by installing field lines on the contour.

This Memphis soil is in capability subclass VIe and in woodland suitability group 2o8.

MeF3—Memphis silt loam, 12 to 40 percent slopes, severely eroded. This is a moderately steep to steep, well drained soil that formed in silty material on hillsides on uplands.

Typically, the surface layer is dark grayish brown silt loam about 2 inches thick. The subsurface layer to a depth of about 6 inches is brown silt loam. The subsoil extends to a depth of about 60 inches. To a depth of about 30 inches, it is dark brown silt loam; below that layer, it is dark yellowish brown silt loam.

In most areas of this severely eroded soil, the original surface layer has been lost through erosion, and the plow layer is subsoil material. In some small areas, the surface layer is a mixture of original topsoil and subsoil. Rills and shallow gullies are common, and in places, a few deep gullies that are not crossable with farm machinery have formed.

Reaction of this soil ranges from very strongly acid to medium acid throughout. Permeability is moderate. Available water capacity is high. Runoff is rapid, and erosion is a severe hazard. The high water table is more than 6 feet below the surface. The rooting zone is deep and easily penetrated by plant roots.

Included in mapping are small areas of Loring soils on ridges and small areas that are not severely eroded.

Most areas of this Memphis soil are used for pasture and woodland. This soil is poorly suited to row crops, truck crops, and small grains because of steep slopes and the hazard of erosion. This soil is better suited to pine trees.

This soil is poorly suited to grasses and legumes for hay or pasture. The steepness of slopes, gullies that hinder the use of equipment, and lowered productivity as the result of erosion are the main limitations.

This soil is well suited to cherrybark oak, water oak, loblolly pine, sweetgum, and yellow-poplar. Plant competition is a moderate limitation, and erosion is a moderate hazard; other limitations are slight.

This soil has severe limitations for urban uses. Steepness of slope is the main limitation. Steepness of slopes is a severe limitation for use of this soil as septic tank absorption fields. This limitation can be partly overcome by installing field lines on the contour.

This Memphis soil is in capability subclass VIIe and in woodland suitability group 2o8.

Mh—Memphis-Udorthents complex, gullied. This complex consists of small areas of Memphis soils, Udorthents, and gullies that are so intermingled that mapping them separately was not practical. The well drained Memphis soils formed in silty material on sloping to steep upland side slopes and narrow ridges between deep, wide, irregular gullies. The Udorthents are areas of soils that are very severely eroded. They formed in silty material between Memphis soils and the gullies. Individual areas are irregular in shape and range from 15 to 180 acres. Slopes range from 7 to 18 percent.

Memphis soils make up about 47 percent of the map unit. Typically, the surface layer is brown silt loam about 4 inches thick. The subsoil extends to a depth of about 60 inches. To a depth of about 20 inches, it is a yellowish brown silt loam; below that layer, it is dark brown silt loam.

The reaction of Memphis soils ranges from very strongly acid to medium acid throughout. Permeability is moderate. Available water capacity is high. Runoff is rapid, and erosion is a severe hazard. The high water table is more than 6 feet below the surface. The root zone is deep and easily penetrated by plant roots.

The Udorthents and gullies make up about 38 percent of the map unit. Typically, they consist of soils that have been so severely eroded by water that soil horizons have been destroyed beyond recognition. The texture is variable; dominantly it is silty, but it ranges from loam to sandy clay loam in the deep gullies.

Udorthents range from very strongly acid to medium acid. Permeability is variable. Available water capacity is low. Runoff is very rapid. Erosion is a very severe hazard.

Minor soils make up about 15 percent of the complex. These include small areas or Loring and Providence soils on narrow upland ridgetops.

Most areas of these soils are used as woodland or pasture. These soils were formerly cultivated. Because of severe sheet and gully erosion, crops are no longer grown. The Memphis soil and Udorthents are poorly suited to row crops, truck crops, small grains, and pasture. Because of the steep slopes and very severe erosion hazard, this complex is better suited to woodland than to other uses.

The Memphis soils are well suited to cherrybark oak, loblolly pine, water oak, sweetgum, and yellow-poplar. Plant competition is a moderate limitation, and erosion is a moderate hazard. The suitability of Udorthents soils is variable for loblolly pine trees. Seedling mortality is severe, but established trees have moderate growth rate.

The soils in this complex have severe limitations for urban uses because of the steep slopes and deep, wide gullies. The steep, rough slopes are severe limitations for use of these soils as septic tank absorption fields. These limitations can be partly overcome by installing field lines on the contour.

These soils are in capability subclass VIIe. The Memphis soils are in woodland suitability group 2o8. The Udorthents are not assigned to a woodland suitability group.

Mo—Morganfield silt loam. This is a nearly level, well drained soil that formed in silty alluvium on broad flood plains. This soil is subject to occasional flooding for brief periods in winter and early in spring. Slopes range from 0 to 2 percent.

Typically, the surface layer is dark brown silt loam about 7 inches thick. The underlying material is dark yellowish brown silt loam to a depth of about 27 inches. The material below that to a depth of about 38 inches is dark brown silt loam that has light brownish gray mottles; to a depth of 60 inches, it is yellowish brown silt loam mottled in shades of gray and brown.

This soil ranges from medium acid to neutral throughout. Permeability is moderate. Available water capacity is high. Runoff is slow, and erosion is a slight hazard. The high water table is within 3 to 4 feet of the surface in winter and early in spring. The root zone is deep and easily penetrated by plant roots. The surface layer is easy to keep in good tilth, but the surface tends to crust after hard rains. A plowpan will form if the soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Adler soils in slightly lower positions on the flood plain and Riedtown soils in positions similar to those of this Morganfield soil.

Most areas of this soil are used for crops or pasture. A small acreage is in woodland. This soil is well suited to row crops, small grains, and truck crops. Flooding, wetness, and slow runoff in wet seasons are limitations. Flooding rarely causes damage to crops during the growing season. Plant rows should be arranged and surface field ditches constructed to remove the excess surface water. Returning crop residue to the soil helps maintain fertility and tilth and reduces crusting. Preparing the seedbed and cultivating in the spring are sometimes slightly delayed because of excess moisture.

This soil is well suited to grasses and legumes for pasture or hay. Livestock overgrazing or grazing when the soil is too wet will cause surface compaction, slow infiltration, and poor tilth. Proper stocking, pasture rotation, and weed and brush control help to maintain the pasture and soil in good condition.

This soil is well suited to green ash, eastern cottonwood, yellow-poplar, sweetgum, Nuttall oak, water oak, and American sycamore. Plant competition is a moderate limitation; other limitations are slight.

This soil has severe limitations for dwelling sites and all urban uses because of flooding. Flooding and wetness are severe limitations for use of this soil as septic tank absorption fields.

This Morganfield soil is in capability subclass IIw and in woodland suitability group 1o4.

Oa—Oaklimeter silt loam. This is a nearly level, moderately well drained soil that formed in silty alluvium on broad flood plains. This soil is subject to occasional flooding for a few hours to about 1 or 2 days in winter and early in spring before crops are planted. Slopes range from 0 to 2 percent.

Typically, the surface layer is dark grayish brown silt loam about 5 inches thick. The subsoil extends to a depth of about 70 inches or more. The upper part to a depth of about 31 inches is dark brown silt loam that has gray mottles below 24 inches; the lower part is silt loam mottled in shades of gray and brown.

This soil is very strongly acid or strongly acid throughout. Permeability is moderate. Available water capacity is high. Runoff is slow, and erosion is a slight hazard. The high water table is within 1 1/2 to 2 1/2 feet of the surface in winter and early in spring. The root zone is deep and easily penetrated by plant roots. The surface layer is easy to keep in good tilth, but it tends to crust. A plowpan forms if the soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in the mapping are small areas of well drained Ariel soils in higher positions and Gillsburg soils in lower positions. Also included are a few small areas of a moderately well drained silty soil in positions similar to those of this Oaklimeter soil.

Most areas of this Oaklimeter soil are used for crops or pasture. A small acreage is in woodland. It is well suited to row crops, truck crops, and small grains (fig. 6). Flooding and seasonal wetness are limitations. Flooding rarely causes damage to crops during the growing season. Plant rows should be arranged and surface field ditches constructed to remove excess surface water. Returning crop residue to the soil helps maintain fertility and tilth and reduces crusting.

This soil is well suited to grasses and legumes for hay or pasture. Livestock overgrazing or grazing when the soil is too wet will cause poor tilth and surface compaction. Proper stocking, controlled grazing, and weed and brush control help keep the soil in good tilth and reduce compaction.

This soil is well suited to cherrybark oak, eastern cottonwood, green ash, loblolly pine, Nuttall oak, willow oak, water oak, sweetgum, and yellow-poplar. Plant competition is a moderate limitation; other limitations are slight.

This soil has severe limitations for all urban uses because of wetness and occasional flooding. Flooding and wetness are severe limitations for use of this soil as septic tank absorption fields.

This Oaklimeter soil is in capability subclass IIw and in woodland suitability group 1o7.

OG—Oaklimeter-Ariel-Gillsburg association. This map unit consists of nearly level, moderately well drained, well drained, and somewhat poorly drained soils. They formed in silty alluvium on the broad flood plain of the Big Black River and its numerous tributaries, some of which are in poorly defined channels. Additionally, there are common shallow sloughs, oxbow lakes, and abandoned channels. Debris, such as uprooted trees and driftwood, and sediment have partly clogged the natural drainage channels, which causes very slow runoff and ponding of shallow water in low places. These soils are frequently flooded for a few hours to several weeks in winter and spring. Periods of very heavy rainfall cause flooding during any season. These soils are in a regular and repeating pattern on the landscape. Individual areas of each soil are large enough to map separately, but because of similar present or predicted uses, they were mapped as one unit. Areas are wide and long and range from 200 to more than 3,500 acres. Slopes range from 0 to 2 percent.

The moderately well drained Oaklimeter soils, which make up about 46 percent of the map unit, are in slightly higher positions on the flood plain between the streams

Figure 6.—Milo sorghum on Oaklimeter silt loam.

and oxbow lakes. Typically, the surface layer is dark grayish brown silt loam about 5 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part to a depth of about 18 inches is dark yellowish brown silt loam that has pale brown mottles; to a depth of about 26 inches, it is silt loam mottled in shades of gray and brown; and the lower part is silt loam mottled in shades of gray and brown.

Oaklimeter soils are very strongly acid or strongly acid throughout. Permeability is moderate. Available water capacity is high. Runoff is slow, and erosion is a slight hazard. The high water table is within 1 1/2 to 2 1/2 feet of the surface in winter and early in spring. The rooting zone is deep and easily penetrated by plant roots.

The well drained Ariel soils, which make up about 34 percent of the map unit, are in slightly higher positions and on natural levees of the flood plains adjacent to channels, sloughs, and oxbow lakes. Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsoil extends to a depth of 65 inches or more. To a depth of about 26 inches, it is dark brown silt loam that has pale brown mottles; to a depth of about 30 inches, it is pale brown silt loam; to a depth of about 38 inches, it is dark brown silt loam; and below that layer, it is gray silt loam mottled in shades of brown.

Ariel soils are very strongly acid or strongly acid throughout. Permeability is moderately slow. Available water capacity is high. Runoff is slow, and erosion is a slight hazard. The high water table is within 2 to 3 feet of the surface in winter and early in spring. The rooting zone is deep and easily penetrated by plant roots.

The somewhat poorly drained Gillsburg soils, which make up about 12 percent of the map unit, are on the lower parts of flood plains between the streams and old sloughs. Typically, the surface layer is dark brown silt loam about 5 inches thick. The subsoil extends to a depth of 60 inches. The upper part to a depth of about 18 inches is dark brown silt loam that has gray mottles; to about 34 inches, it is gray silt loam that has yellowish brown mottles; and the lower part is grayish brown silt loam that has yellowish brown mottles.

Gillsburg soils are very strongly acid or strongly acid throughout. Permeability is moderate in the upper part of the subsoil and moderately slow in the lower part. Available water capacity is high. Runoff is slow, and erosion is a slight hazard. The high water table is within 1 foot to 1 1/2 feet of the surface in winter and early in spring. The rooting zone is deep and easily penetrated by plant roots.

About 8 percent of this unit consists of minor soils. They include small areas of somewhat poorly drained silty soils on the flood plains and small areas of Calhoun soils in depressions and drainageways of stream terraces.

Most areas of the soils in this association are used as woodland (fig. 7). Some areas, which are less likely to be flooded, are used for crops or pasture; however, these soils are poorly suited to row crops, truck crops, and small grains because of wetness and flooding. These limitations can be overcome by a major flood control system and a drainage system.

The soils of this unit are moderately suited to grasses and legumes for hay or pasture. Proper stocking, controlled grazing, and weed and brush control help maintain good tilth and reduce compaction. Livestock should be moved to a higher elevation when flooding is imminent.

These soils are well suited to cherrybark oak, loblolly pine, eastern cottonwood, green ash, sweetgum, water oak, American sycamore, and yellow-poplar. Oaklimeter and Ariel soils have moderate equipment use limitations and Gillsburg soils have severe limitations. Seedling mortality and plant competition are moderate limitations on Oaklimeter, Ariel, and Gillsburg soils.

These soils have severe limitations for all urban uses because of frequent flooding and seasonal wetness. Flooding and wetness are severe limitations for use of these soils as septic tank absorption fields.

These soils are in capability subclass Vw. Oaklimeter and Ariel soils are in woodland suitability group 1w8, and Gillsburg soils are in woodland suitability group 2w9.

Pa—Pits-Udorthents complex. This map unit consists of sand pits, borrow pits, and Udorthents that are scattered throughout the county. These pits are open excavations from which sand and soil have been removed. Depth of the pits generally is about 25 feet.

Sand pits are open excavations from which sand material has been removed for use in roads, driveways, and parking areas. Some material from the pits is high in clay content.

Borrow pits are open excavations from which soil and underlying material was removed for use in constructing roads and dams.

Some abandoned pits are reverting to woodland. A few places have a good stand of pine trees.

Figure 7.—Logging operation for harvest of hardwood timber on Oaklimeter-Ariel-Gillsburg association.

Udorthents consists mainly of overburden that was removed from the surface as the pit was dug or of accumulations of sediment that eroded from bare pit walls and floors. The soil material supports low quality grass and trees.

In this complex, most of this vegetation has little economic value and is useful only for erosion control. Many acres are not protected from erosion. Pits are generally poorly suited to crops, pasture, or woodland.

Pits and Udorthents in this complex are not assigned to a capability subclass or to a woodland suitability group.

PoA—Providence silt loam, 0 to 2 percent slopes. This is a nearly level, moderately well drained soil that has a fragipan. This soil formed in a mantle of silty material overlying loamy material. It is on broad flats in uplands and stream terraces.

Typically, the surface layer is yellowish brown silt loam about 5 inches thick. The subsoil is silt loam and extends to a depth of about 60 inches. To about 9 inches, it is brown; to a depth of about 15 inches, it is strong brown; and to about 22 inches, it is yellowish brown. Below that layer, it is a yellowish brown fragipan mottled in shades of gray and brown.

This soil ranges from very strongly acid to medium acid throughout except where the surface has been limed. Permeability is moderate in the upper parts of the subsoil and moderately slow through the fragipan. Available water capacity is moderate. Runoff is slow, and erosion is a slight hazard. The high water table is perched above the fragipan within 1 1/2 to 3 feet of the surface in wet seasons. The fragipan restricts roots and limits the amount of water available to plants. The surface layer is friable and easily tilled within a wide range of moisture content. The surface tends to crust and pack after hard rains. A plowpan forms easily if the soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Grenada soils that are in positions similar to those of this Providence soil and small areas of Bude soils that are in depressions and drainageways of uplands and terraces.

Most areas of this soil are used for crops or pasture. A small acreage is in woodland. This soil is well suited to row crops, truck crops, and small grains. Plant row arrangement and grassed waterways are needed to remove excess surface water. Returning crop residue to the soil helps maintain fertility and tilth and reduces crusting and packing.

This soil is well suited to grasses and legumes for pasture or hay. Livestock overgrazing or grazing when the soil is too wet will cause surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help to keep the pasture and soil in good condition.

This soil is moderately suited to loblolly pine, shortleaf pine, Shumard oak, yellow-poplar, and sweetgum. Limitations are slight.

This soil has moderate limitations for most urban uses. The low strength of this soil is a severe limitation for streets and roads. Limitations for urban uses include seasonal wetness and the shrink-swell properties of the subsoil. Proper design and careful installation will help offset these limitations. The moderately slow permeability in the fragipan and wetness are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Providence soil is in capability subclass IIw and in woodland suitability group 3o7.

PoB2—Providence silt loam, 2 to 5 percent slopes, eroded. This is a gently sloping, moderately well drained soil that has a fragipan. This soil formed in a mantle of silty material overlying loamy material on broad uplands.

Typically, the surface layer is dark brown silt loam about 6 inches thick. The subsoil extends to a depth of about 70 inches or more. To a depth of about 14 inches, it is dark brown silt loam; to about 22 inches, it is strong brown silt loam. Below that layer to a depth of about 52 inches, it is a fragipan. The upper part of the fragipan to 28 inches is yellowish brown silt loam that has gray mottles; to 36 inches, it is silt loam mottled in shades of brown and gray; and the lower part is strong brown loam with gray mottles. Below the fragipan, the subsoil is yellowish red sandy clay loam mottled in shades of gray and brown.

In most areas of this eroded soil, part of the original surface layer has been removed by erosion, and tillage has mixed the remaining topsoil and subsoil. In some small areas, all of the plow layer is the original topsoil, and in other areas, the plow layer is mainly subsoil material. Some areas of this soil have a few rills and shallow gullies.

This soil ranges from very strongly acid to medium acid throughout except where the surfce has been limed. Permeability is moderate in the upper part of the subsoil and moderately slow through the fragipan. Available water capacity is moderate. Runoff is medium, and erosion is a moderate hazard. The high water table is perched above the fragipan within 1 1/2 to 3 feet of the surface in wet seasons. The fragipan restricts the roots and limits the amount of water available to plants. The surface layer has good tilth and is easily tilled within a wide range of moisture content. The surface tends to crust and pack after hard rains. A plowpan forms if the soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Grenada and Loring soils on uplands and terraces and Tippah soils on uplands. Also included are small areas of soils that have slopes ranging from 5 to 8 percent.

Most areas of this Providence soil are used for crops and pasture; a small acreage is in woodland. This soil is well suited to row crops, truck crops, and small grains. Conservation tillage, contour farming, terraces, and grassed waterways help slow runoff and control erosion. Returning crop residue to the soil helps maintain fertility and tilth and reduces crusting and packing.

This soil is well suited to grasses and legumes for pasture or hay. The plant cover helps slow runoff and control erosion. Livestock overgrazing or grazing when the soil is too wet will cause surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help to keep the pasture and soil in good condition.

This soil is moderately suited to loblolly pine, shortleaf pine, Shumard oak, yellow-poplar, and sweetgum. Limitations are slight.

This soil has moderate limitations for urban uses. The low strength of this soil is a severe limitation for streets and roads. Limitations for urban uses include seasonal wetness and the shrink-swell properties of the subsoil. Proper design and careful installation will help offset these limitations. The moderately slow permeability in the fragipan and wetness are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Providence soil is in capability subclass IIe and in woodland suitability group 3o7.

PoC2—Providence silt loam, 5 to 8 percent slopes, eroded. This is a sloping, moderately well drained soil that has a fragipan. This soil formed in a mantle of silty material overlying loamy material on ridgetops and side slopes in uplands.

Typically, the surface layer is dark brown silt loam about 4 inches thick. The subsoil extends to a depth of about 65 inches. To a depth of about 14 inches, it is dark brown silty clay loam; to 26 inches, it is strong brown silt loam. Below that layer the subsoil is a fragipan. To a depth of 40 inches, it is dark brown silt loam mottled in shades of gray and brown; below that layer, it is strong brown loam mottled in shades of gray and brown.

In most areas of this eroded soil, part of the original surface layer has been removed by erosion, and tillage has mixed the remaining topsoil and subsoil. In some small areas, all of the plow layer is the original topsoil, and in other areas, the plow layer is mainly subsoil. Some areas of this soil have a few rills and shallow gullies.

This soil ranges from very strongly acid to medium acid throughout except where the surface has been limed. Permeability is moderate in the upper part of the subsoil and moderately slow through the fragipan. Available water capacity is moderate. Runoff is medium, and erosion is a moderate hazard. The high water table is perched above the fragipan within 1 1/2 to 3 feet of the surface in wet seasons. The fragipan restricts roots and limits the amount of water available to plants. The surface layer has good tilth, is friable, and is easily tilled within a wide range in moisture content. The surface tends to crust and pack after hard rains. A plowpan forms if the soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Loring and Tippah soils in positions similar to those of this Providence soil. Also included are a few small areas of soils that are severely eroded and a few small areas of soils that have slopes ranging from 2 to 5 percent.

Most areas of this soil are used for pasture or crops; a small acreage is in woodland. This soil is moderately suited to row crops, truck crops, and small grains. The erosion hazard and runoff are increased if row crops are grown. Conservation tillage, contour farming, terraces, grassed waterways, and cropping systems that include grasses and legumes help slow runoff and control erosion. Returning crop residue to the soil helps maintain fertility and tilth and reduces crusting and packing.

This soil is moderately suited to grasses and legumes for pasture or hay. The plant cover helps slow runoff and control erosion. Livestock overgrazing or grazing when the soil is too wet will cause surface compaction, excessive runoff, and poor tilth. In a few places, smoothing and shaping of gullies are needed. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help to keep the pasture and soil in good condition.

This soil is moderately suited to loblolly pine, shortleaf pine, Shumard oak, yellow-poplar, and sweetgum. Limitations are slight.

This soil has moderate limitations for most urban uses. The low strength of this soil for streets and roads is a severe limitation. Limitations for urban uses include seasonal wetness and the shrink-swell properties of the subsoil. Proper design and careful installation will help overcome these limitations. The moderately slow permeability in the fragipan and wetness are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Providence soil is in capability subclass IIIe and woodland suitability group 3o7.

PoC3—Providence silt loam, 5 to 8 percent slopes, severely eroded. This is a sloping, moderately well drained soil that has a fragipan. This soil formed in a mantle of silty material overlying loamy material on ridgetops and side slopes on uplands.

Typically, the surface layer is dark brown silt loam about 3 inches thick. The subsoil extends to a depth of about 66 inches. To a depth of about 16 inches, it is dark brown silty clay loam; to 21 inches, it is yellowish brown silt loam. Below that layer is a fragipan. To about

29 inches, it is yellowish brown silt loam mottled in shades of gray; to about 48 inches, it is light yellowish brown loam mottled in shades of gray.

In most areas of this severely eroded soil, the original surface layer has been lost through erosion, and the plow layer is subsoil material. However, in some small areas, the surface layer is a mixture of topsoil and subsoil. Rills and shallow gullies are common. In a few areas of this soil, a few deep gullies that are not crossable with farm machinery have formed.

This soil ranges from very strongly acid to medium acid throughout except where the surface has been limed. Permeability is moderate in the upper part of the subsoil and moderately slow through the fragipan. Available water capacity is moderate. Runoff is medium to rapid, and erosion is a severe hazard. A high water table is perched above the fragipan within 1 1/2 to 3 feet of the surface in wet seasons. The fragipan restricts roots and limits the water available to plants.

Included in mapping are small areas of soils that have a silty clay loam surface layer and small areas of soils where erosion has exposed the fragipan. These soils are in positions similar to those of this Providence soil. Also included are small areas of Grenada and Loring soils on uplands and terraces and Tippah soils on uplands.

Most areas of this Providence soil are used for pasture or crops. A small acreage is in woodland. This soil is poorly suited to row crops, truck crops, and small grains because erosion is a hazard. Further loss by erosion is possible if cultivated crops are grown. These soils are better suited to a permanent vegetative cover of grasses and legumes or trees.

This soil is moderately suited to grasses and legumes for pasture or hay. The plants help slow runoff and control erosion. Smoothing rills and shaping gullies may be necessary to help make mowing and other production practices easier. Livestock overgrazing or grazing when the soil is too wet will cause surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help to keep the pasture and soil in good condition.

This soil is moderately suited to loblolly pine, shortleaf pine, Shumard oak, yellow-poplar, and sweetgum. Limitations are slight.

This soil has moderate limitations for most urban uses. Low strength of this soil for streets and roads and seasonal wetness are the major limitations. Proper design and careful installation will help offset these limitations. The moderately slow permeability in the fragipan and the wetness are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Providence soil is in capability subclass IVe and in woodland suitability group 3o7.

PrD2—Providence-Lexington complex, 8 to 12 percent slopes, eroded. This map unit consists of small areas of strongly sloping Providence and Lexington soils on uplands. These soils are so intermingled that mapping them separately was not practical. The moderately well drained Providence soil has a fragipan. This soil formed in a mantle of silty material overlying loamy material on ridgetops and upper side slopes. The well drained Lexington soil formed in a mantle of silty material overlying loamy material on middle and lower side slopes. Areas of these soils range from 20 to 100 acres.

Providence soil makes up about 60 percent of the map unit. Typically, the surface layer is grayish brown silt loam about 5 inches thick. The subsoil extends to a depth of about 65 inches or more. To a depth of about 25 inches, it is strong brown silt loam that grades to dark brown below about 10 inches. To a depth of about 55 inches, it is a fragipan that is silt loam to about 32 inches and loam below. The fragipan is yellowish brown mottled in shades of gray and brown. The underlying material is yellowish red sandy loam mottled in shades of brown.

Providence soil ranges from very strongly acid to medium acid throughout except where the surface layer has been limed. Permeability is moderate in the upper part of the subsoil and moderately slow in the fragipan. Available water capacity is moderate. Runoff is rapid, and erosion is a severe hazard. A high water table is perched above the fragipan within 1 1/2 to 3 feet of the surface in wet seasons. The fragipan restricts roots and limits the amount of water available to plants.

Lexington soil makes up about 25 percent of the map unit. Typically, the surface layer is brown silt loam about 4 inches thick. The subsoil extends to a depth of about 72 inches. The upper part to a depth of about 40 inches is yellowish red silt loam that is mottled in the lower part in shades of brown and gray; to a depth of about 56 inches, it is strong brown sandy loam that has red and gray mottles; to a depth of about 62 inches, it is sandy loam; to 72 inches, it is loam; and the lower part is yellowish red mottled in shades of brown.

Lexington soil ranges from very strongly acid to medium acid throughout except where the surface layer has been limed. Permeability is moderate. Available water capacity is moderate. Runoff is rapid, and the erosion hazard is severe. The high water table is more than 6 feet below the surface. This soil has a deep rooting zone, and it is easily penetrated by plant roots.

In most areas of these eroded soils, part of the original surface layer has been removed by erosion, and tillage has mixed the remaining topsoil and subsoil. In some small areas, all of the plow layer is the original topsoil, and in other areas, the plow layer is subsoil material. Some areas of this soil have a few rills and shallow gullies.

Included in mapping are small areas of Smithdale soils on steep upland side slopes of the uplands. These soils make up about 15 percent of the complex.

Most of the soils in this complex are used for pasture or as woodland. A small acreage is used for crops. These soils are poorly suited to row crops, truck crops, and small grains because of the steep slopes, rapid runoff, and erosion hazard. The soils are better suited to a permanent vegetative cover of grasses and legumes or trees because of the erosion hazard.

The soils in this complex are moderately suited to grasses and legumes for hay or pasture. The plant cover helps control erosion. Smoothing and shaping of gullies are needed in a few places. Proper stocking, controlled grazing, and weed and brush control help to control erosion, slow runoff, and reduce surface compaction.

The soils in this complex are moderately suited to Shumard oak, sweetgum, cherrybark oak, loblolly pine, shortleaf pine, yellow-poplar, and southern red oak. Plant competition is a moderate limitation on the Lexington soil; other limitations are slight.

These soils have moderate limitations for most urban uses. The low strength of these soils is a severe limitation for streets and roads. The steepness of slopes is a moderate limitation for some urban uses, but it is severe for small commercial buildings. The moderately slow permeability of the fragipan and wetness are severe limitations for use of Providence soil as septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field. The steepness of slopes is a moderate limitation for use of Lexington soil as septic tank absorption fields. This limitation can be partly overcome by installing field lines on the contour.

These soils are in capability subclass IVe and in woodland suitability group 3o7.

PrD3—Providence-Lexington complex, 8 to 12 percent slopes, severely eroded. This map unit consists of small areas of strongly sloping Providence and Lexington soils on uplands. These soils are so intermingled that mapping them separately was not practical. The moderately well drained Providence soil has a fragipan. This soil formed in a mantle of silty material overlying loamy material on ridgetops and upper side slopes. The well drained Lexington soil formed in a mantle of silty material overlying loamy material on middle and lower side slopes. Areas of these soils range from 15 to 120 acres.

Providence soil makes up about 60 percent of the map unit. Typically, the surface layer is dark brown silt loam about 3 inches thick. The subsoil extends to a depth of about 65 inches. To a depth of about 23 inches, it is a dark brown silty clay loam. Below that layer is a silt loam fragipan that grades to loam as depth increases. The fragipan is yellowish brown mottled in shades of gray.

Providence soil ranges from very strongly acid to medium acid throughout except where the surface layer has been limed. Permeability is moderate in the upper part of the subsoil and moderately slow through the fragipan. Available water capacity is moderate. Runoff is rapid, and erosion is a severe hazard. A high water table is perched above the fragipan within 1 1/2 to 3 feet of the surface in wet seasons. The fragipan restricts roots and limits the water available to plants.

Lexington soil makes up about 25 percent of the map unit. Typically, the surface layer is dark grayish brown silt loam about 1 inch thick. The subsurface layer to a depth of about 3 inches is brown silt loam. The subsoil extends to a depth of about 65 inches. The upper part to a depth of about 23 inches is dark brown silty clay loam; to a depth of about 30 inches, it is strong brown loam mottled in shades of brown and gray; and the lower part is yellowish brown sandy loam mottled in shades of brown.

Lexington soil ranges from very strongly acid to medium acid throughout except where the surface layer has been limed. Permeability is moderate. Available water capacity is moderate. Runoff is rapid, and erosion is a severe hazard. The high water table is more than 6 feet below the surface. The root zone is deep and easily penetrated by plant roots.

In most areas of these severely eroded soils, the original surface layer has been lost through erosion, and the plow layer is subsoil material. In some small areas, the surface layer is a mixture of original topsoil and subsoil. Rills and shallow gullies are common. In a few areas of these soils, a few deep gullies that are not crossable with farm machinery have formed.

Included in mapping are small areas of Smithdale soils on side slopes of the uplands. These soils make up about 15 percent of the complex.

Most of the soils in this complex are used for pasture or as woodland. These soils are poorly suited to row crops, truck crops, and small grains because of the erosion hazard and the steep slopes. If cultivated crops are grown, further losses by erosion are possible. The soils are better suited to a permanent vegetative cover of grasses and legumes or trees because of the erosion hazard.

These soils are moderately suited to grasses and legumes for hay or pasture. The plant cover helps control erosion. Smoothing and shaping of gullies help make mowing and other production practices easier. Overgrazing by livestock causes excessive runoff and increases the erosion hazard. Proper stocking, controlled grazing, and weed and brush control help slow runoff and reduce the erosion hazard.

These soils are moderately suited to Shumard oak, cherrybark oak, loblolly pine, shortleaf pine, yellow-poplar, sweetgum, and southern red oak. Plant competition is a moderate limitation on the Lexington soil; other limitations are slight.

These soils have moderate limitations for most urban uses. The low strength of the soil for streets and roads and the steep slopes are the main limitations. Proper design and careful installation will help overcome these limitations. The Providence soil has severe limitations because of wetness and the moderately slow permeability of the fragipan. These limitations can be partly overcome by increasing the size of the field. Steepness of slopes is a moderate limitation for use of Lexington soil as septic tank absorption fields. This limitation can be partly overcome by installing field lines on the contour.

These soils are in capability subclass VIe and in woodland suitability group 3o7.

Pu—Providence-Udorthents complex, gullied. This map unit consists of small areas of sloping to moderately steep Providence soil, and small areas of sloping to steep Udorthents and gullies that are so intermingled that mapping them separately was not practical. The moderately well drained Providence soil has a fragipan. This soil formed in a mantle of silty material overlying loamy material on upland slopes and narrow ridges between deep, wide, irregularly branching gullies. The gullies range from 3 to 30 feet deep. The heads of gullies are V-shaped but farther down course they have flat bottoms. The Udorthents are very severely eroded soils formed in silty and loamy materials between Providence soils and the gullies. Areas are irregular in shape and range from 15 to 160 acres. Slopes range from 7 to 18 percent.

Providence soil makes up about 45 percent of the map unit. Typically, the surface layer is dark brown silt loam about 3 inches thick. The subsoil extends to a depth of about 60 inches or more. To a depth of about 18 inches, it is strong brown silt loam. A fragipan extends to a depth of about 60 inches. To a depth of 32 inches, it is yellowish brown silt loam that has mottles in shades of gray and brown; to about 60 inches, the fragipan is yellowish brown loam that has mottles in shades of gray.

Providence soil ranges from very strongly acid to medium acid throughout. Permeability is moderate in the upper part of the subsoil and moderately slow in the fragipan. Available water capacity is moderate. Runoff is rapid, and erosion is a severe hazard. The high water table is perched above the fragipan within 1 1/2 to 3 feet of the surface in wet seasons. The fragipan restricts roots and limits the water available to plants.

The Udorthents and gullies make up about 35 percent of the map unit. Typically, the Udorthents are soils that have been so severely eroded by water that the identifying soil horizons have been washed away and deposited as sediment. The surface texture is predominantly silt loam or silty clay loam except along gullies where it is loam or sandy clay loam.

Udorthents range from very strongly acid to medium acid. Permeability rates are variable. Available water capacity is low. Runoff is very rapid. Erosion is a very severe hazard.

Included in mapping are small areas of Smithdale soils on steep side slopes and Loring soils on narrow ridgetops of uplands. These soils make up about 20 percent of the complex.

Most of the soils in this complex are used as woodland or for pasture. The soils were formerly cultivated. Because of the severe sheet and gully erosion, row crops, truck crops, and small grains can no longer be grown.

The Providence soil, Udorthents, and gullies are poorly suited to pasture because of low productivity and the severe hazard of erosion. The soils of this complex are better suited to woodland than to other uses.

The Providence soil is moderately suited to Shumard oak, loblolly pine, shortleaf pine, yellow-poplar, and sweetgum. Limitations of Providence soil are slight. The suitability of Udorthents is variable for hardwoods or pine trees. The seedling mortality rate is severe, but once trees are established, they have a moderate growth rate.

These soils have severe limitations for urban uses. The steep slopes, the deep, wide gullies, and low strength for local streets and roads are the main limitations. The soils have severe limitations for use as septic tank absorption fields because of the steep, rough slopes and in Providence soil, the wetness and the moderately slow permeability of the fragipan. These limitations can be partly overcome by increasing the size of the absorption field and installing field lines on the contour.

These soils are in capability subclass VIIe. The Providence soil is in woodland suitability group 3o7. Udorthents are not assigned to a woodland suitability group.

Re—Riedtown silt loam. This is a nearly level, moderately well drained soil that formed in silty alluvium on broad flood plains. This soil is subject to occasional flooding for a few hours to about 1 or 2 days in winter or early in spring. Slopes range from 0 to 2 percent.

Typically, the surface layer is dark brown silt loam about 6 inches thick. The subsoil extends to a depth of 80 inches or more. To a depth of about 14 inches, it is dark brown silt loam mottled in shades of lighter brown; to a depth of about 32 inches, it is dark brown silt loam that has grayish brown mottles; to a depth of about 45 inches, it is grayish brown silt loam that has yellowish brown mottles; to a depth of 64 inches, it is gray silt loam mottled with yellowish brown; and to 80 inches, it is dark gray silt loam.

This soil ranges from strongly acid to neutral in the surface layer and from medium acid to neutral in the subsoil. Permeability is moderate. Available water capacity is very high. Runoff is slow, and erosion is a slight hazard. The high water table is within 1 1/2 to 3 1/2 feet of the surface in winter and early in spring. The root zone is deep and easily penetrated by plant roots. The surface layer is easy to keep in good tilth, but it tends to crust after hard rains. A plowpan forms if the soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Adler, McRaven, and Oaklimeter soils on flood plains.

Most areas of this soil are used for crops or pasture except for a small acreage that is in woodland. This soil is well suited to row crops, truck crops, and small grains. Seasonal wetness and flooding are limitations. Row arrangement and surface field ditches are needed to remove excess surface water. Returning crop residue to the soil helps maintain fertility and tilth and reduces crusting and packing. Preparing the seedbed and cultivating are sometimes delayed in the spring because of wetness.

This soil is well suited to grasses and legumes for hay or pasture. Livestock overgrazing or grazing when the soil is too wet will cause surface compaction and poor tilth. Proper stocking, controlled grazing, and weed and brush control will help to improve tilth and reduce compaction.

This soil is well suited to eastern cottonwood, green ash, sweetgum, American sycamore, water oak, willow oak, and yellow-poplar. Plant competition is a moderate limitation; other limitations are slight.

This soil has severe limitations for urban uses because of flooding and wetness. Flooding and wetness also are severe limitations for use of this soil as septic tank absorption fields.

This Riedtown soil is in capability subclass IIw and in woodland suitability group 1o4.

SeB2—Siwell silt loam, 2 to 5 percent slopes, eroded. This is a gently sloping, moderately well drained soil that formed in a mantle of silty material and underlying alkaline clays. This soil is on ridgetops on uplands.

Typically, the surface layer is yellowish brown silt loam about 5 inches thick. The subsoil extends to a depth of about 26 inches or more. The upper part is yellowish brown silt loam to a depth of about 11 inches; the lower part is yellowish brown silty clay loam mottled in shades of gray. The underlying material to a depth of 65 inches is yellowish brown clay mottled in shades of gray and brown.

In most areas of this eroded soil, part of the original surface layer has been removed by erosion, and tillage has mixed the remaining topsoil and subsoil. In some small areas, all of the plow layer is the original topsoil, and in other areas, the plow layer is mainly subsoil material. Some areas of this soil have a few rills and shallow gullies.

This soil ranges from very strongly acid to medium acid in the surface layer and upper part of the subsoil except where the surface has been limed. The lower part of the subsoil ranges from slightly acid to moderately alkaline, and the underlying clayey material ranges from neutral to moderately alkaline. Permeability is moderate in the upper part of the subsoil and very slow in the lower part. Available water capacity is high. Runoff is medium, and erosion is a moderate hazard. The high water table is perched within 2 1/2 to 3 feet of the surface in winter and early in spring. The very slow permeability of the clayey underlying material restricts roots. This soil is easy to keep in good tilth, but the surface tends to crust and pack after hard rains. A plowpan forms if the soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Byram and Providence soils on uplands. Also included are small areas of soils that are severely eroded.

Most areas of this Siwell soil are used for pasture or crops; some small acreages are in woodland. This soil is well suited to cultivated crops, truck crops, and small grains. The erosion hazard and runoff are increased if cultivated crops are grown. Conservation tillage, contour farming, terraces, grassed waterways, and cropping systems that include grasses and legumes help slow runoff and control erosion. Returning crop residue to the soil helps maintain fertility and increases water infiltration.

This soil is moderately suited to grasses and legumes for hay or pasture. Proper stocking, controlled grazing, and weed and brush control slow runoff, prevent erosion, and reduce surface compaction. Restricted use during wet periods helps to keep the pasture and soil in good condition.

This soil is moderately suited to cherrybark oak, loblolly pine, sweetgum, Shumard oak, white oak, and yellow-poplar. Limitations are slight.

This soil has severe limitations for urban uses. The low strength of this soil for local streets and roads and the high shrink-swell properties are severe limitations. Proper design and careful installation will help overcome these limitations. The slow permeability of the clayey lower part of the subsoil and wetness are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the field size.

The Siwell soil is in capability subclass IIe and in woodland suitability group 3o7.

SeD3—Siwell silt loam, 8 to 12 percent slopes, severely eroded. This is a strongly sloping, moderately well drained soil that formed in a mantle of silty material and underlying alkaline clay. This soil is on side slopes on uplands.

Typically, the surface layer is dark brown silt loam about 5 inches thick. The subsoil extends to a depth of about 38 inches. The upper part to about 26 inches is yellowish brown silty clay loam that below 13 inches has mottles in shades of red and gray; the lower part to about 38 inches is light olive brown silty clay mottled in shades of brown and gray. The underlying material to 70 inches is light yellowish brown clay that has grayish mottles below about 54 inches.

In most areas of this severely eroded soil, the original surface layer has been lost through erosion, and the plow layer is subsoil material. In some small areas, the surface layer is a mixture of topsoil and subsoil. Rills and shallow gullies are common, and in a few areas, a few deep gullies that are not crossable with farm machinery have formed. This severely eroded soil has poor tilth. The optimum range of moisture for working this soil is narrow. If tillage is done when the soil is too wet or too dry, clods tend to form.

This soil ranges from very strongly acid to medium acid in the surface layer and upper part of the subsoil except where the surface has been limed. The lower part of the subsoil ranges from slightly acid to moderately alkaline and from neutral to moderately alkaline in the underlying clayey material. Permeability is moderate in the upper part of the subsoil and very slow in the lower part. Available water capacity is high. Runoff is rapid, and erosion is a severe hazard. The high water table is perched within 2 1/2 to 3 feet of the surface in winter and early in spring. The very slow permeability of the clayey underlying material restricts roots.

Included in mapping are small areas of Byram and Providence soils on uplands. Also included are small areas of soils that are less eroded and small areas where slopes are less than 8 percent.

Most areas of this Siwell soil are used for pasture. A small acreage is in woodland. This soil is poorly suited to row crops, truck crops, and small grains because of the severe erosion hazard, the rapid runoff, and the steepness of slope. The soil is better suited to a permanent vegetative cover of grasses and legumes or trees.

This soil is moderately suited to grasses and legumes for hay or pasture. The plant cover helps control erosion. Smoothing and shaping gullies help make mowing and other production practices easier. Overgrazing by livestock causes excessive runoff and increases the erosion hazard. Proper stocking, controlled grazing, and weed and brush control help slow runoff and reduce the erosion hazard.

This soil is moderately suited to cherrybark oak, loblolly pine, sweetgum, Shumard oak, white oak, and yellow-poplar. Limitations are slight.

This soil has severe limitations for urban uses. Low strength of this soil for local streets and roads, steepness of slopes, and the high shrink-swell properties are severe limitations. Proper design and careful installation will help overcome these limitations. The wetness and low permeability of the clayey lower subsoil are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the field size.

The Siwell soil is in capability subclass VIe and in woodland suitability group 3o7.

SpD2—Smithdale-Providence complex, 8 to 12 percent slopes, eroded. This complex consists of small areas of strongly sloping Smithdale and Providence soils on uplands that are so intermingled that mapping them separately was not practical. The well drained Smithdale soil formed in loamy material on side slopes. The moderately well drained Providence soil that has a fragipan formed in a mantle of silty material and underlying loamy material. The Providence soil is on ridgetops and upper side slopes. Areas range from 30 to 140 acres.

Smithdale soil makes up about 52 percent of the map unit. Typically, the surface layer is grayish brown fine sandy loam about 4 inches thick. The subsurface layer to a depth of about 12 inches is brown sandy loam. The subsoil extends to a depth of about 80 inches or more. The upper part to a depth of about 25 inches is yellowish red sandy clay loam; to a depth of about 34 inches, it is yellowish red loam; and the lower part is yellowish red loam.

Smithdale soil is very strongly acid or strongly acid throughout. Permeability is moderate. Available water capacity is high. Runoff is rapid, and erosion is a severe hazard. The high water table is more than 6 feet below the surface. The root zone is deep and easily penetrated by plant roots.

Providence soil makes up about 38 percent of the map unit. Typically, the surface layer is brown silt loam about 6 inches thick. The subsoil extends to a depth of about 60 inches or more. To a depth of about 15 inches, it is strong brown silty clay loam. To a depth of 42 inches, it is a fragipan. The fragipan is yellowish brown, and below about 24 inches, it is mottled in shades of gray; it is silt loam in the upper part and loam in the lower part. To about 60 inches, the subsoil is strong brown sandy loam.

Providence soil ranges from very strongly acid to medium acid throughout. Permeability is moderate in the upper part and moderately slow in the fragipan. Available water capacity is moderate. Runoff is rapid, and erosion is a severe hazard. The high water table is perched above the fragipan within 1 1/2 to 3 feet of the surface in wet seasons. The fragipan restricts roots and limits the water available to plants.

In most areas of soils in this complex, part of the original surface layer has been removed by erosion, and tillage has mixed the topsoil and subsoil. In some areas, all of the plow layer is the original topsoil, and in other areas, the plow layer is mainly subsoil material. Some areas of these soils have a few rills and shallow gullies.

Included in mapping are small areas of Lexington, Loring, and Tippah soils on uplands. Also included are some severely eroded areas of soils. These soils make up about 10 percent of the complex.

Most soils in this complex are used for pasture or as woodland. A small acreage is used for crops. These soils are poorly suited to row crops, truck crops, and small grains because of the steepness of slopes, rapid runoff, and the severe erosion hazard. These soils are better suited to a permanent vegetative cover of grasses and legumes or trees.

The soils in this complex are moderately suited to grasses and legumes for hay or pasture. The plant cover helps control erosion. Smoothing and shaping of gullies are needed in a few places. Proper stocking, controlled grazing, and weed and brush control help to control erosion, slow runoff, and reduce surface compaction.

The soils in this complex are moderately suited to Shumard oak, loblolly pine, longleaf pine, shortleaf pine, slash pine, and sweetgum (fig. 8). Plant competition is a moderate limitation on the Smithdale soils; other limitations are slight.

These soils have moderate limitations for urban uses. For small commercial buildings, the steepness of slope is a severe limitation. For local roads and streets, the steepness of slope is a moderate limitation of Smithdale soil, and low strength is a severe limitation of Providence soil. The steepness of slopes is a moderate limitation for use of Smithdale soil as septic tank absorption fields. This can be partly overcome by installing field lines on the contour. Wetness and the moderately slow permeability in the fragipan are severe limitations for use of Providence soil as septic tank absorption fields. Increasing the size of the absorption field can partly overcome these limitations.

These Smithdale and Providence soils are in capability subclass IVe. Smithdale soil is in woodland suitability group 3o1, and Providence soil is in woodland suitability group 3o7.

SpD3—Smithdale-Providence complex, 8 to 12 percent slopes, severely eroded. This complex

Figure 8.—Loblolly pine trees on Smithdale-Providence complex, 8 to 12 percent slopes, eroded. Loblolly pine has a site index of 80 on Smithdale soils and 84 on Providence soils.

consists of small areas of strongly sloping Smithdale and Providence soils that are so intermingled that mapping them separately was not practical. The well drained Smithdale soil formed in loamy material on side slopes. The moderately well drained Providence soil that has a fragipan formed in a mantle of silty material and underlying loamy material. The Providence soil is on ridgetops and upper side slopes. Areas range from 30 to 140 acres.

Smithdale soil makes up about 52 percent of the map unit. Typically, the surface layer is brown fine sandy loam about 3 inches thick. The subsoil extends to a depth of 70 inches or more. The upper part to a depth of about 23 inches is yellowish red sandy clay loam; to a depth of about 42 inches, it is red loam; and the lower part is red sandy loam.

Smithdale soil is very strongly acid or strongly acid throughout. Permeability is moderate. Available water capacity is high. Runoff is rapid, and erosion is a severe hazard. The high water table is more than 6 feet below the surface. The root zone is deep and easily penetrated by plant roots.

Providence soil makes up about 38 percent of the map unit. Typically, the surface layer is yellowish brown silt loam about 4 inches thick. The subsoil extends to a depth of about 60 inches or more. To a depth of about 20 inches, it is brown silt loam. The lower part is a fragipan that is silt loam in the upper part and loam in the lower part. The fragipan is yellowish brown mottled in shades of gray and brown.

Providence soil is very strongly acid to medium acid throughout. Permeability is moderate in the upper part and moderately slow in the fragipan. Available water capacity is moderate. Runoff is rapid, and erosion is a severe hazard. The high water table is perched above the fragipan within 1 1/2 to 3 feet of the surface in wet seasons. The fragipan restricts root growth and the water available to plants.

In most areas of these soils, the original surface layer has been lost through erosion, and much of the surface layer is subsoil material. In some areas, the surface layer is a mixture of original topsoil and subsoil. Rills and shallow gullies are common, and in places, a few deep gullies that are not crossable with farm machinery have formed.

Included in mapping are small areas of Lexington, Loring, and Tippah soils on uplands. Also included are small areas of soil that is less eroded. These soils make up about 10 percent of the complex.

Most areas of soils in this complex are used for pasture or as woodland. A small acreage is used for crops. These soils are poorly suited to row crops, truck crops, and small grains because of the steepness of slope, rapid runoff, and the severe erosion hazard. These soils are better suited to a permanent vegetative cover of grasses and legumes or trees because of the erosion hazard.

Soils in this complex are moderately suited to grasses and legumes for hay or pasture. Smoothing and shaping of gullies are needed in a few places. Proper stocking, controlled grazing, and weed and brush control will help to control erosion, slow runoff, and reduce surface compaction.

Soils in this complex are moderately suited to Shumard oak, loblolly pine, longleaf pine, shortleaf pine, slash pine, and sweetgum. Plant competition on Smithdale soils is a moderate limitation; other limitations are slight.

Soils in this complex have moderate limitations for urban uses. Steepness of slopes is the main limitation, but this can be overcome by proper design and careful installation. For small commercial buildings, steepness of slopes is a severe limitation. For local roads and streets, the limitations on Providence soils are severe. The steepness of slopes is a moderate limitation for use of Smithdale soil as septic tank absorption fields. This can be partly overcome by installing field lines on the contour. Wetness and the moderately slow permeability in the fragipan are severe limitations for use of Providence soil as septic tank absorption fields. Increasing the size of the absorption field can partly overcome these limitations.

The soils in this complex are in capability subclass Vle; Smithdale soil is in woodland suitability group 3o1, and Providence soil is is woodland suitability group 3o7.

SpE2—Smithdale-Providence complex, 12 to 17 percent slopes, eroded. This complex consists of small areas of moderately steep Smithdale and Providence soils that are so intermingled that mapping them separately was not practical. The well drained Smithdale soil formed in loamy material on side slopes. The moderately well drained Providence soil, which has a fragipan, formed in a mantle of silt material and underlying loamy material. The Providence soil is on ridgetops and upper side slopes. Areas range from 25 to 170 acres.

Smithdale soil makes up about 50 percent of the map unit. Typically, the surface layer is dark grayish brown fine sandy loam about 2 inches thick. The subsurface layer to a depth of about 10 inches is brown fine sandy loam. The subsoil extends to a depth of about 80 inches or more. The upper part to a depth of about 28 inches is red sandy clay loam; to a depth of about 46 inches, it is red sandy loam mottled in shades of brown; and the lower part is yellowish red sandy loam.

Smithdale soils are very strongly acid or strongly acid throughout. Permeability is moderate. Available water capacity is high. Runoff is rapid, and erosion is a severe hazard. The high water table is more than 6 feet below the surface. The root zone is deep and easily penetrated by plant roots.

Providence soil makes up about 38 percent of the map unit. Typically, the surface layer is grayish brown silt loam about 5 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part to a depth of about 22 inches is strong brown silty clay loam. The lower part to a depth of 60 inches is a fragipan that is yellowish red sandy clay loam that has grayish mottles. Below about 27 inches, the fragipan grades to yellowish red loam that has mottles in shades of brown and gray.

Providence soil ranges from very strongly acid to medium acid throughout. Permeability is moderate in the upper part of the subsoil and moderately slow in the fragipan. Available water capacity is moderate. Runoff is rapid, and erosion is a severe hazard. The high water table is perched above the fragipan within 1 1/2 to 3 feet of the surface in wet seasons. The fragipan restricts roots and the water available to plants.

In most areas, part of the original surface layer has been removed by erosion, and tillage has mixed the topsoil and subsoil. In places, all of the plow layer is the original topsoil, and in other places, the plow layer is subsoil material. Some areas of these soils have a few rills and shallow gullies.

Included in mapping are some small areas of Lexington and Tippah soils on uplands. Also included are small, severely eroded areas of soils. These soils make up about 12 percent of the complex.

Most areas of soils in this complex are used as woodland. A small acreage is used for pasture. Soils in this complex are poorly suited to row crops, truck crops, and small grains because of the steepness of slope and the severe erosion hazard. These soils are better suited to a permanent vegetative cover of grasses and legumes or trees.

These soils are poorly suited to pasture because of low productivity. If the soils are used for pasture, proper stocking, controlled grazing, and weed and brush control are necessary. Steepness of slope and hillside drainageways are limitations to equipment use. Smoothing and shaping of gullies are needed in a few places.

Soils in this complex are moderately suited to Shumard oak, loblolly pine, longleaf pine, shortleaf pine, slash pine, and sweetgum. Plant competition on Smithdale soils is a moderate limitation; other limitations are slight.

Soils in this complex have moderate and severe limitations for urban uses. Steep side slopes are the main limitations. For small commercial buildings, the steepness of slopes is a severe limitation. For local roads and streets, the low strength of Providence soil is a severe limitation. Steepness of slopes is a moderate limitation for use of Smithdale soil as septic tank absorption fields. This can be partly overcome by installing field lines on the contour. Wetness and the moderately slow permeability of the fragipan are severe limitations for use of Providence soil as septic tank absorption fields. Increasing the size of the absorption field can partly overcome these limitations.

The soils in this complex are in capability subclass VIe. Smithdale soil is in woodland suitability group 3o1, and Providence soil is in woodland suitability group 3o7.

SR—Smithdale-Providence association, hilly. This map unit consists of well drained and moderately well drained soils. The landscape is one of narrow winding ridgetops, segregated by moderately steep to steep hillsides that border narrow drainageways. The Smithdale soils formed in loamy material on side slopes. The Providence soils, which have a fragipan, formed in a mantle of silty material and underlying loamy material. These soils are in a regular and repeating pattern on the landscape. Individual areas of each soil are large enough to map separately, but because of similar present and expected uses, they were mapped as one unit. Areas range from 160 to 4,000 acres. Slopes range from 12 to 30 percent.

The well drained Smithdale soils make up about 52 percent of the map unit. Slopes range from 12 to 30 percent. Typically, the surface layer is very dark grayish brown and light yellowish brown sandy loam about 1 inch thick. The subsurface layer to a depth of about 9 inches is yellowish brown sandy loam. The subsoil extends to a depth of about 80 inches or more. To a depth of about 12 inches, it is strong brown sandy loam; to a depth of about 28 inches, it is red sandy clay loam that has a few pockets of uncoated sand grains; and to 80 inches, it is red sandy loam that has pockets of uncoated sand grains.

Smithdale soils are very strongly acid or strongly acid throughout. Permeability is moderate. Available water capacity is high. Runoff is rapid, and erosion is a severe hazard. The high water table is more than 6 feet below the surface. The root zone is deep and easily penetrated by plant roots.

The moderately well drained Providence soils make up about 28 percent of the map unit. Slopes range from 12 to 15 percent. Typically, the surface layer is light yellowish brown silt loam about 4 inches thick. The subsoil extends to a depth of about 65 inches or more. The upper part to a depth of about 21 inches is dark brown silty clay loam. To about 48 inches, it is a fragipan that is silt loam in the upper part and loam in the lower part; throughout, the fragipan is mottled in shades of brown and gray. Below the fragipan, the subsoil is yellowish red sandy loam that has grayish mottles.

Providence soils range from very strongly acid to medium acid throughout. Permeability is moderate in the upper part of the subsoil and moderately slow in the fragipan. Available water capacity is moderate. Runoff is rapid, and erosion is a severe hazard. The high water table is perched above the fragipan within 1 1/2 to 3 feet of the surface in wet seasons. The fragipan restricts roots and the amount of water available to plants.

Other soils mapped in this association are red clayey soils on side slopes, a few small areas of Lexington soils on narrow ridgetops, and small areas of Oaklimeter soils in narrow drainageways. These soils make up about 20 percent of the association.

Most areas of soils in this association are used as woodland. These soils are poorly suited to pasture, truck crops, small grains, or row crops because of steep slopes, rapid runoff, and the severe erosion hazard. These soils should be kept in a permanent vegetative cover of grasses and legumes or trees.

These soils are moderately suited to loblolly pine, longleaf pine, shortleaf pine, slash pine, Shumard oak, and sweetgum. Plant competition on Smithdale soils is a moderate limitation; other limitations are slight.

These soils have severe limitations for urban uses because of the steep slopes. However, in some small areas of gently sloping to sloping soils, limitations are moderate for urban uses. The steepness of slopes is a severe limitation for use of Smithdale soil as septic tank absorption fields. This limitation can be partly overcome by installing lines on the contour. Wetness and the moderately slow permeability in the fragipan are severe limitations for use of Providence soil as septic tank absorption fields. Increasing the size of the absorption field can partly overcome these limitations.

The Smithdale soils are in capability subclass VIIe and in woodland suitability group 3o1. The Providence soils are in capability subclass VIe and in woodland suitability group 3o7.

TpB2—Tippah silt loam, 2 to 5 percent slopes, eroded. This is a gently sloping, moderately well drained soil that formed in a mantle of silty material and underlying clay on ridgetops on uplands.

Typically, the surface layer is pale brown silt loam about 5 inches thick. The subsoil extends to a depth of about 66 inches. The upper part to a depth of about 16 inches is strong brown silty clay loam; to a depth of about 30 inches, it is strong brown silt loam that has pale brown mottles; also, grayish mottles are below about 22 inches; to about 36 inches, it is strong brown silty clay loam mottled in shades of brown and gray; to about 51 inches, it is yellowish red clay mottled in shades of gray and brown; and the lower part is clay mottled in shades of red, gray, and brown.

In most areas of this eroded soil, part of the original surface layer has been removed by erosion, and tillage has mixed the topsoil and subsoil. In some small areas of this soil, all of the plow layer is the original topsoil, and in other places, the plow layer is mainly subsoil material. Some areas of this soil have a few rills and shallow gullies.

This soil ranges from very strongly acid to medium acid throughout except where the surface has been limed. Permeability is moderate in the upper part of the subsoil and is slow in the lower part. Available water capacity is high. Runoff is medium, and erosion is a moderate hazard. The high water table is perched within 2 to 2 1/2 feet of the surface in winter and spring. The root zone is deep and easily penetrated by plant roots. The surface layer has good tilth and is easily tilled within a wide range of moisture content. The surface tends to crust and pack after hard rains. A plowpan forms if this soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Providence soils on uplands. Also included are a few small areas of soils that have slopes greater than 5 percent.

Most areas of this soil are used for crops or pasture. A small acreage is in woodland. This soil is well suited to row crops, truck crops, and small grains. If row crops are grown, conservation tillage, contour farming, grassed waterways, and terraces may be needed to control erosion. Returning crop residue to the soil helps maintain fertility and tilth and reduces crusting and packing.

This soil is well suited to grasses and legumes for hay or pasture. The vegetative cover helps control erosion. Livestock overgrazing or grazing when the soil is too wet will cause surface compaction, excessive runoff, and poor tilth. Proper stocking, controlled grazing, and weed and brush control help slow runoff, maintain good tilth, and reduce compaction.

This soil is moderately suited to cherrybark oak, loblolly pine, Shumard oak, sweetgum, white oak, and yellow-poplar. Plant competition is a moderate limitation; other limitations are slight.

This soil has severe limitations for urban uses. The low strength of the soil for streets and roads, wetness, and the high shrink-swell properties are severe limitations for urban uses. Proper design and careful installation will help overcome these limitations. The slow permeability of the clayey lower subsoil and wetness are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the field size.

This Tippah soil is in capability subclass IIe and in woodland suitability group 3o7.

TpC2—Tippah silt loam, 5 to 8 percent slopes, eroded. This is a sloping, moderately well drained soil that formed in a mantle of silty material and underlying clay on ridgetops and side slopes on uplands.

Typically, the surface layer is yellowish brown silt loam about 4 inches thick. The subsoil extends to a depth of about 68 inches or more. The upper part to a depth of about 11 inches is reddish brown silty clay loam; to about 18 inches, it is strong brown silt loam; to a depth of about 35 inches, it is strong brown silt loam mottled in shades of brown and gray; and the lower part is clay mottled in shades of red, brown, and gray.

In most areas of this eroded soil, part of the original surface layer has been removed by erosion, and tillage has mixed the topsoil and subsoil. In some places, all of the plow layer is the original topsoil, and in other places, the plow layer is mainly subsoil material. Some areas of this soil have a few rills and shallow gullies.

This soil ranges from very strongly acid to medium acid throughout except where the surface has been limed. Permeability is moderate in the upper part of the subsoil and is slow in the lower part. Available water capacity is high. Runoff is medium, and erosion is a moderate hazard. The high water table is perched within 2 to 2 1/2 feet of the surface in winter and spring. The root zone is deep and easily penetrated by plant roots. This soil can be tilled within a wide range of moisture content, but the surface tends to crust and pack after hard rains. A plowpan forms if the soil is tilled when wet. Chiseling or subsoiling can break up the plowpan.

Included in mapping are small areas of Providence soils on uplands. Also a few small areas of severely eroded Tippah soils are included.

Most areas of this soil are used for pasture or as woodland. A small acreage is used for crops. This soil is moderately suited to row crops, truck crops, and small grains. Cultivation increases runoff and the hazard of erosion. If row crops are grown, cropping systems that include grasses and legumes, conservation tillage, contour farming, grassed waterways, and terraces help control erosion. Returning crop residue to the soil helps maintain fertility and tilth and reduces crusting and packing.

This soil is well suited to grasses and legumes for hay or pasture. The vegetative cover helps control erosion. Smoothing and shaping of gullies are needed in a few places. Overgrazing or grazing when the soil is too wet causes surface compaction, excessive runoff, and poor tilth. Proper stocking, controlled grazing, and weed and brush control help slow runoff, maintain tilth, and reduce compaction.

This soil is moderately suited to cherrybark oak, loblolly pine, Shumard oak, sweetgum, white oak, and yellow-poplar. Plant competition is a moderate limitation; other limitations are slight.

This soil has severe limitations for urban uses. The low strength of the soil for streets and roads, wetness, and high shrink-swell properties are severe limitations for urban uses. Proper design and careful installation will help overcome these limitations. Wetness and the slow permeability of the clayey lower part of the subsoil are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the field size.

This Tippah soil is in capability subclass IIIe and in woodland suitability group 3o7.

TpD3—Tippah silt loam, 5 to 10 percent slopes, severely eroded. This is a sloping to strongly sloping, moderately well drained soil that formed in a mantle of silty material and underlying clay on side slopes on uplands.

Typically, the surface layer is grayish brown silt loam about 3 inches thick. The subsoil extends to a depth of about 60 inches. The upper part to a depth of about 17 inches is yellowish red silty clay loam; to a depth of about 24 inches, it is silty clay loam mottled in shades of red and brown; to 36 inches, it is red clay mottled in shades of gray and brown; and the lower part is clay mottled in shades of red, gray, and brown.

In most areas, the original surface layer has been removed by erosion, and much of the surface layer is subsoil material. In some places, the surface layer is a mixture of original topsoil and subsoil. Rills and shallow gullies are common, and in places, a few deep gullies that are not crossable with farm equipment have formed.

This soil ranges from very strongly acid to medium acid throughout. Permeability is moderate in the upper part of the subsoil and is slow in the lower part. Available water capacity is high. Runoff is rapid, and erosion is a severe hazard. The high water table is perched within 2 to 2 1/2 feet of the surface in wet seasons. The rooting zone is deep and easily penetrated by plant roots.

Included in mapping are small areas of Providence soils on uplands. Also, a few small areas of less eroded soils are included.

Most areas of this soil are used for pasture or as woodland. This soil is poorly suited to row crops, truck crops, and small grains. Because of the erosion hazard, this soil is better suited to a permanent plant cover of grasses and legumes or trees.

This soil is moderately suited to grasses and legumes for hay and pasture. The plant cover helps control erosion. Overgrazing increases runoff and the hazard of erosion. Proper stocking, controlled grazing, and weed and brush control will help slow runoff and control erosion. Smoothing of rills and shaping of gullies are necessary for the use of some machinery.

This soil is moderately suited to cherrybark oak, loblolly pine, Shumard oak, sweetgum, white oak, and yellow-poplar. Plant competition is a moderate limitation; other limitations are slight.

This soil has severe limitations for urban uses. Low strength of this soil for streets and roads, wetness, steepness of slopes for small commercial buildings, and the high shrink-swell properties are the main limitations. Proper design and careful installation will partly overcome these limitations. Wetness and the slow permeability of the lower part of the subsoil are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the size of the field and constructing it on the contour.

This Tippah soil is in capability subclass VIe and in woodland suitability group 3o7.

Prime farmland

This section defines and discusses prime farmland, and the soils that are prime farmland in Madison County are listed.

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

Prime farmland soils, as defined by the USDA, are soils that are best suited to producing food, feed, forage, fiber, and oilseed crops. Such soils have properties that are favorable for economic production of high yields of crops. The soils need to be treated and managed using acceptable farming methods. The moisture supply must be adequate, and the growing season must be sufficiently long. Prime farmland soils produce the highest yields with minimal inputs of energy and economic resources, and farming these soils results in the least damage to the environment.

Prime farmland soils may now be used for crops, pasture, or woodland, or they may be in other uses. The soils must either be used for producing food or fiber or be available for these uses. Urban or built-up land and water areas cannot be considered prime farmland.

Prime farmland soils usually have an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. They have few or no rocks and are permeable to water and air. Prime farmland soils are not excessively erodible or saturated with water for long periods and are not flooded during the growing season. The slopes range mainly from 0 to 5 percent. For more detailed information on the criteria for prime farmland, consult the local staff of the Soil Conservation Service.

About 217,000 acres, or about 45 percent of the soils in Madison County, meet the soil requirements for prime farmland. The soils are scattered throughout the county and are mainly in general soil map units 1, 3, 6, 7, 8, 9, and 10.

The trend in land use in some parts of the county has been the conversion of prime farmland to industrial and urban uses. The loss of prime farmland to these uses puts pressure on marginal lands, which generally are more erodible, droughty, difficult to cultivate, and usually less productive than prime farmland.

Soils that have limitations, such as a high water table, may qualify for prime farmland if these limitations are overcome by such measures as drainage. In the following list, the corrective measure for such limitations is shown in parentheses. Onsite evaluation is necessary to see if these limitations have been overcome by corrective measures.

Some areas that were prime farmland in Madison County are used as urban and built-up land. This is defined as any contiguous unit of land 10 acres or more that is used for nonfarming uses, including residences, industrial sites, commercial sites, construction sites, institutional sites, public administrative sites, railroad yards, small parks, cemeteries, airports, golf courses, sanitary landfills, sewage treatment plants, water control structures and spillways, and shooting ranges.

The following map units, or soils, make up prime farmland in Madison County.

Ad	Adler silt loam
Ar	Ariel silt loam
BdA	Bude silt loam, 0 to 2 percent slopes
BrB2	Byram silt loam, 2 to 5 percent slopes, eroded
Ca	Calhoun silt loam (where adequately drained)
CbA	Calloway silt loam, 0 to 1 percent slopes
CbB	Calloway silt loam, 1 to 3 percent slopes
Gb	Gillsburg silt loam
GrA	Grenada silt loam, 0 to 2 percent slopes
GrB2	Grenada silt loam, 2 to 5 percent slopes, eroded
LoA	Loring silt loam, 0 to 2 percent slopes
LoB2	Loring silt loam, 2 to 5 percent slopes, eroded
Mc	McRaven silt loam (where adequately drained)
MeA	Memphis silt loam, 0 to 2 percent slopes
MeB2	Memphis silt loam, 2 to 5 percent slopes, eroded
Mo	Morganfield silt loam
Oa	Oaklimeter silt loam
PoA	Providence silt loam, 0 to 2 percent slopes
PoB2	Providence silt loam, 2 to 5 percent slopes, eroded
Re	Riedtown silt loam

TpB2 Tippah silt loam, 2 to 5 percent slopes, eroded

The location of each map unit is shown on detailed soil maps in the back of this publication. The soil qualities that affect use and management are described in the section "Detailed soil map units." The extent of each listed map unit is shown in table 4. This list does not constitute a recommendation for a particular land use.

Use and management of the soils

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

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

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

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

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

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

Crops and pasture

Thomas E. Irvin, district conservationist, Soil Conservation Service, helped prepare this section.

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

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed soil map units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Soil erosion is a major problem on about half of the soils used for crops and pasture in the county. Erosion is a hazard on soils where the slope is more than 2 percent.

Productivity is reduced as the surface layer is lost, and part of the subsoil is mixed with the plow layer. Loss of the surface layer is especially damaging to the soils that have a fragipan which limits the depth of the rooting zone. Bude, Byram, Calloway, Grenada, Loring, and Providence soils have a fragipan. Control of erosion will reduce the amount of sediment going into streams. This will improve the quality of water for municipal use, for recreation, for fish, and for wildlife.

The kind of soil, the slope, and the degree of erosion determine the length of time a soil should be cultivated as related to the time it should be protected by a vegetative cover or sod crop in a rotation. If cultivated crops are grown, surface runoff can be controlled to reduce erosion. Terraces, conservation tillage, contour farming, and wide strips of close-growing vegetation are used to control runoff and erosion. The water from the terraces should be discharged into grassed waterways. Returning crop residue to the soil helps increase infiltration and reduce runoff and the hazard of erosion (fig. 9).

For contour cultivation, furrows are plowed across the slope, in the same direction as the terraces, and about parallel to them. A furrow slows the water, and it also conducts some of the water across the slope to reduce velocity. Contour cultivation is needed on gently sloping soils to control runoff and reduce erosion.

Many soils on flood plains in the county need main and lateral ditches and surface field ditches leading to them to help remove excess surface water. Diversions are needed to protect soils on bottom lands from runoff of adjoining hills. Adler, Ariel, Cascilla, Gillsburg, McRaven, Morganfield, Oaklimeter, and Riedtown are examples of soils on flood plains. Poorly drained Calhoun soil also needs surface drainage.

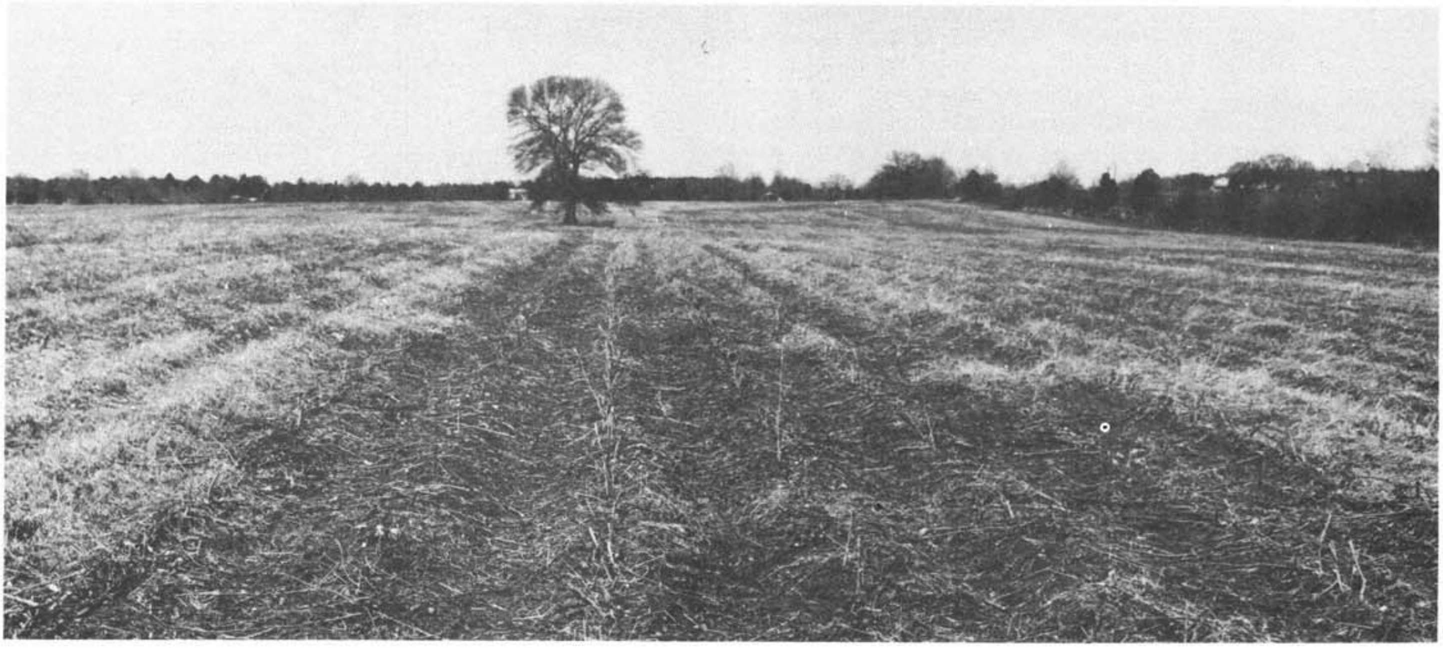

Figure 9.—Crop residue from cotton is used to provide a winter cover on Loring silt loam, 2 to 5 percent slopes, eroded, and to improve the supply of organic matter.

According to the 1974 Census of Agriculture, about 221,500 acres in the county was used for crops and pasture and 198,000 acres was in woodland.

In Madison County, the soils are suited to many kinds of pasture plants including common bermudagrass, improved bermudagrasses, bahiagrass, dallisgrass, and ryegrass (fig. 10). The grazing capacity of the pasture depends largely on the amount of fertilizer applied and favorable weather conditions. The amounts and kinds of fertilizer should be determined by soil tests.

The grazing should be regulated so that good growth of forage is maintained and the soils are protected. After a period of grazing, a rest period is needed so that pasture plants can develop new growth. Weeds should be controlled by mowing.

Yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

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

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

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

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land capability classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops (*10*). Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

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

Class I soils have slight limitations for their use.

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

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

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

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

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

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

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production. No soils in class VIII are recognized 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 risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry. No soils in subclass c are recognized in Madison County.

In class I there are no subclasses because the soils of this class have slight limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have

Figure 10.—Bermudagrass and lespedeza on Grenada silt loam, 2 to 5 percent slopes, eroded, provides good grazing for beef cattle.

other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The acreage of soils in each capability class and subclass is shown in table 6. The capability classification of each map unit is given in the section "Detailed soil map units."

Woodland management and productivity

Joseph V. Zary, forester, Soil Conservation Service, helped prepare this section.

Madison County is 41 percent, or about 198,000 acres, woodland. About 66 percent of the woodland is owned by miscellaneous private owners, about 17 percent is owned by farmers, about 13 percent is owned by the forest industry, and about 4 percent is in other public ownership (*13*).

Soils influence the growth of tree crops by providing a reservoir of moisture and all essential elements for growth except those that are derived from the atmosphere—carbon and oxygen. There is a strong relationship between the production of wood and various soil characteristics.

The kind of tree and its growth show a direct relationship between soil depth, texture, structure, topographic position, and inherent fertility.

The forest may be subdivided into forest types. Such types have distinct individuality that may require separate treatment. Generally, types are based on species composition, site quality, or age. As used in this survey, forest types are stands of trees of similar character, composed of the same species, and growing under the same ecological and biological conditions. The forest types are named for the tree species which are present in the greatest abundance and frequency (*13*).

The *oak-gum-cypress* forest type is most important. This includes bottom land forest, mainly tupelo, blackgum, sweetgum, oaks, or southern baldcypress, singly or in combination; where pines make up 25 to 50 percent, the stand would be classified oak-pine. In 1977, the oak-gum-cypress forest type was on about 59,400 acres, or 30 percent, of the woodland in the county. Commonly associated trees include eastern cottonwood, black willow, ash, hackberry, maple, and elm. Most of the acreage in this forest type is located on flood plains of the major streams in the county and their tributaries (*13*).

The *loblolly-shortleaf pine* forest type ranks second in importance. This type includes southern pines (except longleaf or slash pine) and eastern redcedar, singly or in combination. In 1977, the loblolly-shortleaf forest type was on about 52,800 acres, or 27 percent, of the woodland throughout the county. Commonly associated trees include oak, hickory, sweetgum, and blackgum (*13*).

The *oak-hickory* forest type is third in importance. This type includes mainly upland oaks or hickories, singly or in combination; where pines make up 25 to 50 percent, the stand would be classified oak-pine. In 1977, the oak-hickory forest type was on about 46,200 acres, or 23 percent, of the woodland in the county. Commonly associated trees include yellow-poplar, maple, and elm.

The *oak-pine* forest type ranks fourth in importance. This type includes mainly hardwoods (usually upland oaks), but softwoods, except cypress, make up 25 to 50 percent of the stand. In 1977, the oak-pine forest type was on about 33,000 acres, or 17 percent, of the woodland throughout the county. Commonly associated trees include hickory, sweetgum, blackgum, and yellow-poplar.

The *longleaf-slash pine* forest type is fifth in importance. This type includes forests in which 50 percent or more of the stand is longleaf or slash pine, singly or in combination. This forest type was on 6,600 acres, or about 3 percent, of the woodland in the county. Commonly associated trees include other southern pines, oak, and gum.

The loblolly-shortleaf, oak-hickory, longleaf-slash, and oak-pine forest types are mainly on lower slopes to upper slopes and ridges throughout the county. The oak-hickory forest type and the oak components of the oak-pine forest type are in upland positions.

In terms of cubic feet of growing stock, board feet of saw timber, distribution, and acreages which they occupy, individual species would rate in the following order: pine; northern red oak; white oak; sweetgum, tupelo, and blackgum; hickory, red maple, and elm; yellow-poplar; and sugarberry (*7*).

The tree crops harvested in Madison County help support a substantial timber economy in central Mississippi and a number of wood-using industries in the county itself.

Presently, two pulpwood dealers for pine and hardwood are located in the county, eight secondary wood-using industries mainly for manufacturing caskets, furniture, turned-wood furniture parts, dimension stock and frames, and cabinets for television and stereo sets are in the county (*4*).

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *w* indicates excessive water in or on the soil; *t*, toxic substances in the soil; and *s*, sandy texture. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: w, t, and s.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *plant competition* indicate the degree to which undesirable plants are expected to invade where there are openings in the tree canopy. The invading plants compete with native plants or planted seedlings. A rating of *slight* indicates little or no competition from other plants; *moderate* indicates that plant competition is expected to hinder the development of a fully stocked stand of desirable trees; *severe* indicates that plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed to control undesirable plants.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. Site index was determined at age 30 years for eastern cottonwood, 35 years for American sycamore, and 50 years for all other species. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

Woodland understory vegetation

David W. Sanders, grassland conservationist, Soil Conservation Service, helped prepare this section.

Understory vegetation consists of grasses, forbs, shrubs, and other plants. Some woodland, if well managed, can produce enough understory vegetation to support grazing of livestock or wildlife, or both, without damage to the trees.

The quantity and quality of understory vegetation vary with the kind of soil, the age and kind of trees in the canopy, the density of the canopy, and the depth and condition of the litter. The density of the canopy determines the amount of light that understory plants receive.

Significant changes in kinds and abundance of plants occur as the canopy changes, often regardless of grazing use. Therefore, the forage value rating of grazable woodland in this survey is not an ecological evaluation of the understory. Forage value ratings are based on the percentage of the existing understory plant community made up of preferred and desirable plant species as they relate to livestock palatability.

Table 8 shows, for each soil suitable for woodland use, the potential for producing understory vegetation. The *total production* of understory vegetation includes the herbaceous plants and the leaves, twigs, and fruit of woody plants up to a height of 4 1/2 feet. The *dry weight* is the pounds per acre of air-dry vegetation in *favorable, normal,* and *unfavorable* years. In a favorable year, soil moisture is above average during the optimum part of the growing season; in a normal year, soil moisture is average; and in an unfavorable year, it is below average.

Table 8 also lists the common names of the *characteristic vegetation* on each soil and the percentage *composition,* by air-dry weight, of each kind of plant. The table shows the kind and percentage of understory plants expected under a canopy density that is most nearly typical of woodland in which the production of wood crops is highest.

Recreation

Ernest E. Dorrill, III, landscape architect, Soil Conservation Service, helped prepare this section.

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation (fig. 11). The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its visual quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The

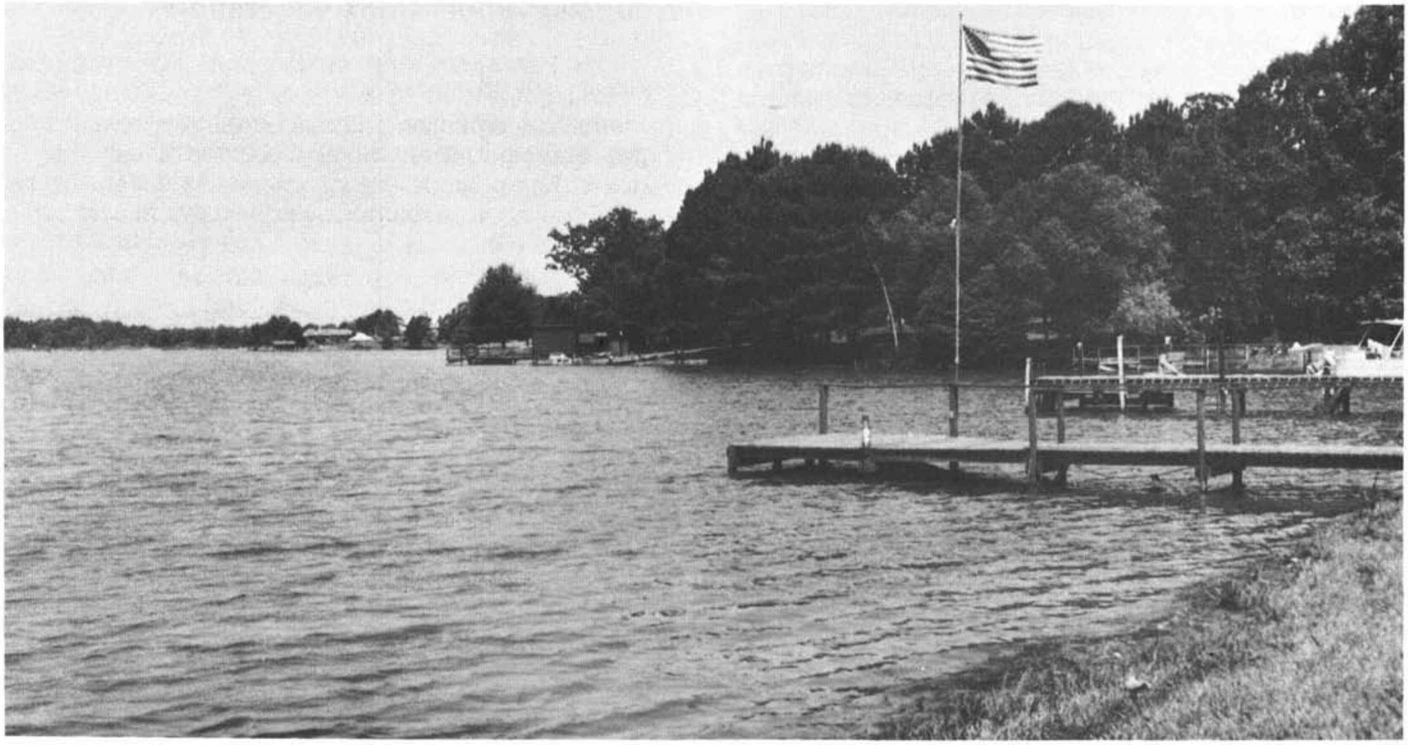

Figure 11.—Lake Lorman, a recreational and residential area, is on Riedtown silt loam and Byram silt loam, 5 to 8 percent slopes, severely eroded. The lake is used for boating, swimming, fishing, and water skiing.

capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

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

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

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

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

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required.

The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface.

Wildlife habitat

Charles E. Hollis, wildlife biologist, Soil Conservation Service, helped prepare this section.

Madison County provides habitat for a wide variety of wildlife species, both game and nongame. Some species such as the white-tailed deer, cottontail rabbit, squirrel, beaver, and mourning dove have large stable populations; however, the American alligator, red-cockaded woodpecker, river otter, and bald eagle are present only as remnant population. Still other species such as the black bear, red wolf, and cougar are now extremely rare or extinct from this part of their former range.

Of all the factors which have affected wildlife, man's use of the land is the most important. Man changed it from one habitat type to another or eliminated it as a suitable habitat; the wildlife species and population levels of the area changed accordingly.

The second most important factor affecting wildlife is the soil. The soil directly affects the kinds and amount of vegetation that is available for use by wildlife as food and cover. If the soil has the potential, desired wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining and managing existing vegetation, or by promoting the natural establishment of the desired plant community. Many soils of Madison County have the potential for improvement in at least one habitat type or element.

In table 10, the soils in Madison County are rated according to their potential for providing various kinds of habitat on habitat elements. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

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

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, soil reaction, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and millet (fig. 12).

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

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

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

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

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are wild azalea, arrowwood, baccharis, and dogwood.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are

Figure 12.—Brown top millet on Calloway silt loam, 0 to 1 percent slopes, produces good feed for wildlife, mainly ducks, doves, and quail.

texture of the surface layer, wetness, reaction, salinity, and slope. Examples of wetland plants are smartweed, wild millet, wildrice, pickerelweed, cordgrass, rushes, sedges, and cattails.

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

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

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

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

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

Engineering

Robert L. Tisdale, agricultural engineer, Soil Conservation Service, helped prepare this section.

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

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

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

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

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

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

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

Building site development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

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

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

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

Sanitary facilities

Table 12 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

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

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to effectively filter the effluent.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, flooding, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope can cause construction problems.

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

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

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, slope, and flooding affect both types of landfill. Texture, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

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

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

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

Construction materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

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

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

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

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

Sand is a natural aggregate suitable for commercial use with a minimum of processing. Sand is used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

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

A soil rated as a probable source has a layer of clean sand or a layer of sand that is up to 12 percent silty fines. This material must be at least 3 feet thick. All other soils are rated as an improbable source.

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

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

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

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

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

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

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

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

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

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

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

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

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

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

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Wetness and slope affect the construction of grassed waterways. A hazard of water erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil properties

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

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 20. The soil samples were tested by the Mississippi State Highway Department Testing Division, Jackson, Miss.

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

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

Engineering index properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

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

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

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

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

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 15.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and chemical properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

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

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

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

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior. The figures given for permeability represent the basic intake rate used for design of irrigation systems.

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

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

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

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

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 16, the estimated content of organic matter of the plow layer is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Soil and water features

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

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

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

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

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

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

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt and water in swamps and marshes are not considered flooding.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

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

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 17.

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

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

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

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

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

Physical and chemical analyses of selected soils

D. E. Pettry, agronomist, Department of Agronomy, Mississippi Agricultural and Forestry Experiment Station, Mississippi State University, helped prepare this section.

The results of physical analyses of several typical pedons in the county are given in table 18 and the results of chemical analyses in table 19. The data are for soils sampled from excavated pits at selected sites. The pedons, except the second Calhoun soil pedon and the Calloway soil pedon, are the pedons described as typical for the series in the section "Soil series and their morphology." Soil samples were analyzed by the Soil Genesis Laboratory of the Mississippi Agricultural and Forestry Experiment Station.

Most determinations, except those for grain size analyses, were made on soil material smaller than 2 millimeters in diameter. The samples were prepared for analysis by air-drying, carefully crushing, and screening through a standard 20-mesh sieve. Measurements reported as percent or quantity of unit weight were calculated on an ovendry basis. The particle size analysis shown in table 18 were obtained using Day's hydrometer method (*3*). The methods used in obtaining the data in table 19 are indicated in the list that follows. The codes in parentheses refer to published methods (*11*).

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

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

Cation-exchange capacity—sum of cations (5A3a).

Base saturation—sum of cations, TEA, pH 8.2 (5C3).

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

The physical properties of soils such as water infiltration and conduction, shrink-swell potential, crusting, ease of tillage, and available water capacity are closely related to soil texture (the percentage of sand, silt, and clay).

A large proportion of the soils in Madison County formed in loess material, and they have a high content of silt. The deep, silty soils in the western and central parts of the county tend to be very erodible. The soils with a high silt content in the surface layer, such as Calhoun and Calloway soils, tend to pack when cultivated. In soils that are intensively cultivated, the surface tends to crust, which may hinder plant emergence.

Some soils in the county, such as Siwell and Byram soils, are silty in the surface layer and upper part of the subsoil and are clayey in the lower part. The clayey part is dominated by montmorillonitic clay. This type of clay is sticky and plastic when wet and swells and shrinks upon wetting and drying.

The deep, loamy soils on the ridgetops and side slopes of ridges in the eastern part of the county, such as Smithdale soils, have a relatively high sand content. The coarse textured surfaces enhance rapid water infiltration; the soils tend to be droughty.

Soil chemical properties, in combination with other soil features, such as permeability, structure, texture, and consistence, influence the limitations and potentials of individual soils. Chemical properties are not evident in visual observations of a soil; laboratory analyses are necessary to determine the characteristics. The amount and type of clay minerals present and the organic matter content largely regulate the chemical nature of soils. These substances have the capacity to attract and hold cations. Exchangeable cations are positively charged elements that are bonded to negatively charged clay minerals and organic matter.

The exchangeable cations may be removed or exchanged through leaching or plant uptake. Through this mechanism of cation exchange, soil acidity is corrected by liming. It is useful to note that 1 milliequivalent per 100 grams of extractable acidity (hydrogen + aluminum) requires 1,000 pounds of calcium carbonate (lime) per acre to neutralize it.

Soil chemical data are expressed as milliequivalents (meq) per 100 grams of dry soil. It is useful to convert milliequivalents per 100 grams of the various cations to the common units of pounds per acre for the surface plow layer. The plow layer, or topsoil, of average soils to a depth of 6.67 inches weighs about 2 million pounds. The conversions for the cations listed in table 19 are as follows:

Calcium meq/100 grams x 400 = pounds per acre
Magnesium meq/100 grams x 240 = pounds per acre
Potassium meq/100 grams x 780 = pounds per acre
Sodium meq/100 grams x 460 = pounds per acre

Many of the soils in Madison County are acid and have a moderate to relatively low capacity to retain plant nutrients (cations) because of the influence of siliceous parent materials. Crops on these soils respond to proper fertilization and management.

Base saturation is related to weathering, and it reflects the replacement of bases by hydrogen. The Bonn soils of the level, silty stream terraces have high sodium levels and base saturation values in the subsoils.

The soil taxonomy classification system used in the National Cooperative Soil Survey uses chemical soil properties as differentiating criteria in some categories of the system. The Alfisol and Ultisol orders, which are classes in the highest category in the system, are separated on the basis of percentage base saturation deep in the subsoil. Ultisols have base saturation less than 35 percent in the lower part of the soil; in Alfisols, such values are greater than 35 percent. For example, Bonn soils have base saturation levels greater than 35 percent at depths below 4 feet; they are Alfisols.

Engineering index test data

Table 20 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are typical of the series and are described in the section "Soil series and their morphology." The soil samples were tested by the Mississippi State Highway Department Testing Division, Jackson, Mississippi.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are: AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); Moisture density, Method A—T 99 (AASHTO), D 698 (ASTM); Shrinkage—T 92 (AASHTO), D 427 (ASTM); and Volume change (Abercrombie)—Georgia Highway Standard.

Classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*12*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 21, the soils of the survey area are classified according to the system. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

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

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Fluvaquents (*Fluv*, meaning flood plain, plus *aquent*, the suborder of the Entisols that have an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Aeric* identifies the subgroup that has more soil aeration than is typical for the great group. An example is Aeric Fluvaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-silty, mixed, acid, thermic Aeric Fluvaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series. The Gillsburg series is an example of coarse-silty, mixed, acid, thermic Aeric Fluvaquents in Madison County.

Soil series and their morphology

In this section, each soil series recognized in Madison County is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*9*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*12*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed soil map units."

Adler series

The Adler series consists of moderately well drained soils that formed in silty alluvium on flood plains. Slopes range from 0 to 2 percent. The soils of the Adler series are coarse-silty, mixed, nonacid, thermic Aquic Udifluvents.

Adler soils are associated with McRaven, Morganfield, and Riedtown soils on flood plains. McRaven soils, which are in lower lying areas, do not have bedding planes. Morganfield soils, which are on natural levees and in slightly higher positions, do not have mottles of chroma 2 within 20 inches of the surface. Riedtown soils, which are in positions similar to those of Adler soils, have a brown cambic horizon and do not have bedding planes.

Typical pedon of Adler silt loam; about 2.25 miles south of Flora, on State Highway 22, 0.8 mile west along drainage ditch, and 200 feet north of ditch; NE1/4NE1/4 sec. 24, T. 8 N., R. 2 W.

Ap—0 to 6 inches; brown (10YR 5/3) silt loam; weak fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.
C1—6 to 15 inches; yellowish brown (10YR 5/4) silt loam; structureless; friable; many fine roots; thin pale brown horizontal strata; neutral; clear wavy boundary.
C2—15 to 28 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct light brownish gray (10YR 6/2) and pale brown (10YR 6/3) mottles; structureless; friable; few fine roots; thin pale brown horizontal strata; slightly acid; clear wavy boundary.
C3—28 to 34 inches; mottled light brownish gray (10YR 6/2), grayish brown (10YR 5/2), pale brown (10YR 6/3), and dark yellowish brown (10YR 4/4) silt loam; common fine brown and black concretions; thin horizontal strata; structureless; friable; slightly acid; clear smooth boundary.
C4—34 to 60 inches; mottled pale brown (10YR 6/3), light brownish gray (10YR 6/2), and light yellowish brown (10YR 6/4) silt loam; structureless; friable; few fine brown concretions; thin horizontal strata; slightly acid.

Reaction ranges from medium acid to neutral throughout except where the surface has been limed.

The Ap horizon is grayish brown, brown, or dark brown.

The C1 horizon is yellowish brown, dark brown, or brown. The C2 and C3 horizons are similar in color to the C1 horizon, but they have few to many mottles of chroma 2 or less within 20 inches of the surface. The lower C horizons are mottled in shades of gray and brown, or they have a gray matrix color.

Ariel series

The Ariel series consists of well drained soils that formed in silty alluvium on flood plains. Slopes range from 0 to 2 percent. The soils of Ariel series are coarse-silty, mixed, thermic Fluventic Dystrochrepts.

Ariel soils are associated with Bruno, Gillsburg, Morganfield, Oaklimeter, and Siwell soils. Bruno soils, which are in positions similar to those of the Ariel soils on the flood plains, are sandy textured and have bedding planes. Gillsburg soils, which are in lower areas of flood plains, have grayer subsoil. Morganfield soils, which are on slightly higher areas of flood plains, are well drained and do not have mottles of chroma 2 or less within 20 inches of the surface. Oaklimeter soils, which are in slightly lower positions on flood plains, have mottles of chroma 2 or less within 24 inches of the surface. Siwell soils, which are on the uplands, have alkaline clayey substrata at depths of less than 48 inches.

Typical pedon of Ariel silt loam; north of Canton along State Highway 43, 1.5 miles north of intersection of State Highways 43 and 16, 200 feet east of State Highway 43; SE1/4NE1/4sec. 16, R. 3 E., T. 9 N.

Ap—0 to 6 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable; many fine roots; very strongly acid; abrupt smooth boundary.
B21—6 to 13 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; many fine roots; very strongly acid; clear smooth boundary.
B22—13 to 25 inches; dark brown (10YR 4/3) silt loam; common medium distinct pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; few fine black concretions; strongly acid; clear smooth boundary.
A2b—25 to 32 inches; mottled dark yellowish brown (10YR 4/4), yellowish brown (10YR 5/4), and light brownish gray (10YR 6/2) silt loam; weak medium subangular blocky structure; friable; few fine black concretions; very strongly acid; clear smooth boundary.
B21b—32 to 52 inches; dark yellowish brown (10YR 4/4) silt loam; many medium distinct gray (10YR 6/1) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; friable; slightly brittle; few fine black concretions; few tongues of gray silt between prisms; very strongly acid; clear smooth boundary.
B22b—52 to 72 inches; mottled dark yellowish brown (10YR 4/4), dark grayish brown (10YR 4/2), and light brownish gray (10YR 6/2) silt loam; weak coarse prismatic structure parting to weak medium subangular blocky; friable; slightly brittle; few fine black concretions; few tongues of gray silt between prisms; very strongly acid.

Reaction is very strongly acid or strongly acid throughout except where the surface has been limed. Depth to the buried solum ranges from 20 to 40 inches. Clay content ranges from 12 to 18 percent in the 10- to 40-inch control section.

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

The B21 and B22 horizons are yellowish brown, dark brown, or dark yellowish brown.

The A2b horizon is pale brown, light brownish gray, or mottled in shades of gray and brown.

The B21b and B22b horizons are yellowish brown, dark grayish brown, or dark yellowish brown that have few to many mottles in shades of gray and brown.

Bonn series

The Bonn series consists of poorly drained soils that are high in exchangeable sodium. These soils formed in silty material on low terraces and in small depressions on flood plains. Slopes range from 0 to 1 percent. The soils of the Bonn series are fine-silty, mixed, thermic Glossic Natraqualfs.

Bonn soils are associated with Calloway, Grenada, and Loring soils. Calloway soils, which are on slightly higher areas on uplands and stream terraces, have a fragipan. Grenada soils, which are on higher stream terraces, are better drained and have a fragipan. Loring soils, which are on ridgetops and side slopes, have browner subsoil and a fragipan.

Typical pedon of Bonn silt loam; east of Canton from intersection of State Highways 16 and 43, 2 miles southeast on State Highway 43, and 900 feet north of highway; SW1/4NE1/4 sec. 33, T. 9 N., R. 3 E.

Ap—0 to 4 inches; gray (10YR 5/1) silt loam, streaks of yellowish brown (10YR 5/6); weak fine granular structure; very friable; many fine and medium roots; very strongly acid; abrupt smooth boundary.

A2—4 to 18 inches; light gray (10YR 7/1) silt loam; common medium distinct yellowish brown (10YR 5/6) and common fine faint pale brown (10YR 6/3) mottles; massive; friable; many fine roots; few pockets of gray silt; very strongly acid; gradual wavy boundary.

B&A—18 to 23 inches; gray (10YR 5/1) silt loam; common medium faint grayish brown (10YR 5/2) and dark yellowish brown (10YR 4/4) mottles; massive parting to moderate medium subangular blocky structure; friable; few fine roots; common light gray silt pockets; strongly acid; gradual irregular boundary.

B21tg—23 to 38 inches; light brownish gray (10YR 6/2) silty clay loam; few medium distinct dark brown (7.5YR 4/4) and few medium distinct yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm; gray silt coats on faces of peds mostly in upper part; patchy clay films; tongues of A2 extend through and range from 1/2 inch to 3 inches in width; few fine and medium black concretions; very strongly acid; gradual wavy boundary.

B22tg—38 to 46 inches; grayish brown (10YR 5/2) silty clay loam; many medium distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic sturcture parting to moderate medium subangular blocky; firm; few fine roots; few small pores; few medium black concretions; strongly acid; gradual wavy boundary.

B3—46 to 55 inches; yellowish brown (10YR 5/4) silt loam; common medium faint light brownish gray (10YR 6/2) mottles; massive parting to weak fine subangular blocky structure; friable; few fine vesicles; few fine and medium black concretions; neutral; gradual smooth boundary.

Cg—55 to 72 inches; light brownish gray (10YR 6/2) silt loam; many coarse distinct yellowish brown (10YR 5/8) mottles; massive; friable; few pockets of gray silt; common fine and medium black concretions; mildly alkaline.

Solum thickness ranges from 40 to 60 inches. Exchangeable sodium saturation ranges from 15 to 50 percent in all horizons below a depth of 16 inches. Reaction of the A horizon ranges from very strongly acid to medium acid except where the surface has been limed. The lower Bt horizon ranges from very strongly acid to neutral. The C horizon ranges from neutral to strongly alkaline.

The Ap horizon is gray, brown, grayish brown, or light brownish gray, and in places, it has brownish mottles.

The A2 horizon is gray or grayish brown and has brownish mottles.

The Bt horizon is light brownish gray, grayish brown, or gray and has few to many mottles in shades of brown, yellow, and gray. Texture is silt loam or silty clay loam.

The C horizon is gray, light brownish gray, or yellowish brown and has mottles in shades of brown and gray.

The Bonn soils in this survey are considered taxadjuncts to the Bonn series. These soils have less exchangeable sodium saturation in the upper Bt horizons and are slightly more acid in the lower Bt horizons than allowed for the series.

Bruno series

The Bruno series consists of excessively drained, nearly level soils that formed in sandy alluvium on flood plains. Slopes range from 0 to 2 percent. The soils of the Bruno series are sandy, mixed, thermic Typic Udifluvents.

Bruno soils are associated with Ariel, Gillsburg, and Oaklimeter soils. Ariel soils are in positions similar to those of the Bruno soils on flood plains. Gillsburg soils are in lower positions on flood plains. Oaklimeter soils are in slightly lower positions. All of these associated soils are in coarse-silty families.

Typical pedon of Bruno sandy loam, in an area of Bruno-Ariel complex; 5 miles north of Sharon and 135 feet east of county road; SW1/4SE1/4 sec. 6, T. 10 N., R. 4 E.

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

C1—5 to 10 inches; pale brown (10YR 6/3) sandy loam; weak fine granular structure; very friable; many fine roots; medium acid; abrupt smooth boundary.

C2—10 to 13 inches; brown (10YR 5/3) loamy sand; single grained; loose; few fine roots; medium acid; abrupt smooth boundary.

C3—13 to 16 inches; dark yellowish brown (10YR 4/4) loam; weak fine granular structure; very friable; few fine roots; medium acid; abrupt smooth boundary.

C4—16 to 34 inches; dark yellowish brown (10YR 4/4) sand; strata of yellowish brown (10YR 5/8) loam; single grained; loose; medium acid; abrupt smooth boundary.

C5—34 to 40 inches; dark yellowish brown (10YR 4/4) sand; single grained; loose; strongly acid; abrupt smooth boundary.

C6—40 to 48 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct grayish brown (10YR 5/2) mottles; structureless; bedding planes; very friable; strongly acid; abrupt smooth boundary.

C7—48 to 65 inches; mottled brown (10YR 5/3), light brownish gray (10YR 6/2), and yellowish brown (10YR 5/6) silt loam; structureless; friable; strongly acid.

Reaction ranges from strongly acid to mildly alkaline throughout. Thin bedding planes are common.

The Ap horizon is brown, dark brown, or dark grayish brown.

The C horizon is dark yellowish brown, pale brown, brown, or dark grayish brown and has grayish mottles in the lower part. Texture above 40 inches is loamy sand or sand that has thin strata of sandy loam, loam, or silt loam.

Bude series

The Bude series consists of somewhat poorly drained soils that have a fragipan. These soils formed in a silty mantle and the underlying loamy material on the uplands and stream terraces. Slopes range from 0 to 2 percent. The soils of the Bude series are fine-silty, mixed, thermic Glossaquic Fragiudalfs.

Bude soils are associated with Daleville, Gillsburg, and Providence soils. Daleville soils, which are on slightly lower stream terraces and flood plains, are poorly drained and do not have a fragipan. Gillsburg soils, which are on flood plains, do not have a fragipan. Providence soils, which are in higher positions on uplands and on stream terraces, are better drained and have browner subsoil.

Typical pedon of Bude silt loam, 0 to 2 percent slopes; 4.5 miles west of Madison-Leake County line along Natchez Trace Parkway, 175 feet south of Parkway, and 90 feet southwest of woodland; NW1/4SW1/4 sec. 9, T. 9 N., R. 5 E.

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

B21—7 to 12 inches; yellowish brown (10YR 5/4) silt loam; few medium distinct grayish brown (10YR 5/2) mottles; weak fine and medium subangular blocky structure; friable; many fine roots; few fine black concretions; very strongly acid; clear smooth boundary.

B22—12 to 23 inches; yellowish brown (10YR 5/6) silt loam; common medium distinct grayish brown (10YR 5/2) and few fine faint brown mottles; weak fine and medium subangular blocky structure; friable; few fine pores; few fine brown and black concretions; very strongly acid; clear smooth boundary.

B&A—23 to 27 inches; mottled yellowish brown (10YR 5/6) (B part), pale brown (10YR 6/3), and gray (10YR 6/1) (A part) silt loam; A material is about 20 percent of volume; brittle and compact in the brown portion; very strongly acid; clear irregular boundary.

B'x1—27 to 36 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) and pale brown (10YR 6/3) mottles; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; firm, compact and brittle in about 60 percent of mass; few fine voids; patchy clay films on faces of peds; common brown and black concretions; strongly acid; clear irregular boundary.

IIB'x2—36 to 42 inches; mottled gray (10YR 6/1), brownish yellow (10YR 6/6), and light brownish gray (10YR 6/2) silt loam containing noticeable sand; weak coarse prismatic structure parting to moderate medium and fine subangular blocky; firm, compact and brittle in about 60 percent of mass; patchy clay films; vertical tongues of gray silt about 3/4 inch wide between prisms; few brown and black concretions; very strongly acid; gradual irregular boundary.

IIB'x3—42 to 52 inches; mottled yellowish brown (10YR 5/6), pale brown (10YR 6/3), and gray (10YR 6/1) silt loam that has high sand content; weak coarse prismatic structure parting to moderate coarse subangular blocky; firm, compact and brittle; patchy clay films on prism faces; few vertical tongues less than 1 inch wide of gray silt between prisms; very strongly acid; gradual wavy boundary.

IIB'x4—52 to 62 inches; gray (10YR 6/1) silt loam; common medium distinct brownish yellow (10YR 6/8) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm, slightly compact and brittle; common fine black and brown concretions; very strongly acid.

Solum thickness is 60 inches or more. Reaction ranges from very strongly acid to medium acid throughout except where the surface has been limed. Brown and black concretions range from none to many throughout the soil. Depth to the fragipan ranges from 18 to 30 inches.

The Ap horizon is dark grayish brown, dark brown, or yellowish brown. The A2 horizon, if present, is pale brown or is light yellowish brown.

The B2 horizon is yellowish brown, strong brown, or light yellowish brown and has few to many mottles of chroma 2 or less. It is silt loam or silty clay loam. The B'x horizon is mottled in shades of gray and brown, or it is shades of gray and has brownish mottles. This horizon is silt loam or silty clay loam.

The IIB'x horizon is mottled in shades of gray, brown, and yellow, or it has a gray matrix. The IIB'x horizon is silt loam or clay loam. The sand content of the soil is greater than 15 percent at depths of 48 inches or less. In some places, there are underlying horizons of sandy loam.

Byram series

The Byram series consists of moderately well drained soils that have a fragipan. These soils formed in a mantle of silty material and underlying clayey deposits on ridges and side slopes on uplands. Slopes range from 2 to 12 percent. The soils of the Byram series are fine-silty, mixed, thermic Typic Fragiudalfs.

Byram soils are associated with Grenada, Loring, Providence, and Siwell soils. Grenada soils, which are in lower areas on uplands, do not have alkaline clay horizons. Loring, Providence, and Siwell soils are in positions similar to those of the Byram soils. Loring soils do not have an IIC horizon of clayey texture. Providence soils have more than 15 percent sand within 48 inches of the surface. Siwell soils do not have a fragipan and have horizons of clayey texture within 48 inches of the surface.

Typical pedon of Byram silt loam, 2 to 5 percent slopes, eroded; 1.5 miles north of Madison along U.S. Highway 51, 10.2 miles west along county road, and 300 feet east of road; NW1/4SE1/4 sec. 33, T. 8 N., R. 2 E.

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

B21t—5 to 14 inches; strong brown (7.5YR 5/6) silty clay loam; moderate fine and medium subangular blocky structure; friable; many fine roots; common black stains; thin patchy clay films on faces of peds; very strongly acid; clear smooth boundary.

B22t—14 to 20 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine and medium subangular blocky structure; friable; few fine black concretions; few fine clay films on faces of peds; yellowish brown (10YR 5/4) stains along root channels; very strongly acid; gradual irregular boundary.

Bx1—20 to 30 inches; yellowish brown (10YR 5/4) silt loam; few medium distinct light brownish gray (10YR 6/2) and many medium dark yellowish brown (10YR 4/4) mottles; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; firm, compact and brittle in 70 percent of the horizon; few fine roots in cracks; pale brown silt coatings on faces of peds; common fine and medium brown and black concretions; patchy clay films in interior of peds; very strongly acid; gradual irregular boundary.

Bx2—30 to 44 inches; mottled yellowish brown (10YR 5/6), light brownish gray (10YR 6/2), dark yellowish brown (10YR 4/4), and pale brown (10YR 6/3) silt loam; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; firm, compact and brittle in 75 percent of the horizon; common fine vesicles; few brown and black concretions; strongly acid; gradual irregular boundary.

B23t—44 to 56 inches; yellowish brown (10YR 5/6) silty clay loam; common medium distinct gray (10YR 6/1) mottles; moderate medium subangular blocky structure; firm; few fine black concretions; clay films on faces of peds; medium acid; clear wavy boundary.

IIC—56 to 72 inches; light olive brown (2.5Y 5/4) silty clay; common medium distinct gray (10YR 6/1) mottles; massive; firm, very plastic and sticky; few dark stains; intersecting pressure faces; few white bodies and streaks of calcium carbonate; neutral.

Depth to the fragipan ranges from 18 to 30 inches. Depth to the clayey IIC horizon ranges from 48 to 72 inches. Reaction of the A horizon and the upper part of the B horizon ranges from very strongly acid to medium acid except where the surface has been limed. Reaction of the lower part of the B horizon ranges from medium acid to neutral. The IIC horizon ranges from slightly acid to moderately alkaline.

The A horizon is dark grayish brown, brown, strong brown, or yellowish brown.

The B1 (if present), B21t, and B22t horizons are brown, strong brown, yellowish brown, or dark yellowish brown. Texture is silt loam or silty clay loam. Clay content in the upper 20 inches of the B horizon ranges from 20 to 32 percent.

The Bx horizon is brown, strong brown, yellowish brown, or dark yellowish brown or mottled in shades of brown and gray. Texture is silt loam or silty clay loam.

The B23t horizon, if present, is yellowish brown, dark yellowish brown, or light olive brown and has few to many mottles in shades of gray, or it is mottled in shades of brown and gray. Texture is silt loam or silty clay loam.

The IIC horizon is yellowish brown, light olive brown, or olive and has few to many mottles in shades of gray, brown, yellow, and red; or it is mottled in shades of brown, yellow, red, or gray. Texture is silty clay or clay. Nodules of soft calcium carbonate range from none to many.

Calhoun series

The Calhoun series consists of poorly drained soils that formed in silty material on nearly level areas and in small depressions on uplands and stream terraces. Slopes range from 0 to 1 percent. The soils of the Calhoun series are fine-silty, mixed, thermic Typic Glossaqualfs.

Calhoun soils are associated with Calloway, Cascilla, Grenada, and Memphis soils. Calloway soils, which are in slightly higher areas, have a fragipan. Cascilla soils, which are flood plains, have browner subsoil. Grenada soils, which are on higher stream terraces, are better drained and have a fragipan. Memphis soils, which are in higher positions on uplands, have browner subsoil.

Typical pedon of Calhoun silt loam; 5 miles west of Flora along Flora Road, 2 miles west along Phillips Road, 600 feet south on field road, and 1.5 miles east of Hinds County line; NE1/4SE1/4 sec. 8, T. 8 N., R. 2 W.

Ap—0 to 7 inches; grayish brown (10YR 5/2) silt loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; abrupt smooth boundary.

A21g—7 to 15 inches; gray (10YR 5/1) silt loam; weak medium subangular blocky structure; friable; many fine roots; few stains of yellowish red (5YR 4/6) along root channels; very strongly acid; gradual wavy boundary.

A22g—15 to 23 inches; gray (10YR 6/1) silt loam; few medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; few fine roots; few stains of yellowish red (5YR 4/6) along root channels; few small brown and black concretions; very strongly acid; gradual irregular boundary.

B21tg—23 to 34 inches; gray (10YR 6/1) silty clay loam; few medium distinct yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm; gray silt coats on faces of peds mostly in upper part; patchy clay films on faces of peds; tongues of A2 extend through horizon; few fine and medium black concretions; very strongly acid; gradual wavy boundary.

B22tg—34 to 44 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few small pores; patchy clay films on faces of peds; few medium black concretions; very strongly acid; gradual wavy boundary.

B3g—44 to 52 inches; gray (10YR 6/1) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm; few fine vesicles; patchy clay films on faces of peds; few fine and medium black concretions; very strongly acid; gradual smooth boundary.

Cg—52 to 65 inches; grayish brown (10YR 5/2) silt loam; common coarse distinct yellowish brown (10YR 5/8) mottles; massive; firm; common fine and medium black concretions; strongly acid.

Reaction ranges from very strongly acid to medium acid in the A horizon; it is very strongly acid or strongly acid in the upper part of the B horizon and is very strongly acid to mildly alkaline in the lower part of the B horizon and in the C horizon.

The Ap horizon is gray, brown, dark grayish brown, grayish brown, or light brownish gray and in places has brownish mottles. The A2 horizon is gray or grayish brown and has brownish mottles.

The B horizon is light brownish gray, grayish brown, or gray and has few to many mottles in shades of brown, yellow, and gray. Texture is silt loam or silty clay loam.

The Cg horizon is gray, grayish brown, light brownish gray, or yellowish brown and has mottles in shades of brown and gray.

Calloway series

The Calloway series consists of somewhat poorly drained soils that have a fragipan. These soils formed in silty material on stream terraces and uplands. Slopes are 0 to 3 percent. The soils of the Calloway series are fine-silty, mixed, thermic Glossaquic Fragiudalfs.

Calloway soils are associated with Bonn, Calhoun, Grenada, and Memphis soils. Bonn soils, which are on low terraces and flood plains, are poorly drained. They have horizons that are high in exchangeable sodium below a depth of 16 inches. Calhoun soils, which are in lower positions of uplands and on stream terraces, are poorly drained, and the lower part of the A horizon and upper part of the B horizon have matrix colors of chroma 2 or less. Grenada soils, which are in slightly higher positions, are better drained and have a browner, less gray upper part of the B horizon. Memphis soils, which are on uplands and terraces, have slopes of 0 to 40 percent and are well drained. They do not have a fragipan and do not have a seasonal high water table.

Typical pedon of Calloway silt loam, 0 to 1 percent slopes; 1 mile north of Bear Creek and 0.75 mile west of U.S. Highway 51; NW1/4NW1/4 sec. 22, T. 8 N., R. 2 E.

O1—1 inch to 0; very dark grayish brown (2.5Y 3/2) organic matter and partly decayed leaves and twigs that have an abundance of small roots and mycelium.

A1—0 to 1 inch; dark grayish brown (10YR 4/2) silt loam; moderate fine granular structure; very friable; many fine roots and wormholes; strongly acid; clear smooth boundary.

A2—1 inch to 6 inches; grayish brown (10YR 5/2) with pockets of brownish yellow (10YR 6/6) silt loam; weak medium granular structure; very friable; many fine and medium roots; few fine brown and black concretions; strongly acid; gradual wavy boundary.

B&A—6 to 19 inches; yellowish brown (10YR 5/4) silt loam; many medium distinct light gray (10YR 7/2) mottles in the A portion; weak fine subangular blocky and granular structure; friable; few fine roots; a few fine brown and black concretions; few fine pores; strongly acid; gradual irregular boundary.

A'2—19 to 30 inches; light brownish gray (10YR 6/2) silt loam; many medium distinct brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; friable, slightly compact; few fine roots; many fine brown and black concretions; many voids and vesicules; strongly acid; gradual irregular boundary.

B'x1—30 to 53 inches; grayish brown (10YR 5/2) silt loam; many medium and coarse distinct brownish yellow (10YR 6/6) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm, compact and brittle; clay films on faces of peds and in pores; black coatings on some peds; thick gray silt coatings in cracks and on peds; polygonal cracks filled with gray silty material; common fine brown and black concretions; common fine voids; few roots in cracks; strongly acid; gradual wavy boundary.

B'x2—53 to 60 inches; mottled yellowish brown (10YR 5/8), gray (10YR 5/1), and very pale brown (10YR 7/4) silt loam; weak coarse prismatic structure parting to weak to moderate coarse subangular blocky; firm, compact and brittle; patchy clay films on faces of peds and in pores; few fine voids; polygonal cracks filled with gray silt material; medium acid.

Solum thickness ranges from 60 to 70 inches. Depth to the fragipan ranges from 14 to 38 inches. Reaction of the surface layer and the upper part of the subsoil ranges from very strongly acid to medium acid. The lower part of the subsoil ranges from strongly acid to neutral.

The A1 horizon is a very dark grayish brown, dark gray, or dark grayish brown. The Ap and A2 horizons are dark grayish brown, grayish brown, or light yellowish brown.

The B or B&A horizon is yellowish brown, light yellowish brown, olive brown, or light olive brown. Mottles range from few to many in shades of gray. In some places, the horizon is mottled in shades of gray and brown. Texture is silt loam or silty clay loam. Clay content of the soil from a depth of 10 inches to the fragipan ranges from 18 to 30 percent.

The A'2 horizon is light brownish gray, light gray, or pale brown. In some places, the A'2 horizon is not present, and an A'2 and B'x or a B'x and A'2 horizon is at the top of the lower sequum.

The B'x horizon is grayish brown, yellowish brown, or light olive brown and has few to many grayish mottles, or the horizon is mottled in shades of brown, gray, or yellow. Texture is silt loam or silty clay loam. Black and brown concretions range from none to many.

Cascilla series

The Cascilla series consists of well drained soils that formed in silty alluvium on flood plains and natural levees of the major streams. Slopes range from 0 to 2 percent. The soils of the Cascilla series are fine-silty, mixed, thermic Fluventic Dystrochrepts.

Cascilla soils are associated with Calhoun, Columbus, and Daleville soils. Calhoun soils, which are on poorly drained areas of uplands and terraces, have more gray and less brown in the upper subsoil. Columbus soils, which are on low stream terraces and flood plains, have coarser texture. Daleville soils, which are in depressions of terraces and on flood plains, have grayer subsoil.

Typical pedon of Cascilla silt loam, in an area of Cascilla-Calhoun association; 2 miles south along gravel road from Yockanookany Deer Camp on Dummy Line Road and 100 feet south of county road; SE1/4NE1/4 sec. 28, T. 9 N., R. 5 E.

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

B1—4 to 8 inches; dark brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; few fine roots; few wormcasts; strongly acid; abrupt smooth boundary.

B21—8 to 16 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium and coarse subangular blocky structure; friable; few fine roots; few wormcasts; patchy clay films in root channels; strongly acid; clear smooth boundary.

B22—16 to 27 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; few fine roots; few thin patchy clay films on faces of peds; very strongly acid; clear smooth boundary.

B23—27 to 48 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct light brownish gray (10YR 6/2) and common medium faint pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; few fine roots; very strongly acid; clear smooth boundary.

B3—48 to 56 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable; very strongly acid; clear smooth boundary.

IIC1—56 to 64 inches; yellowish brown (10YR 5/4) loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; very strongly acid; clear smooth boundary.

IIC2—64 to 70 inches; light brownish gray (10YR 6/2) loam; common medium distinct yellowish brown (10YR 5/4) and pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; very strongly acid.

The solum thickness ranges from 45 to 80 inches. Reaction is very strongly acid or strongly acid throughout.

The A horizon is very dark grayish brown, dark grayish brown, brown, or very dark gray.

The B horizon texture is silt loam or silty clay loam. The B2 horizon is yellowish brown, dark yellowish brown, or dark brown and has few to common grayish mottles below a depth of 24 inches. The B3 horizon is yellowish brown or dark yellowish brown and has few to many mottles in shades of gray.

The IIC horizon is yellowish brown, light brownish gray, or grayish brown. Texture is silt loam, loam, or fine sandy loam.

The Cascilla soils in this survey are considered taxadjuncts to the Cascilla series. These soils have slightly more than 15 percent sand coarser than very fine sand, which is more than allowed for the series.

Columbus series

The Columbus series consists of moderately well drained soils that formed in loamy sediment on low stream terraces and flood plains. Slopes range from 0 to 2 percent. The soils of the Columbus series are fine-loamy, siliceous, thermic Aquic Hapludults.

Columbus soils are associated with Calhoun, Cascilla, and Daleville soils. Calhoun soils, which are in low places on uplands and terraces, have grayer subsoil. Cascilla soils, which are on slightly higher areas of natural levees of flood plains, are in a fine-silty family. Daleville soils, which are in low places or swags of terraces and on flood plains, have grayish subsoil.

Typical pedon of Columbus loam, in an area of Columbus-Daleville association; 1.5 miles west of the Madison-Leake County line on Dummy Line Road and 200 feet north of road; SE1/4NW1/4 sec. 11, T. 9 N., R. 5 E.

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

B21t—5 to 22 inches; yellowish brown (10YR 5/6) clay loam; moderate fine and medium subangular blocky structure; firm, slightly plastic; few fine roots; continuous clay films on faces of peds; very strongly acid; clear wavy boundary.

B22t—22 to 31 inches; yellowish brown (10YR 5/8) loam; common medium distinct light brownish gray (10YR 6/2) and yellowish red (5YR 5/8) mottles; moderate fine and medium subangular blocky structure; friable; few fine roots; patchy clay films on faces of peds; very strongly acid; clear wavy boundary.

B3—31 to 40 inches; mottled strong brown (7.5YR 5/8), very pale brown (10YR 7/3), and light brownish gray (10YR 6/2) fine sandy loam; weak medium subangular blocky structure; friable; few sand grains coated with clay; very strongly acid; gradual wavy boundary.

IIC1—40 to 55 inches; strong brown (7.5YR 5/8) loamy sand; single grained; loose; very strongly acid.

IIC2—55 to 65 inches; mottled yellowish brown (10YR 5/6), light brownish gray (10YR 6/2), and yellowish red (5YR 5/6) loamy sand; single grained; loose; very strongly acid.

Reaction is very strongly acid or strongly acid throughout.

The A horizon is dark brown, brown, or dark grayish brown.

The Bt horizon is yellowish brown, dark yellowish brown, or strong brown. The B22t horizon has mottles in shades of gray, red, or brown. The upper 20 inches of the Bt horizon has 18 to 33 percent clay content. Texture is clay loam, loam, or sandy clay loam.

The B3 horizon is light brownish gray or grayish brown and has mottles in shades of brown and red, or it is mottled in shades of gray, brown, and red. Texture is sandy clay loam, fine sandy loam, or loam.

The IIC horizon is strong brown or yellowish brown and has grayish and brownish mottles, or it is mottled in shades of brown, gray, and red.

The Columbus soils in this survey are considered taxadjuncts to the Columbus series. These soils have slightly more clay in the upper 20 inches of the B2t horizon than allowed for the series.

Daleville series

The Daleville series consists of poorly drained soils that formed in loamy sediment in low areas on stream terraces and flood plains. Slopes range from 0 to 2 percent. The soils of the Daleville series are fine-loamy, siliceous, thermic Typic Paleaquults.

Daleville soils are associated with Bude, Cascilla, and Columbus soils. Bude soils, which are in slightly higher positions of uplands and terraces, have a fragipan. Cascilla and Columbus soils, which are in higher positions of natural levees on flood plains or stream terraces, have browner subsoil.

Typical pedon of Daleville sandy loam, in an area of Columbus-Daleville association; 2.5 miles west of the Madison-Leake County line on Dummy Line Road, southeast 1,000 feet on county road, and south 300 feet; SE1/4NE1/4 sec. 15, T. 9 N., R. 5 E.

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

A2g—4 to 10 inches; light brownish gray (10YR 6/2) sandy loam; common medium distinct red (2.5YR 4/6) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; friable; many fine roots; very strongly acid; clear smooth boundary.

B21tg—10 to 21 inches; light brownish gray (10YR 6/2) sandy clay loam; common medium distinct yellowish brown (10YR 5/8) and red (2.5YR 4/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm, plastic; few fine roots; few patchy clay films on faces of peds; very strongly acid; clear irregular boundary.

B22tg—21 to 36 inches; gray (10YR 6/1) sandy clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm, plastic; few fine roots; few tongues of gray silt between prisms; few patchy clay films on faces of peds; very strongly acid; clear irregular boundary.

B23tg—36 to 55 inches; gray (10YR 6/1) sandy clay loam; many medium distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm, plastic; few patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

B24tg—55 to 65 inches; light gray (10YR 7/1) sandy clay loam; few medium distinct strong brown (7.5YR 5/6) and few medium prominent red (2.5YR 5/6) mottles; moderate medium subangular blocky structure; firm, plastic; few patchy clay films on faces of peds; very strongly acid.

Reaction is very strongly acid or strongly acid throughout.

The A1 horizon is dark grayish brown, very dark grayish brown, or dark gray. The Ap or A2 horizon is light brownish gray, grayish brown, or gray. Texture is sandy loam or fine sandy loam.

The Btg horizon is gray, light brownish gray, grayish brown, or light gray. Mottles in shades of brown, red, and yellow range from few to many. In some places, the lower part of the Bt horizon is mottled in shades of gray or brown. Texture is loam or sandy clay loam. Black and brown concretions range from none to many.

Gillsburg series

The Gillsburg series consists of somewhat poorly drained soils that formed in silty alluvium on flood plains. Slopes range from 0 to 2 percent. The soils of the Gillsburg series are coarse-silty, mixed, acid, thermic Aeric Fluvaquents.

Gillsburg soils are associated with Ariel, Bruno, Bude, McRaven, and Oaklimeter soils. Ariel soils, which are in higher positions on the flood plains, have browner and less gray subsoil. Bruno soils, which are in higher positions of the flood plains, have coarser texture and bedding planes. Bude soils, which are on uplands or in terrace positions near flood plains, have a fragipan. McRaven soils, which are on flood plains, are in a nonacid family. Oaklimeter soils, which are in slightly higher positions of the flood plains, are better drained and have fewer gray mottles in the upper part of the subsoil.

Typical pedon of Gillsburg silt loam; 2.75 miles north of Canton along State Highway 16 and 1,200 feet north of intersection of Highways 16 and 51; NE1/4NW1/4 sec 36, T. 10 N., R. 2 E.

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

B21—5 to 15 inches; dark brown (10YR 4/3) silt loam; few medium distinct grayish brown (10YR 5/2) mottles; weak fine and medium subangular blocky structure; friable; few fine roots; few fine brown and black concretions; very strongly acid; gradual smooth boundary.

B22—15 to 30 inches; light brownish gray (10YR 6/2) silt loam; few medium distinct yellowish brown (10YR 5/4) mottles; weak fine and medium subangular blocky structure; friable, slightly brittle; few fine roots; few fine pores; few silt coats on faces of peds; few black and brown concretions; very strongly acid; clear irregular boundary.

A2b—30 to 48 inches; light gray (10YR 7/1) silt loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; friable, slightly brittle and compact; few fine roots; many fine voids; gray silt coats or tongues about 3/4 inch wide between prisms; many fine and medium black and brown concretions; very strongly acid; clear irregular boundary.

A&B—48 to 60 inches; light brownish gray (10YR 6/2) silt loam; many medium distinct yellowish brown (10YR 5/4) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; friable, mottled part slightly brittle; gray tongues of silt 1/2 inch wide between prisms; few voids; nearly continuous clay films on faces of prisms; few fine and medium black and brown concretions; strongly acid; clear irregular boundary.

Btgb—60 to 72 inches; gray (10YR 6/1) silt loam; common medium distinct light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable; few voids; clay films on faces of peds; few fine black concretions; medium acid.

Depth to the A2b horizon ranges from 20 to 42 inches. Reaction is very strongly acid or strongly acid except in the Bb horizon, which is very strongly acid to medium acid, and in areas where the surface has been limed.

The Ap horizon is grayish brown, brown, or dark grayish brown.

The B21 horizon is dark brown, dark yellowish brown, or brown; or it is mottled in shades of brown and gray. The B22 horizon is grayish brown, light brownish gray, or gray; or it is mottled in shades of brown and gray. The Bb horizon has colors similar to those of the B22 horizon. Texture of the Bb horizon is silt loam or silty clay loam. Clay content of the control section ranges from 8 to 18 percent.

The Gillsburg soils in this survey are considered taxadjuncts to the Gillsburg series. These soils have more exchangeable sodium in the lower part than allowed for the series.

Grenada series

The Grenada series consists of moderately well drained soils that have a fragipan. These soils formed in silty material on uplands and stream terraces. Slopes range from 0 to 5 percent. The soils of Grenada series are fine-silty, mixed, thermic Glossic Fragiudalfs.

Grenada soils are associated with Bonn, Byram, Calhoun, Calloway, Loring, and Memphis soils. Bonn soils, which are on low terraces and flood plains, are poorly drained and have horizons below a depth of 16 inches that are high in exchangeable sodium. Byram soils, which are on ridgetops and side slopes, have clayey horizons between 4 and 6 feet. Calhoun soils, which are in the lower positions of uplands or terraces, have subsoil that has chroma of 2 or less. Calloway soils, which are on slightly lower areas, have grayish mottles within 16 inches of the surface. Loring soils, which are in higher positions of the landscape, are better drained. Memphis soils, which are in higher positions, are well drained silty soils that do not have a fragipan.

Typical pedon of Grenada silt loam, 0 to 2 percent slopes; 6 miles north of Canton, 1,000 feet south of State Highway 16 at Old Yazoo City Road, and 660 feet west of Old Yazoo City Road; NE1/4SE1/4 sec. 21, T. 10 N., R. 2 E.

Ap—0 to 5 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable; many fine roots; medium acid; clear smooth boundary.

B21—5 to 13 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine and medium subangular blocky structure; friable; many fine roots; few black concretions; very strongly acid; clear smooth boundary.

B22—13 to 22 inches; dark yellowish brown (10YR 4/4) silt loam; common medium faint pale brown (10YR 6/3) mottles; moderate medium and fine subangular blocky structure; friable; few fine roots; common medium black concretions; very strongly acid; clear smooth boundary.

A'2—22 to 25 inches; light gray (10YR 7/2) silt loam; many medium distinct dark yellowish brown (10YR 4/4) mottles; weak fine and medium subangular blocky structure; friable; few fine pores; slightly brittle; few fine and medium black concretions; very strongly acid; clear irregular boundary.

B'x1—25 to 38 inches; yellowish brown (10YR 5/6) silt loam; common medium distinct light brownish gray (10YR 7/2) and gray (10YR 6/1) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm, compact and brittle; few fine voids; few patchy clay films; tongues of gray silt between prisms; few fine and medium black and brown concretions; very strongly acid; clear irregular boundary.

B'x2—38 to 54 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct yellowish brown (10YR 5/6) and gray (10YR 6/1) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm, compact and brittle; few fine voids; patchy clay films on faces of peds and in voids; tongues of gray silt between prisms; few fine black and brown concretions; strongly acid; clear irregular boundary.

B'x3—54 to 70 inches; mottled dark yellowish brown (10YR 4/4), light gray (10YR 7/2), and light yellowish brown (10YR 6/4) silt loam; weak coarse prismatic structure parting to weak medium subangular blocky; firm, slightly compact and brittle; thin patchy clay films on faces of peds; few fine black concretions; strongly acid.

Reaction of the A, B2, A'2, and upper B'x horizons range from very strongly acid to medium acid except where the surface has been limed. The lower part of the B'x horizon ranges from strongly acid to neutral.

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

The B horizon is dark yellowish brown, yellowish brown, or light yellowish brown. Texture of the B horizon is silt loam or silty clay loam.

The A'2 horizon is light gray or light brownish gray and has mottles in shades of brown.

The B'x horizon is dark yellowish brown, yellowish brown, or brown and has grayish mottles, or is mottled in shades of brown and gray. Texture of the Bx horizon is silt loam or silty clay loam.

Lexington series

The Lexington series consists of well drained soils that formed in a mantle of silty material and underlying loamy material on the uplands. Slopes range from 8 to 12 percent. The soils of the Lexington series are fine-silty, mixed, thermic, Typic Paleudalfs.

Lexington soils are associated with Providence, Smithdale, and Tippah soils. Providence soils, which are on ridgetops and side slopes of 0 to 15 percent, have a fragipan. Smithdale soils, which are on adjacent steeper side slopes, are in a fine-loamy family. Tippah soils, which are on adjacent ridgetops and side slopes, are underlain by acid clay or silty clay at a depth of 3 feet or less.

Typical pedon of Lexington silt loam, in an area of Providence-Lexington complex, 8 to 12 percent slopes, eroded; 1 mile northwest of Camden on State Highway 17, 3/4 mile north on county road, and 500 feet east of county road; NE1/4SE1/4 sec. 13, T. 11 N., R. 4 E.

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

B21t—4 to 24 inches; yellowish red (5YR 5/6) silt loam; moderate medium subangular blocky structure; friable; many fine roots; thin patchy films on faces of peds; strongly acid; clear smooth boundary.

B22t—24 to 32 inches; yellowish red (5YR 5/8) silt loam; few medium distinct pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; friable; few fine roots; few black stains; patchy clay films on faces of peds; very strongly acid; abrupt smooth boundary.

B23t—32 to 40 inches; yellowish red (5YR 5/6) silt loam; common medium distinct pale brown (10YR 6/3) and light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable; common black stains and concretions; few fine pores; patchy clay films on faces of peds; very strongly acid; clear smooth boundary.

IIB31—40 to 56 inches; strong brown (7.5YR 5/8) sandy loam; common medium faint yellowish red (5YR 4/6) mottles and common light brownish gray (10YR 6/2) skeletans; weak medium subangular blocky structure; friable; few fine pores; very strongly acid; clear smooth boundary.

IIB32—56 to 62 inches; yellowish red (5YR 5/6) sandy loam; common very pale brown (10YR 7/3) skeletans; weak medium subangular blocky structure; friable; very strongly acid; clear smooth boundary.

IIB33—62 to 72 inches; yellowish red (5YR 5/6) loam; common medium distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; friable; clay films on faces of peds; very strongly acid.

Solum thickness is 60 inches or more. Combined thickness of the A and B horizons containing less than 15 percent sand is less than 48 inches and commonly is about 35 inches. Reaction ranges from very strongly acid to medium acid throughout.

The Ap horizon is brown, yellowish brown, or dark brown.

The Bt horizon is reddish brown, yellowish red, strong brown, or dark yellowish brown. It is silt loam or silty clay loam. Clay content commonly is 20 to 30 percent, but it ranges from 18 to 35 percent. The upper 20 inches of the Bt horizon commonly contains 5 to 10 percent fine and coarser sand, and everywhere sand is less than 15 percent. The amount of sand increases with depth.

The IIB3 horizon is dark brown, dark reddish brown, reddish brown, strong brown, or yellowish red. The few to common skeletans are brownish yellow, brown, yellow, or yellowish brown. Texture is sandy loam or loam.

Loring series

The Loring series consists of moderately well drained soils that have a fragipan. These soils formed in silty material on uplands and stream terraces. Slopes range from 0 to 12 percent. The soils of the Loring series are fine-silty, mixed, thermic Typic Fragiudalfs.

Loring soils are associated with Bonn, Byram, Grenada, Memphis, Siwell, and Tippah soils. Bonn soils, which are on low terraces and flood plains, are poorly drained and have horizons at depths below 16 inches that are high in exchangeable sodium. Byram soils, which are in positions similar to those of Loring soils, are underlain with alkaline clayey material at a depth of 4 to 6 feet. Grenada soils, which are in lower positions on uplands and stream terraces, have an A'2 horizon above the fragipan. Memphis soils, which are in higher positions, are better drained and do not have a fragipan. Siwell and Tippah soils are in positions similar to those of Loring soils on uplands. Siwell soils are underlain with alkaline clay in the upper 48 inches, and Tippah soils are underlain with acid clay in the upper 48 inches.

Typical pedon of Loring silt loam, 2 to 5 percent slopes, eroded; 1.5 miles east of Big Black River, 0.5 mile east of State Highway 16, 400 feet east of north-south road, and 75 feet south of paved road; NE1/4NE1/4 sec. 26, T. 10 N., R. 2 E.

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

B1—4 to 9 inches; dark brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; friable; many fine roots; very strongly acid; clear smooth boundary.

B21t—9 to 19 inches; dark brown (7.5YR 4/4) silt loam; moderate medium and fine subangular blocky structure; friable; few fine black concretions; many fine roots; discontinuous clay films on faces of peds; common pale brown (10YR 6/3) silt coatings in lower part; very strongly acid; clear smooth boundary.

B22t—19 to 30 inches; dark brown (7.5YR 4/4) silt loam; moderate medium and fine subangular blocky structure; friable; few fine roots; few fine black concretions; patchy clay films; strongly acid; clear smooth boundary.

Bx1—30 to 45 inches; dark brown (7.5YR 4/4) silt loam; many medium faint pale brown (10YR 6/3) and common medium distinct light gray (10YR 7/2) mottles; weak coarse prismatic structure parting to moderate medium and fine subangular blocky; firm, compact and brittle; patchy clay films; few fine black concretions; few streaks and seams of gray silt; very strongly acid; clear wavy boundary.

Bx2—45 to 52 inches; dark brown (7.5YR 4/4) silt loam; common medium faint pale brown (10YR 6/3) and gray (10YR 6/1) mottles; weak medium prismatic structure parting to weak medium and fine subangular blocky; firm, compact and brittle; few streaks and seams of gray silt; patchy clay films; very strongly acid; gradual wavy boundary.

C—52 to 70 inches; dark brown (7.5YR 4/4) silt loam; few medium faint pale brown (10YR 6/3) and few medium distinct gray (10YR 6/1) mottles; massive; firm, slightly compact and brittle; few fine black concretions; strongly acid.

Solum thickness ranges from 45 to 75 inches. Depth of the fragipan ranges from 22 to 35 inches. The A and B horizons range from very strongly acid to medium acid. The C horizon, where present, ranges from very strongly acid to slightly acid. Sand content is usually less than 5 percent throughout, but it may range up to 15 percent. Content of black and brown concretions ranges from few to common.

The A horizon is brown, strong brown, or yellowish brown.

The B1 and B2t horizons are dark brown, strong brown, yellowish brown, or dark yellowish brown. Texture is silt loam or silty clay loam. In places, the lower part of the B2t horizon has gray mottles.

The Bx horizon is brown, dark brown, strong brown, yellowish brown, or dark yellowish brown mottled in shades of yellow, brown, and gray; or it is mottled in shades of gray, brown, or yellow. It is silt loam or silty clay loam.

McRaven series

The McRaven series consists of somewhat poorly drained soils that formed in silty alluvium on flood plains. Slopes range from 0 to 2 percent. The soils of the McRaven series are coarse-silty, mixed, nonacid, thermic Aeric Fluvaquents.

McRaven soils are associated with Adler, Gillsburg, Oaklimeter, and Riedtown soils. Adler soils, which are in slightly higher positions on the flood plains, are better drained and have bedding planes. Gillsburg and Oaklimeter soils, which are in positions similar to those of McRaven soils on the flood plains, are in acid families. Riedtown soils, which are in higher positions on the flood plains, are better drained.

Typical pedon of McRaven silt loam; 2 miles west of Canton on State Highway 22 to Virlilia Road, 0.25 mile north along first drainage ditch that crosses Virlilia Road, and 600 feet east; SW1/4SE1/4 sec. 22, T. 9 N., R. 2 E.

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

B21—7 to 15 inches; dark brown (10YR 4/3) silt loam; common medium faint grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine black and brown concretions; neutral; clear smooth boundary.

B22—15 to 30 inches; grayish brown (10YR 5/2) silt loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; friable; few fine roots and pores; common fine black and brown concretions; slightly acid; clear wavy boundary.

Ab&B23gb—30 to 44 inches; gray (10YR 5/1) silt loam; few fine distinct yellowish brown (10YR 5/4) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; friable; few gray tongues and pockets of silt; slightly brittle and compact; few fine pores; common fine and medium black and brown concretions; neutral; clear wavy boundary.

B24gb—44 to 70 inches; light brownish gray (2.5Y 6/2) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak fine subangular blocky; friable, mottled part slightly brittle; few gray tongues and pockets of silt; common brown and black concretions; slightly acid.

Depth to the buried soil ranges from 20 to 42 inches. Reaction ranges from medium acid to neutral in the surface layer and the upper part of the subsoil. In the lower part of the subsoil, reaction ranges from slightly acid to mildly alkaline. Brown and black concretions range from none to many throughout.

The Ap horizon is dark brown, dark grayish brown, or brown.

The B21 horizon is dark brown, dark yellowish brown, or dark grayish brown and has none to common grayish mottles.

The B22 horizon is grayish brown, light brownish gray, or gray mottled in shades of brown and gray.

The lower B horizon is similar in color to the B22 horizon, or is mottled in shades of brown and gray. Texture is silt loam or silty clay loam.

Memphis series

The Memphis series consists of well drained soils that formed in silty material on uplands and terraces. Slopes range from 0 to 40 percent. The soils of the Memphis series are fine-silty, mixed, thermic Typic Hapludalfs.

Memphis soils are associated with Calhoun, Calloway, Grenada, and Loring soils. Calhoun soils, which are in lower positions on the landscape, are poorly drained and have a grayish B horizon. Calloway soils, which are in lower positions, are somewhat poorly drained and have a fragipan. Grenada and Loring soils, which are in lower positions, have a fragipan.

Typical pedon of Memphis silt loam, 0 to 2 percent slopes; 9 miles west of Flora, 320 feet south of east-west field road, and 400 feet east of Hinds County line; SW1/4NW1/4 sec. 18, T. 8 N., R. 2 W.

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

B21t—6 to 24 inches; dark brown (7.5YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; firm, slightly plastic; many fine roots; continuous clay films on peds; few dark coatings on faces of some peds; few pale brown silt coatings on faces of some peds; very strongly acid; clear smooth boundary.

B22t—24 to 36 inches; dark brown (7.5YR 4/4) silt loam; moderate medium subangular blocky structure; friable, slightly plastic; few fine roots; thin patchy clay films on faces of some peds; pale brown silt coatings on faces of peds; very strongly acid; clear smooth boundary.

B23t—36 to 52 inches; dark brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; friable; few fine roots; few patchy clay films on some peds; few pale brown silt coatings on faces of some peds; very strongly acid; clear smooth boundary.

C—52 to 76 inches; dark brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; friable; pale brown silt coatings in cracks and between peds; very strongly acid.

Solum thickness ranges from 32 to 76 inches. Reaction ranges from very strongly acid to medium acid throughout except where the surface has been limed.

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

The B2t horizons are dark brown, strong brown, yellowish brown, or dark yellowish brown. The texture is silt loam or silty clay loam. Clay content ranges from 25 to 32 percent in the upper 20 inches.

The B3 horizon, if present, is dark brown, strong brown, or yellowish brown. The C horizon, if present, has colors similar to those of the B3 horizon.

Morganfield series

The Morganfield series consists of well drained soils that formed in silty alluvium on flood plains. Slopes range from 0 to 2 percent. The soils of the Morganfield series are coarse-silty, mixed, nonacid, thermic Typic Udifluvents.

Morganfield soils are associated with Adler, Ariel, and Riedtown soils. Adler soils, which are in slightly lower areas on flood plains, have mottles of chroma 2 or less within 20 inches of the surface. Ariel soils, which are on flood plains, do not have bedding planes. Riedtown soils, which are in areas similar to Morganfield soils on the flood plains, do not have bedding planes.

Typical pedon of Morganfield silt loam; 4 miles south of Flora on State Highway 22, 2.5 miles west on county road, 350 feet south of county road, and 200 feet east of Spring Creek; SW1/4SE1/4 sec. 27, T. 8 N., R. 2 W.

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

C1—7 to 27 inches; dark yellowish brown (10YR 4/4) silt loam; structureless; friable; few fine roots; thin pale brown horizontal strata; medium acid; gradual smooth boundary.

C2—27 to 38 inches; dark brown (10YR 4/3) silt loam; medium distinct light brownish gray (10YR 6/2) mottles; friable; few fine roots; few fine brown concretions; thin pale brown horizontal strata; medium acid; clear smooth boundary.

C3—38 to 60 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct light brownish gray (10YR 6/2) and common medium faint pale brown (10YR 6/3) mottles; structureless; friable; few fine brown and black concretions; thin horizontal strata; slightly acid.

Reaction ranges from medium acid to neutral throughout.

The Ap horizon is dark brown or dark grayish brown.

The C horizon is yellowish brown, dark brown, or dark yellowish brown. In places, the C2 horizon has grayish mottles at depths below 20 inches. The C3 or lower horizons, if present, may have few to many chroma 2 mottles at depths below 20 inches. Brown and black concretions range from none to common.

Oaklimeter series

The Oaklimeter series consists of moderately well drained soils that formed in silty alluvium on flood plains. Slopes range from 0 to 2 percent. The soils of the Oaklimeter series are coarse-silty, mixed, thermic Fluvaquentic Dystrochrepts.

Oaklimeter soils are associated with Ariel, Bruno, Gillsburg, McRaven, and Riedtown soils. Ariel soils, which are in slightly higher positions of flood plains, have browner subsoil. Bruno soils, which are in higher positions of flood plains, have a sandy control section. Gillsburg soils, which are in slightly lower positions, have grayer subsoil. McRaven soils, which are in slightly lower positions on the flood plains, are less acid. Riedtown soils, which are in positions similar to those of Oaklimeter soils on the flood plains, are less acid.

Typical pedon of Oaklimeter silt loam; 9 miles north of Canton, 0.75 mile west of U.S. Highway 51, and 1,200 feet south of road; NE1/4NW1/4 sec. 3, T. 10 N., R. 3 E.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam; few medium faint yellowish brown mottles; weak fine granular structure; friable; many fine roots; strongly acid; abrupt smooth boundary.

B21—5 to 20 inches; dark brown (10YR 4/3) silt loam; few fine faint pale brown mottles; weak medium subangular blocky structure; friable; many fine roots; few fine black concretions; strongly acid; clear smooth boundary.

B22—20 to 31 inches; dark brown (10YR 4/3) silt loam; common medium distinct light brownish gray (10YR 6/2) and pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; few fine brown and black concretions; strongly acid; gradual wavy boundary.

B23b&A2b—31 to 40 inches; mottled gray (10YR 6/1), very pale brown (10YR 7/3), and yellowish brown (10YR 5/4) silt loam; weak coarse prismatic structure parting to weak medium subangular blocky; friable; few fine brown and black concretions; strongly acid; gradual wavy boundary.

Btgb—40 to 70 inches; gray (10YR 6/1) silt loam; few medium distinct very pale brown (10YR 7/3) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; friable; many medium brown and black concretions; few fine pores; few thin clay films in pores and on faces of some peds; strongly acid.

Solum thickness ranges from 60 to more than 80 inches. Depth to the buried solum ranges from 20 to 35 inches. Clay content in the 10- to 40-inch control section is 7 to 18 percent. Soil reaction is very strongly acid or strongly acid throughout.

The A horizon is dark grayish brown, brown, or dark brown.

The B21 horizon is brown, dark brown, dark yellowish brown, or yellowish brown. Grayish or brownish mottles range from none to common. The B22 horizon has matrix colors similar to those of the B21 horizon, except it has few to many grayish mottles, or the horizon is mottled in shades of brown and gray.

The B23b&A2b and Btgb horizons are gray, light brownish gray, or are mottled in shades of gray and brown. Texture is silt loam or silty clay loam. Black and brown concretions range from none to many.

Providence series

The Providence series consists of moderately well drained soils that have a fragipan. These soils formed in a mantle of silty material and underlying loamy material on stream terraces and uplands. Slopes range from 0 to 15 percent. The soils of the Providence series are fine-silty, mixed, thermic Typic Fragiudalfs.

Providence soils are associated with Bude, Byram, Lexington, Smithdale, and Tippah soils. Bude soils, which are on lower lying stream terraces and uplands, have grayish mottles within 16 inches of the surface. Byram soils, which are on adjacent ridgetops and side slopes, are underlain with alkaline clayey material at depths of 4 to 6 feet. Lexington soils, which are on side slopes, do not have a fragipan. Smithdale soils, which are on steeper side slopes, do not have a fragipan and are in a fine-loamy family. Tippah soils, which are in positions similar to those of Providence soils, are underlain with acid clay at a depth of 24 to 36 inches.

Typical pedon of Providence silt loam, 2 to 5 percent slopes, eroded; 0.75 mile north of Camden on State Highway 17 and 300 feet east of the highway; NE1/4NW1/4 sec. 24, T. 11 N., R. 4 E.

Ap—0 to 6 inches; dark brown (10YR 4/3) silt loam; few medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; many fine roots; medium acid; abrupt smooth boundary.

B1—6 to 9 inches; strong brown (7.5YR 5/8) silt loam; weak fine subangular blocky structure; friable; few fine roots; strongly acid; clear smooth boundary.

B21t—9 to 14 inches; dark brown (7.5YR 4/4) silt loam; moderate medium and fine subangular blocky structure; friable; many fine roots; patchy clay films on faces of peds; medium acid; clear smooth boundary.

B22t—14 to 22 inches; strong brown (7.5YR 5/6) silt loam; moderate fine and medium subangular blocky structure; friable; few patchy clay films; few fine black concretions; medium acid; clear irregular boundary.

Bx1—22 to 28 inches; yellowish brown (10YR 5/6) silt loam; common medium distinct gray (10YR 6/1) mottles; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; firm, compact and brittle; voids; pale brown silt coatings in cracks between prisms; patchy clay films; few black concretions; strongly acid; clear wavy boundary.

Bx2—28 to 36 inches; mottled strong brown (7.5YR 5/6), light brownish gray (10YR 6/2), and dark yellowish brown (10YR 4/4) silt loam; weak coarse prismatic structure parting to moderate medium subangular blocky; firm, compact and brittle; fine pores; few fine black concretions; strongly acid; gradual wavy boundary.

IIBx3—36 to 52 inches; strong brown (7.5YR 5/6) loam; common medium distinct gray (10YR 6/1) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm, compact and brittle; sand grains bridged with clay; strongly acid; clear smooth boundary.

IIB23t—52 to 70 inches; yellowish red (5YR 5/6) sandy clay loam; common medium distinct gray (10YR 6/1) and yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; patchy clay films; very strongly acid.

Depth to the fragipan ranges from 18 to 38 inches. The reaction of the soil ranges from very strongly acid to medium acid throughout except where the surface has been limed.

The Ap horizon is grayish brown, dark brown, yellowish brown, or light yellowish brown.

The B1 and B2t horizons are strong brown, yellowish brown, dark brown, or yellowish red. Texture is silt loam or silty clay loam. The Bt horizon usually contains 20 to 30 percent clay and 5 to 15 percent sand.

The Bx and IIBx horizons have yellowish red to yellowish brown matrix colors that are mottled in shades of gray, brown, and red, or they are mottled yellow, brown, gray, and red. The upper part of the fragipan is silty clay loam or silt loam. The lower part is clay loam, sandy clay loam, or sandy loam. It ranges from firm to very firm. The IIBt horizon ranges from red to gray. Texture is sandy loam, loam, sandy clay loam, or clay loam.

Riedtown series

The Riedtown series consists of moderately well drained soils that formed in silty alluvium on flood plains. Slopes range from 0 to 2 percent. The soils of the Riedtown series are coarse-silty, mixed, thermic Fluvaquentic Eutrochrepts.

Riedtown soils are associated with Adler, McRaven, Morganfield, and Oaklimeter soils; all are on flood plains. Adler soils, which are in positions similar to Riedtown soils, have thin horizontal strata. McRaven soils, which are in slightly lower areas, have grayer subsoil. Morganfield soils, which are in higher positions, have thin horizontal strata and have a browner upper control section. Oaklimeter soils, which are in positions similar to those of Riedtown soils, are more acid below the surface layer.

Typical pedon of Riedtown silt loam; 2 miles west of Canton along State Highway 22, about 1 mile northwest along Virlilia Road, 0.25 mile north along Old Yazoo City Road, northeast along drainage ditch 0.25 mile, and southeast 200 feet; NW1/4NW1/4 sec. 22, T. 9 N., R. 2 E.

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

B21—6 to 14 inches; dark brown (10YR 4/3) silt loam; few fine faint pale brown mottles; weak medium subangular blocky structure; friable; few fine roots; few fine brown and black concretions; slightly acid; clear smooth boundary.

B22—14 to 32 inches; dark brown (10YR 4/3) silt loam; common medium faint grayish brown (10YR 5/2) mottles; weak coarse prismatic structure parting to weak fine and medium subangular blocky; friable; common fine and medium brown and black concretions; slightly acid; clear smooth boundary.

B23b&A2b—32 to 45 inches; grayish brown (10YR 5/2) silt loam; few medium faint yellowish brown (10YR 5/4) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; few pockets and seams of gray silt; slightly brittle; common fine brown and black concretions; medium acid; clear smooth boundary.

B24gb—45 to 64 inches; gray (10YR 5/1) silt loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few brown and black concretions; few pockets of gray silt; slightly acid; clear smooth boundary.

B25gb—64 to 80 inches; dark gray (10YR 4/1) silt loam; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few pockets of gray silt; few brown and black concretions; slightly acid.

Depth to the buried horizon ranges from 20 to 40 inches. Reaction in the A horizon ranges from strongly acid to neutral and from medium acid to neutral in the B horizon.

The Ap horizon is dark brown, dark grayish brown, or brown.

The B21 and B22 horizons are dark brown, dark yellowish brown, or yellowish brown and have none to common grayish mottles.

The B23b&A2b horizon is grayish brown, brown, and dark yellowish brown; it has many mottles in shades of gray and brown. Texture is silt loam or silty clay loam.

The B24gb and the B25gb horizons are dark gray, gray, or grayish brown and have few to many brown mottles.

Siwell series

The Siwell series consists of moderately well drained soils that formed in a mantle of silty material and underlying alkaline clay on uplands. Slopes range from 2 to 12 percent. The soils of the Siwell series are fine-silty, mixed, thermic Typic Hapludalfs.

Siwell soils are associated with Ariel, Byram, and Loring soils. Ariel soils, which are on flood plains, have less clay in the subsoil. Byram and Loring soils are in positions similar to those of Siwell soils. Byram soils have underlying alkaline clayey material at a depth of 4 to 6 feet. Loring soils have a fragipan.

Typical pedon of Siwell silt loam, 8 to 12 percent slopes, severely eroded; 7.5 miles south of Canton on U.S. Highway 51, 0.2 miles west on county road, and 650 feet southwest of railroad; SE1/4NW1/4 sec. 33, T. 8 N., R. 2 E.

Ap—0 to 5 inches; dark brown (10YR 4/3) silt loam; moderate medium granular structure; friable; common medium and fine roots; strongly acid; abrupt smooth boundary.

B21t—5 to 13 inches; yellowish brown (10YR 5/8) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; few small black concretions; strongly acid; gradual smooth boundary.

B22t—13 to 19 inches; yellowish brown (10YR 5/8) silty clay loam; few fine faint brown (10YR 5/3) and few fine distinct yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; friable; common fine roots; few small black concretions; very strongly acid; gradual irregular boundary.

B23t—19 to 26 inches; yellowish brown (10YR 5/6) silty clay loam; common medium distinct light brownish gray (10YR 6/2) and common medium prominent yellowish red (5YR 5/6) mottles; moderate medium subangular structure; firm, slightly plastic; few patchy clay films on faces of peds; strongly acid; gradual smooth boundary.

IIB24t—26 to 38 inches; light olive brown (2.5Y 5/6) silty clay; common medium distinct yellowish brown (10YR 5/6) and common fine distinct light brownish gray (10YR 6/2) mottles; moderate medium angular blocky structure; firm, very sticky and very plastic; pressure faces and clay films on surfaces of peds; medium acid; gradual wavy boundary.

IIC1—38 to 54 inches; light yellowish brown (2.5Y 6/4) clay; intersecting slickensides parting to moderate medium angular blocky structure; firm, very sticky and very plastic; few to common calcium carbonate nodules; mildly alkaline; wavy boundary.

IIC2—54 to 70 inches; light yellowish brown (2.5Y 6/4) clay; few fine faint gray (10YR 6/1) mottles; massive in places parting to weak fine angular blocky fragments; firm, very sticky and very plastic; common fine calcium carbonate nodules; mildly alkaline.

The solum thickness ranges from 24 to 55 inches. Thickness of the silty upper part is 20 to 40 inches. The reaction of the A and B2t horizons ranges from very strongly acid to medium acid. The reaction of the IIB24t horizon ranges from slightly acid to moderately alkaline. The IIC horizon ranges from neutral to moderately alkaline.

The A horizon is dark brown, brown, or yellowish brown.

The B2t horizon is yellowish brown, brown, or strong brown. In places, the lower part of the Bt horizon has few to common mottles in shades of brown, gray, or red. Texture is silt loam or silty clay loam.

The IIB2t horizon is light olive brown or yellowish brown and has mottles in shades of gray and brown, or the horizon is mottled in shades of brown, red, and gray. The texture is silty clay loam or silty clay.

The IIC horizon is yellowish red, light yellowish brown, yellowish brown, or light olive brown; or it is mottled in shades of brown, red, and gray. From none to many nodules of soft chalk are present.

Smithdale series

The Smithdale series consists of well drained soils that formed in loamy material in hilly uplands. Slopes range from 8 to 30 percent. The soils of the Smithdale series are fine-loamy, siliceous, thermic Typic Paleudults.

Smithdale soils are associated with Ariel, Lexington, and Providence soils. Ariel soils, which are on flood plains, are in a coarse-silty family. Lexington soils, which are on uplands that have slopes of 8 to 12 percent, have a fine-silty upper B horizon. Providence soils, which are on terraces and uplands that have slopes of less than 15 percent, have a fragipan.

Typical pedon of Smithdale sandy loam, in an area of Smithdale-Providence association, hilly; 0.3 mile east of Cedar Hill Church and 600 feet north of gravel road; SE1/4SW1/4 sec. 22, T. 11 N., R. 5 E.

A1—0 to 1 inch; a mixture of light yellowish brown (10YR 6/4) and very dark grayish brown (10YR 3/2) sandy loam; weak fine granular structure; very friable; many fine roots; very strongly acid; abrupt smooth boundary.

A2—1 inch to 9 inches; yellowish brown (10YR 5/6) sandy loam; weak fine granular structure; very friable; common fine roots; strongly acid; clear smooth boundary.

B1—9 to 12 inches; strong brown (7.5YR 5/6) sandy loam; weak medium subangular blocky structure; friable; few discontinuous streaks of yellowish red (5YR 4/6); few fine roots; strongly acid; gradual wavy boundary.

B21t—12 to 28 inches; red (2.5YR 4/6) sandy clay loam; moderate fine and medium subangular blocky structure; friable; few fine roots; nearly continuous clay films on faces of peds; some uncoated sand grains; few root channels with decayed roots; few pockets of strong brown (7.5YR 5/6); very strongly acid; gradual wavy boundary.

B22t—28 to 47 inches; red (2.5YR 4/8) sandy loam; moderate medium subangular blocky structure; friable; common to many uncoated sand grains; some sand grains coated with clay; slightly compact in places; few fine roots and root channels; very strongly acid; gradual wavy boundary.

B23t—47 to 80 inches; red (2.5YR 4/6) sandy loam; few medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; common pockets of uncoated sand grains; very strongly acid.

The solum thickness is 60 inches or more. Reaction is very strongly acid or strongly acid except where the surface has been limed.

The A horizon is sandy loam or fine sandy loam. The A1 horizon is dark grayish brown or dark brown. The A2 horizon is yellowish brown or dark brown.

The upper part of the Bt horizon is red or yellowish red. Texture is sandy clay loam or loam. The lower part of the Bt horizon has colors similar to those in the upper Bt horizon and has few to many pockets of uncoated sand grains. Texture is loam or sandy loam. The lower Bt horizon has few to many pockets of brownish material.

Tippah series

The Tippah series consists of moderately well drained soils that formed in silty material over clay on uplands. Slopes range from 2 to 10 percent. The soils of the Tippah series are fine-silty, mixed, thermic Aquic Paleudalfs.

Tippah soils are associated with Lexington, Loring, and Providence soils. Lexington soils, which are on ridges and side slopes, are less clayey in the lower part of the subsoil. Loring soils, which are on uplands and terraces, have a fragipan. Providence soils, which are on ridges and side slopes of the uplands and terraces, have coarser texture in the lower part of the subsoil.

Typical pedon of Tippah silt loam, 5 to 8 percent slopes, eroded; 1 mile north of State Highway 16, 100 feet west of county road, 0.5 mile west of Leake County line; NE1/4NW1/4 sec. 24, T. 10 N., R. 5 E.

Ap—0 to 4 inches; yellowish brown (10YR 5/4) silt loam; few medium distinct dark brown (7.5YR 4/4) mottles; weak medium subangular blocky structure; friable; many fine roots; strongly acid; abrupt smooth boundary.

B21t—4 to 11 inches; reddish brown (5YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; many fine roots; patchy clay films; strongly acid; clear smooth boundary.

B22t—11 to 18 inches; strong brown (7.5YR 5/6) silt loam; moderate fine and medium subangular blocky structure; friable; many fine roots; patchy clay films on faces of peds; strongly acid; clear smooth boundary.

B23t—18 to 27 inches; strong brown (7.5YR 5/8) silt loam; common medium distinct gray (10YR 6/1) and pale brown (10YR 6/3) mottles; moderate fine and medium subangular blocky structure; cracks filled with gray silt; slightly firm; patchy clay films on faces of peds; few medium brown concretions; very strongly acid; clear wavy boundary.

B24t—27 to 35 inches; strong brown (7.5YR 5/6) silt loam; few medium distinct gray (10YR 6/1) mottles; moderate medium subangular blocky structure; cracks filled with gray silt; firm; patchy clay films on faces of peds; few fine brown concretions; very strongly acid; clear wavy boundary.

IIB25t—35 to 48 inches; mottled red (2.5YR 4/6) and yellowish brown (10YR 5/6) clay; weak coarse subangular blocky structure; firm; thin continuous clay films; strongly acid; gradual wavy boundary.

IIB26t—48 to 68 inches; red (2.5YR 4/6) clay; common medium distinct gray (10YR 6/1) and yellowish brown (10YR 5/4) mottles; weak coarse subangular blocky structure; thin continuous clay films; firm; strongly acid.

Solum thickness is 60 inches or more. Reaction of the soil ranges from very strongly acid to medium acid throughout except where the surface has been limed.

The A horizon is yellowish brown, pale brown, or dark grayish brown.

The B21t horizon is reddish brown, strong brown, or yellowish red. Texture is silt loam or silty clay loam.

The B22t, B23t, and B24t horizons have matrix colors similar to those of the B21t horizon; but they have few to many mottles in shades of brown and gray. Texture is silt loam or silty clay loam.

The IIBt horizon is red, yellowish brown, or gray; or it is mottled in shades of red, brown, or gray. Texture is clay or silty clay.

Formation of the soils

In this section the factors of soil formation are discussed and related to the soils of Madison County. In addition, the processes of soil formation are described.

Factors of soil formation

This section discusses the major factors and processes that have affected the formation and morphology of the soils of Madison County. Soil, as used in this discussion, is a natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material that has been conditioned by relief over periods of time.

Soils are formed through the interaction of five major factors: climate, plant and animal life (especially plants), parent material, relief, and time. The relative influence of each factor varies from place to place, and in some places, one factor dominates in the formation of a soil. Local variation in soils in Madison County is mainly the result of differences in parent material, relief, time, and the effects of man.

Climate

The climate of Madison County is of the humid, warm-temperate, continental type. Winters are mild and generally have short periods of freezing temperatures. Summers are fairly hot and occasionally the temperatures are more than 100° F.

This climate favors rapid chemical reactions. When rainfall is heavy late in winter and early in spring, soils are leached of soluble materials. Little organic matter accumulates in the soils. Climate is fairly uniform throughout the county and is not a major factor in producing differences in the soils. Normal average temperature and rainfall for Madison County are given in table 1.

Plants and animals

Plants, animals, earthworms, and other organisms are important in the formation of soils. Bacteria, fungi, and other micro-organisms aid in decomposing organic matter and in weathering rock. Earthworms are active in mixing soil in the surface layer.

The kinds and numbers of plants and animals that live on and in the soil are determined by climate, parent material, relief, and age of the soil.

Vegetation, including hardwood and pine trees, has greatly affected soil formation in Madison County.

Parent material

Parent material is the unconsolidated mass in which a soil develops. The parent material of the soils in Madison County consists of deep loess, thin loess, marine deposits, and alluvium.

Loess is the silt from glacial rock. This material was carried southward by waters from melting glaciers and deposited on flood plains of the Mississippi River. Later this silty material was re-deposited by wind on the older formations. In the central and western parts of the county, Calloway, Grenada, Loring, and Memphis soils formed in deep loess on uplands.

Some soils in Madison County formed in more than one kind of parent material. The upper horizons formed in thin loess less than 4 feet thick, and the lower horizons formed in acid marine deposits. Bude, Providence, and Tippah soils formed in this combination of parent materials.

In the southeastern part of the county, Byram and Siwell soils formed in weathered loess over calcareous marine clay deposits.

The parent materials in the steeper areas of the eastern part of the county are marine deposits. Soils that formed in these sediments are mixtures of sand, silt, and clay and have much more sand than soils formed in loess. Smithdale soils formed in this kind of parent material.

The soils along streams throughout the county are formed in alluvium washed from the surrounding uplands and re-deposited by the streams on the flood plains. Adler, Ariel, Bruno, Cascilla, Gillsburg, McRaven, Morganfield, Oaklimeter, and Riedtown soils formed in this kind of parent material.

Relief

Relief affects the rate of runoff, moisture content in soils, and surface erosion. The rate of runoff is greater on steep slopes than on gentle slopes. Excess moisture is present in soils that develop in relatively flat, low areas where water may stand for long periods. This wetness causes gray or mottled colors in the subsoil of poorly drained soils. Bonn, Calhoun, and Daleville soils are poorly drained soils that have a grayish subsoil. Soils that formed in well drained sites include the Memphis and Smithdale soils. The Memphis soils have brownish subsoil, and the Smithdale soils have reddish subsoil, which is characteristic of soils that form in a well drained environment.

The topography in the central and southwestern parts of Madison County is gently sloping to undulating. Slopes range from 0 to 40 percent. In the extreme southwestern part of the county, the landscape is one of hills that have steep side slopes and narrow valleys. In the eastern and northern parts of the county, the topography ranges from undulating to strongly sloping and hilly. In the northeastern part, the topography is mainly steep hills that have narrow ridgetops and valleys. Some of the highest areas in the county are in the northeastern part. The highest elevation is about 475 feet near Greenwood Cemetery. The lowest elevation is about 140 feet near Big Black River where it flows into Hinds County.

Time

A long time is required for most soils to form. The weathering of soil materials precedes the development of soil horizons. The age of a soil is reflected in the degree of development of the soil profile.

The soils along flood plains of streams are the youngest soils in the county because material has been recently deposited and is still being deposited. Ariel, Gillsburg, Morganfield, and Oaklimeter soils are on flood plains and do not have strongly expressed horizons. The soils on uplands are older. Grenada, Loring, Memphis, Providence, and Smithdale soils are older loamy soils that formed on uplands. These soils have strongly expressed horizons.

Processes of soil horizon differentiation

Several processes were involved in the formation of soil horizons in the soils of Madison County. These are accumulations of organic matter, leaching of calcium carbonates and bases, reduction and transfer of iron, and formation and translocation of silicate clay minerals. In most soils, more than one of these processes has been active in the development of horizons.

The accumulation of organic matter in the upper part of the soil profile has been important in forming an A1 horizon. Generally, the soils of Madison County are low in content of organic matter.

Carbonates and bases have been leached from nearly all of the soils. Leaching of bases in soils normally precedes translocation of silicate clay minerals. Most of the soils of the county are moderately to strongly leached, and this has contributed to the development of horizons.

Reduction and transfer of iron, a process called gleying, is evident in the poorly drained soils of the county. The gray color in the subsoil horizons indicates the reduction and loss of iron. Some horizons contain reddish-brown mottles and concretions; this indicates segregation of iron.

In soils such as Loring, Memphis, and Providence soils, the translocation of clay minerals has contributed to the development of soil horizons. These soils have an accumulation of translocated silicate clays in the B horizon in the form of clay films. The A2 horizon, above the B horizon, is lower in content of clay and generally lighter in color. The B horizon generally has an accumulation of clay (clay films) in pores and on ped surfaces. These soils were probably leached of carbonates and soluble salts to a considerable extent before translocation of silicate clays took place. Leaching of bases and translocation of silicate clays are among the more important processes in horizon differentiation in the soils of Madison County.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

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

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

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

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

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	More than 12

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Broad-base terrace. A ridge-type terrace built to control erosion by diverting runoff along the contour at a nonscouring velocity. The terrace is 10 to 20 inches high and 15 to 30 feet wide and has gently sloping sides, a rounded crown, and a dish-shaped channel along the upper side. It may be nearly level or have a grade toward one or both ends.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that loosen the subsoil and bring clods to the surface. A form of emergency tillage to control soil blowing.

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

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

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15.2 to 38.1 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. Only the tillage essential to crop production and prevention of soil damage.

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

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

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

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

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

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

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

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

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or arresting grazing for a prescribed period.

Dendritic drainage pattern. Irregular branching (treelike) in all directions with tributaries joining the main stream at all angles.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

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

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess alkali (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

Excess fines (in tables). Excess silt and clay in the soil. 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.

Fine textured soil. Sandy clay, silty clay, and clay.

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.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as

(1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the 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.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, invader plants follow disturbance of the surface.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

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

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

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.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated 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 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

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

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor filter (in tables). Because of rapid permeability or an impermeable layer near the surface, the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

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

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

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

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

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. 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.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded 1951-73 at Canton, Miss.]

Month	Temperature: Average daily maximum	Temperature: Average daily minimum	Temperature: Average	Temperature: 2 years in 10 will have-- Maximum temperature higher than--	Temperature: 2 years in 10 will have-- Minimum temperature lower than--	Temperature: Average number of growing degree days[1]	Precipitation: Average	Precipitation: 2 years in 10 will have-- Less than--	Precipitation: 2 years in 10 will have-- More than--	Precipitation: Average number of days with 0.10 inch or more	Precipitation: Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	56.8	33.8	45.4	79	11	93	4.73	2.36	6.79	8	.6
February---	59.9	35.6	47.8	80	15	109	4.88	2.61	6.88	7	.2
March-------	68.0	42.9	55.5	85	24	228	5.81	2.34	8.72	8	.6
April-------	76.5	51.5	64.0	88	31	420	6.28	3.47	8.76	7	.0
May---------	83.8	59.2	71.5	94	42	667	4.98	1.66	7.70	7	.0
June--------	90.7	66.5	78.6	99	51	858	2.98	1.38	4.35	5	.0
July--------	93.2	69.6	81.4	100	60	973	4.35	1.71	6.56	7	.0
August------	92.5	67.9	80.2	100	54	936	4.14	2.29	5.76	6	.0
September--	88.9	63.1	76.0	98	43	780	2.76	1.08	4.21	5	.0
October----	80.5	50.6	65.6	93	28	484	2.53	.49	4.13	4	.0
November---	68.7	41.2	55.0	86	19	188	3.55	1.45	5.32	5	.0
December---	59.9	35.9	47.9	80	13	116	5.96	3.23	8.35	8	.3
Yearly:											
Average--	76.6	51.5	64.1	---	---	---	---	---	---	---	---
Extreme--	---	---	---	102	9	---	---	---	---	---	---
Total----	---	---	---	---	---	5,852	52.95	46.52	63.61	77	1.7

[1]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded 1951-73 at Canton, Miss.]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 17	March 25	April 8
2 years in 10 later than--	March 6	March 20	April 3
5 years in 10 later than--	February 12	March 9	March 25
First freezing temperature in fall:			
1 year in 10 earlier than--	October 28	October 23	October 16
2 years in 10 earlier than--	November 7	October 29	October 20
5 years in 10 earlier than--	November 27	November 9	October 29

TABLE 3.--GROWING SEASON

[Recorded 1951-73 at Canton, Miss.]

Probability	Length of growing season if daily minimum temperature is--		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	246	218	199
8 years in 10	260	227	205
5 years in 10	286	244	217
2 years in 10	313	261	229
1 year in 10	327	270	235

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
Ad	Adler silt loam	2,625	0.5
Ar	Ariel silt loam	39,290	8.2
Bb	Bonn silt loam	550	0.1
Bc	Bruno-Ariel complex	980	0.2
BdA	Bude silt loam, 0 to 2 percent slopes	975	0.2
BrB2	Byram silt loam, 2 to 5 percent slopes, eroded	7,530	1.6
BrC2	Byram silt loam, 5 to 8 percent slopes, eroded	8,410	1.7
BrC3	Byram silt loam, 5 to 8 percent slopes, severely eroded	960	0.2
BrD3	Byram silt loam, 8 to 12 percent slopes, severely eroded	2,150	0.4
Ca	Calhoun silt loam	2,915	0.6
CbA	Calloway silt loam, 0 to 1 percent slopes	6,185	1.3
CbB	Calloway silt loam, 1 to 3 percent slopes	5,550	1.2
CC	Cascilla-Calhoun association	1,930	0.4
CD	Columbus-Daleville association	10,500	2.2
Gb	Gillsburg silt loam	14,425	3.0
GrA	Grenada silt loam, 0 to 2 percent slopes	5,700	1.2
GrB2	Grenada silt loam, 2 to 5 percent slopes, eroded	8,905	1.9
LoA	Loring silt loam, 0 to 2 percent slopes	1,620	0.3
LoB2	Loring silt loam, 2 to 5 percent slopes, eroded	50,400	10.5
LoC2	Loring silt loam, 5 to 8 percent slopes, eroded	37,610	7.8
LoC3	Loring silt loam, 5 to 8 percent slopes, severely eroded	10,040	2.1
LoD2	Loring silt loam, 8 to 12 percent slopes, eroded	2,805	0.6
LoD3	Loring silt loam, 8 to 12 percent slopes, severely eroded	4,830	1.0
Mc	McRaven silt loam	1,715	0.4
MeA	Memphis silt loam, 0 to 2 percent slopes	975	0.2
MeB2	Memphis silt loam, 2 to 5 percent slopes, eroded	3,670	0.8
MeC2	Memphis silt loam, 5 to 8 percent slopes, eroded	3,815	0.8
MeD2	Memphis silt loam, 8 to 12 percent slopes, eroded	395	0.1
MeD3	Memphis silt loam, 8 to 12 percent slopes, severely eroded	4,905	1.0
MeF2	Memphis silt loam, 12 to 40 percent slopes, eroded	3,825	0.8
MeF3	Memphis silt loam, 12 to 40 percent slopes, severely eroded	4,055	0.8
Mh	Memphis-Udorthents complex, gullied	1,275	0.3
Mo	Morganfield silt loam	6,465	1.3
Oa	Oaklimeter silt loam	26,150	5.4
OG	Oaklimeter-Ariel-Gillsburg association	20,790	4.3
Pa	Pits-Udorthents complex	860	0.2
PoA	Providence silt loam, 0 to 2 percent slopes	925	0.2
PoB2	Providence silt loam, 2 to 5 percent slopes, eroded	23,380	4.9
PoC2	Providence silt loam, 5 to 8 percent slopes, eroded	33,985	7.1
PoC3	Providence silt loam, 5 to 8 percent slopes, severely eroded	8,345	1.7
PrD2	Providence-Lexington complex, 8 to 12 percent slopes, eroded	12,300	2.6
PrD3	Providence-Lexington complex, 8 to 12 percent slopes, severely eroded	9,785	2.0
Pu	Providence-Udorthents complex, gullied	2,715	0.6
Re	Riedtown silt loam	7,180	1.5
SeB2	Siwell silt loam, 2 to 5 percent slopes, eroded	690	0.1
SeD3	Siwell silt loam, 8 to 12 percent slopes, severely eroded	1,925	0.4
SpD2	Smithdale-Providence complex, 8 to 12 percent slopes, eroded	3,505	0.7
SpD3	Smithdale-Providence complex, 8 to 12 percent slopes, severely eroded	8,060	1.7
SpE2	Smithdale-Providence complex, 12 to 17 percent slopes, eroded	11,630	2.4
SR	Smithdale-Providence association, hilly	28,030	5.8
TpB2	Tippah silt loam, 2 to 5 percent slopes, eroded	1,300	0.3
TpC2	Tippah silt loam, 5 to 8 percent slopes, eroded	1,550	0.3
TpD3	Tippah silt loam, 5 to 10 percent slopes, severely eroded	2,845	0.6
	Water-greater than forty acres	11,350	2.4
	Water-less than forty acres	5,360	1.1
	Total	480,640	100.0

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Map symbol and soil name	Cotton lint	Corn	Soybeans	Wheat	Common bermuda-grass	Improved bermuda-grass	Tall fescue
	Lb	Bu	Bu	Bu	AUM*	AUM*	AUM*
Ad------------------------ Adler	800	100	35	50	7.0	12.0	9.5
Ar------------------------ Ariel	800	110	40	---	6.0	11.0	10.0
Bb. Bonn							
Bc------------------------ Bruno-Ariel	550	70	25	---	5.0	7.0	5.0
BdA----------------------- Bude	625	85	25	---	6.5	9.0	8.0
BrB2---------------------- Byram	700	85	30	---	7.0	9.5	8.0
BrC2---------------------- Byram	650	70	25	---	6.5	9.0	7.5
BrC3---------------------- Byram	---	---	25	---	5.5	7.0	7.0
BrD3---------------------- Byram	---	---	---	---	5.0	6.5	5.5
Ca------------------------ Calhoun	400	---	25	---	5.0	6.0	5.0
CbA----------------------- Calloway	650	85	35	---	6.0	9.0	8.0
CbB----------------------- Calloway	650	80	35	---	6.5	9.0	8.5
CC:**							
Cascilla------------------	---	---	---	---	7.0	8.0	7.0
Calhoun-------------------	---	---	---	---	5.0	6.0	5.0
CD:**							
Columbus------------------	---	---	---	---	4.5	7.0	5.0
Daleville-----------------	---	---	---	---	5.0	6.0	4.0
Gb------------------------ Gillsburg	650	90	35	---	7.0	10.0	9.0
GrA----------------------- Grenada	600	80	35	---	7.0	9.5	8.0
GrB2---------------------- Grenada	550	75	30	---	7.0	8.0	7.5
LoA----------------------- Loring	750	90	35	40	7.0	9.0	8.0
LoB2---------------------- Loring	700	90	30	40	7.0	9.0	8.0
LoC2---------------------- Loring	650	70	25	35	5.5	8.5	7.5

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Cotton lint	Corn	Soybeans	Wheat	Common bermudagrass	Improved bermudagrass	Tall fescue
	Lb	Bu	Bu	Bu	AUM*	AUM*	AUM*
LoC3 Loring	600	65	20	30	5.0	8.5	7.0
LoD2 Loring	500	60	20	30	5.0	8.5	7.0
LoD3 Loring	450	55	15	25	4.5	7.0	5.5
Mc McRaven	700	100	35	---	8.0	10.0	10.0
MeA Memphis	800	95	40	40	8.0	10.5	8.5
MeB2 Memphis	750	90	35	35	7.5	10.0	8.5
MeC2 Memphis	700	80	30	30	7.0	9.0	7.5
MeD2 Memphis	600	65	25	25	6.0	8.0	7.0
MeD3 Memphis	---	---	---	---	5.5	6.5	6.0
MeF2 Memphis	---	---	---	---	4.5	6.0	5.0
MeF3 Memphis	---	---	---	---	---	---	---
Mh Memphis-Udorthents	---	---	---	---	---	---	---
Mo Morganfield	950	115	45	---	8.0	12.0	10.0
Oa Oaklimeter	750	95	40	---	9.0	11.0	10.0
OG:**							
Oaklimeter	---	---	---	---	6.0	7.0	6.0
Ariel	---	---	---	---	5.5	7.0	6.0
Gillsburg	---	---	---	---	6.0	8.0	6.0
Pa Pits-Udorthents	---	---	---	---	---	---	---
PoA Providence	700	80	35	---	8.5	10.0	8.5
PoB2 Providence	700	80	35	---	8.5	9.5	8.5
PoC2 Providence	650	70	30	---	7.0	9.0	7.5
PoC3 Providence	500	55	25	---	6.5	8.5	6.5
PrD2 Providence-Lexington	---	---	---	---	5.5	8.0	6.0
PrD3 Providence-Lexington	---	---	---	---	5.0	7.0	5.0

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Cotton lint	Corn	Soybeans	Wheat	Common bermuda-grass	Improved bermuda-grass	Tall fescue
	Lb	Bu	Bu	Bu	AUM*	AUM*	AUM*
Pu-------------------------- Providence-Udorthents	---	---	---	---	---	---	---
Re-------------------------- Riedtown	750	100	40	---	9.0	12.0	9.0
SeB2------------------------ Siwell	---	---	---	---	7.0	10.0	8.0
SeD3------------------------ Siwell	---	---	---	---	5.0	7.0	5.0
SpD2------------------------ Smithdale-Providence	---	---	---	---	5.5	9.0	5.5
SpD3------------------------ Smithdale-Providence	---	---	---	---	5.0	8.5	5.0
SpE2------------------------ Smithdale-Providence	---	---	---	---	4.5	8.0	4.5
SR:**							
Smithdale------------------	---	---	---	---	---	---	---
Providence-----------------	---	---	---	---	---	---	---
TpB2------------------------ Tippah	650	80	35	---	8.5	10.0	8.5
TpC2------------------------ Tippah	600	70	30	---	7.5	9.0	7.5
TpD3------------------------ Tippah	---	---	---	---	5.0	7.0	5.0

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.
** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)			
		Erosion (e)	Wetness (w)	Soil problem (s)	Climate (c)
		Acres	Acres	Acres	Acres
I	975	---	---	---	---
II	206,638	98,220	108,418	---	---
III	97,856	94,275	2,915	666	---
IV	63,148	48,681	14,467	---	---
V	18,751	---	18,751	---	---
VI	38,016	38,016	---	---	---
VII	26,099	26,099	---	---	---
VIII	---	---	---	---	---

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
Ad----- Adler	1o4	Slight	Slight	Slight	Moderate	Green ash----- Eastern cottonwood-- Water oak----- Willow oak----- Sweetgum----- American sycamore---	95 120 100 100 100 115	Green ash, eastern cottonwood, sweetgum, American sycamore.
Ar----- Ariel	1o7	Slight	Slight	Slight	Moderate	Cherrybark oak----- Eastern cottonwood-- Loblolly pine----- Sweetgum----- Water oak----- Yellow-poplar-----	110 115 95 100 105 110	Cherrybark oak, eastern cottonwood, loblolly pine, sweetgum, water oak, yellow-poplar.
Bb----- Bonn	5t0	Slight	Severe	Severe	---------	Eastern redcedar----	---	Eastern redcedar.
Bc:*								
Bruno-----	2s5	Slight	Moderate	Moderate	Moderate	Cherrybark oak----- Water oak----- Sweetgum----- Willow oak----- River birch-----	116 105 110 88 ---	Cherrybark oak, Shumard oak, chestnut oak, willow oak, sweetgum, yellow-poplar.
Ariel-----	1o7	Slight	Slight	Slight	Moderate	Cherrybark oak----- Eastern cottonwood-- Loblolly pine----- Sweetgum----- Water oak----- Yellow-poplar-----	110 115 95 100 105 110	Cherrybark oak, eastern cottonwood, loblolly pine, sweetgum, water oak, yellow-poplar.
BdA----- Bude	2w8	Slight	Moderate	Slight	Moderate	Cherrybark oak----- Loblolly pine----- Sweetgum-----	90 90 90	Cherrybark oak, Shumard oak, loblolly pine, sweetgum, yellow-poplar.
BrB2, BrC2, BrC3, BrD3----- Byram	3o7	Slight	Slight	Slight	Moderate	Cherrybark oak----- Southern red oak---- Sweetgum----- White oak----- Loblolly pine----- Shortleaf pine-----	85 75 85 80 85 75	Cherrybark oak, southern red oak, sweetgum, white oak, loblolly pine.
Ca----- Calhoun	3w9	Slight	Severe	Moderate	---------	Loblolly pine----- Shortleaf pine----- Sweetgum-----	84 --- ---	Loblolly pine, slash pine.
CbA, CbB----- Calloway	2w8	Slight	Moderate	Slight	Moderate	Cherrybark oak----- Loblolly pine----- Shortleaf pine----- Sweetgum----- Water oak-----	90 90 80 90 90	Cherrybark oak, Shumard oak, sweetgum, water oak, yellow-poplar.
CC:*								
Cascilla-----	1w7	Slight	Moderate	Moderate	Moderate	Cherrybark oak----- Eastern cottonwood-- Loblolly pine----- Nuttall oak----- Water oak----- Sweetgum----- Yellow-poplar-----	112 110 93 114 104 102 115	Cherrybark oak, eastern cottonwood, loblolly pine, Nuttall oak, sweetgum, American sycamore, yellow-poplar.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
CC:* Calhoun	3w9	Slight	Severe	Moderate	---------	Cherrybark oak	90	Loblolly pine, slash pine.
						Water oak	90	
						Sweetgum	90	
						Loblolly pine	90	
						Slash pine	90	
CD:* Columbus	2w8	Slight	Moderate	Slight	Slight	Loblolly pine	90	Loblolly pine, sweetgum, yellow-poplar.
						Sweetgum	85	
						Water oak	90	
						Yellow-poplar	90	
Daleville	2w9	Slight	Severe	Severe	Moderate	Loblolly pine	95	Green ash, loblolly pine, Nuttall oak, Shumard oak, sweetgum.
						Sweetgum	90	
						Water oak	85	
						Willow oak	80	
Gb Gillsburg	2w8	Slight	Moderate	Moderate	Moderate	Cherrybark oak	100	Eastern cottonwood, loblolly pine, sweetgum, American sycamore, yellow-poplar.
						Eastern cottonwood	105	
						Green ash	85	
						Loblolly pine	90	
						Sweetgum	90	
						American sycamore	105	
						Water oak	95	
						Yellow-poplar	105	
GrA, GrB2 Grenada	3o7	Slight	Slight	Slight	Slight	Cherrybark oak	85	Cherrybark oak, Shumard oak, water oak, loblolly pine, white oak, slash pine, sweetgum.
						Southern red oak	80	
						Loblolly pine	85	
						Shortleaf pine	75	
						Sweetgum	80	
LoA, LoB2, LoC2, LoC3, LoD2, LoD3 Loring	3o7	Slight	Slight	Slight	Severe	Cherrybark oak	86	Loblolly pine, yellow-poplar.
						Sweetgum	90	
						Southern red oak	74	
						Loblolly pine	85	
						Water oak	82	
Mc McRaven	1w5	Slight	Moderate	Slight	Moderate	Cherrybark oak	120	Eastern cottonwood, green ash, sweetgum, American sycamore.
						Eastern cottonwood	110	
						Green ash	90	
						Sweetgum	100	
						American sycamore	110	
						Water oak	95	
						Willow oak	95	
MeA, MeB2, MeC2, MeD2, MeD3 Memphis	2o7	Slight	Slight	Slight	Slight	Cherrybark oak	90	Cherrybark oak, loblolly pine, sweetgum, yellow-poplar.
						Loblolly pine	90	
						Sweetgum	90	
						Water oak	90	
MeF2, MeF3 Memphis	2o8	Moderate	Slight	Slight	Moderate	Cherrybark oak	90	Cherrybark oak, loblolly pine, sweetgum, yellow-poplar.
						Loblolly pine	90	
						Sweetgum	90	
						Water oak	90	
Mh:* Memphis	2o8	Moderate	Slight	Slight	Moderate	Cherrybark oak	90	Cherrybark oak, loblolly pine, sweetgum, yellow-poplar.
						Loblolly pine	90	
						Sweetgum	90	
						Water oak	90	
Udorthents.								

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
Mo------------------ Morganfield	1o4	Slight	Slight	Slight	Moderate	Eastern cottonwood--	120	Eastern cottonwood, green ash, sweetgum, American sycamore, yellow-poplar.
						Green ash-----------	90	
						Nuttall oak---------	100	
						Sweetgum------------	110	
						Water oak-----------	105	
						Yellow-poplar-------	115	
Oa------------------ Oaklimeter	1o7	Slight	Slight	Slight	Moderate	Cherrybark oak------	100	Cherrybark oak, eastern cottonwood, loblolly pine, Nuttall oak, sweetgum, water oak, yellow-poplar.
						Eastern cottonwood--	100	
						Green ash-----------	90	
						Loblolly pine-------	90	
						Nuttall oak---------	100	
						Willow oak----------	100	
						Sweetgum------------	100	
OG:* Oaklimeter---------	1w8	Slight	Moderate	Moderate	Moderate	Cherrybark oak------	100	Cherrybark oak, eastern cottonwood, loblolly pine, Nuttall oak, sweetgum, water oak, yellow-poplar.
						Eastern cottonwood--	100	
						Green ash-----------	90	
						Loblolly pine-------	90	
						Nuttall oak---------	100	
						Willow oak----------	100	
						Sweetgum------------	100	
Ariel--------------	1w8	Slight	Moderate	Moderate	Moderate	Cherrybark oak------	110	Cherrybark oak, eastern cottonwood, loblolly pine, sweetgum, water oak, yellow-poplar.
						Eastern cottonwood--	115	
						Loblolly pine-------	95	
						Sweetgum------------	100	
						Water oak-----------	105	
						Yellow-poplar-------	110	
Gillsburg----------	2w9	Slight	Severe	Moderate	Moderate	Cherrybark oak------	100	Eastern cottonwood, loblolly pine, sweetgum, American sycamore, yellow-poplar.
						Eastern cottonwood--	105	
						Green ash-----------	85	
						Loblolly pine-------	90	
						Sweetgum------------	90	
						American sycamore---	105	
						Water oak-----------	95	
						Yellow-poplar-------	105	
PoA, PoB2, PoC2, PoC3--------------- Providence	3o7	Slight	Slight	Slight	Slight	Loblolly pine-------	84	Loblolly pine, Shumard oak, sweetgum, yellow-poplar.
						Shortleaf pine------	64	
						Sweetgum------------	90	
PrD2,* PrD3:* Providence---------	3o7	Slight	Slight	Slight	Slight	Loblolly pine-------	84	Loblolly pine, Shumard oak, sweetgum, yellow-poplar.
						Shortleaf pine------	64	
						Sweetgum------------	90	
Lexington----------	3o7	Slight	Slight	Slight	Moderate	Cherrybark oak------	80	Cherrybark oak, Shumard oak, loblolly pine, sweetgum, yellow-poplar.
						Southern red oak----	70	
						Loblolly pine-------	80	
						Shortleaf pine------	70	
						Sweetgum------------	89	
						Yellow-poplar-------	90	
Pu:* Providence---------	3o7	Slight	Slight	Slight	Slight	Loblolly pine-------	84	Loblolly pine, Shumard oak, sweetgum, yellow-poplar.
						Shortleaf pine------	64	
						Sweetgum------------	90	
Udorthents.								

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
Re: Riedtown	1o4	Slight	Slight	Slight	Moderate	Eastern cottonwood	115	Eastern cottonwood, green ash, sweetgum, American sycamore, yellow-poplar.
						Green ash	90	
						Sweetgum	105	
						American sycamore	110	
						Water oak	100	
						Willow oak	100	
						Yellow-poplar	110	
SeB2, SeD3: Siwell	3o7	Slight	Slight	Slight	Slight	Cherrybark oak	85	Cherrybark oak, Shumard oak, loblolly pine, sweetgum, yellow-poplar.
						Shumard oak	90	
						White oak	80	
						Loblolly pine	85	
						Sweetgum	85	
						Yellow-poplar	85	
SpD2,* SpD3,* SpE2:*								
Smithdale	3o1	Slight	Slight	Slight	Moderate	Loblolly pine	80	Loblolly pine.
						Shortleaf pine	69	
						Longleaf pine	65	
						Slash pine	80	
Providence	3o7	Slight	Slight	Slight	Slight	Loblolly pine	84	Loblolly pine, Shumard oak, sweetgum, yellow-poplar.
						Shortleaf pine	64	
						Sweetgum	90	
SR:*								
Smithdale	3o1	Slight	Slight	Slight	Moderate	Loblolly pine	80	Loblolly pine.
						Shortleaf pine	69	
						Longleaf pine	65	
						Slash pine	80	
Providence	3o7	Slight	Slight	Slight	Slight	Loblolly pine	84	Loblolly pine, Shumard oak, sweetgum, yellow-poplar.
						Shortleaf pine	64	
						Sweetgum	90	
TpB2, TpC2, TpD3: Tippah	3o7	Slight	Slight	Slight	Moderate	Cherrybark oak	95	Cherrybark oak, Shumard oak, loblolly pine, sweetgum, yellow-poplar.
						Shumard oak	95	
						White oak	80	
						Loblolly pine	78	
						Sweetgum	90	
						Yellow-poplar	90	

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WOODLAND UNDERSTORY VEGETATION

[Only the soils suitable for production of commercial trees are listed]

Map symbol and soil name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
		Lb/acre		Pct
Ad: Adler	Favorable	---	Pinehill bluestem	30
	Normal	1,500	Switchcane	27
	Unfavorable	---	Longleaf uniola	20
			Switchgrass	8
			Beaked panicum	8
Ar: Ariel	Favorable	---	Beaked panicum	26
	Normal	1,600	Pinehill bluestem	21
	Unfavorable	---	Switchcane	20
			Longleaf uniola	16
Bb: Bonn	Favorable	---	Pinehill bluestem	30
	Normal	1,500	Switchcane	27
	Unfavorable	---	Longleaf uniola	20
			Switchgrass	8
			Beaked panicum	8
Bc:* Bruno	Favorable	---		
	Normal	---		
	Unfavorable	---		
Ariel	Favorable	---	Beaked panicum	26
	Normal	1,600	Pinehill bluestem	21
	Unfavorable	---	Switchcane	20
			Longleaf uniola	16
BdA: Bude	Favorable	---	Pinehill bluestem	30
	Normal	1,500	Switchcane	27
	Unfavorable	---	Longleaf uniola	20
			Switchgrass	8
			Beaked panicum	8
BrB2, BrC2, BrC3, BrD3: Byram	Favorable	---	Beaked panicum	31
	Normal	1,600	Pinehill bluestem	25
	Unfavorable	---	Longleaf uniola	19
			Switchcane	19
Ca: Calhoun	Favorable	---	Pinehill bluestem	33
	Normal	1,500	Switchcane	27
	Unfavorable	---	Longleaf uniola	20
CbB: Calloway	Favorable	---	Pinehill bluestem	30
	Normal	1,500	Switchcane	27
	Unfavorable	---	Longleaf uniola	20
			Switchgrass	8
			Beaked panicum	8
CC:* Cascilla	Favorable	---	Beaked panicum	26
	Normal	1,600	Pinehill bluestem	21
	Unfavorable	---	Longleaf uniola	16
Calhoun	Favorable	---	Pinehill bluestem	33
	Normal	1,500	Switchcane	27
	Unfavorable	---	Longleaf uniola	20
CD:* Columbus	Favorable	---	Pinehill bluestem	21
	Normal	1,800	Longleaf uniola	13
	Unfavorable	---	Cutover muhly	11
			Beaked panicum	11

See footnote at end of table.

TABLE 8.--WOODLAND UNDERSTORY VEGETATION--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
CD:*				
Daleville	Favorable	---	Pinehill bluestem	25
	Normal	1,200	Cutover muhly	17
	Unfavorable	---	Longleaf uniola	17
			Beaked panicum	9
Gb	Favorable	---	Pinehill bluestem	20
Gillsburg	Normal	1,500	Switchcane	10
	Unfavorable	---	Beaked panicum	30
			Longleaf uniola	15
GrA, GrB2	Favorable	---	Beaked panicum	30
Grenada	Normal	1,600	Longleaf uniola	20
	Unfavorable	---	Pinehill bluestem	15
			Switchcane	10
LoA, LoB2, LoC2, LoC3, LoD2, LoD3	Favorable	---	Beaked panicum	30
Loring	Normal	1,600	Pinehill bluestem	20
	Unfavorable	---	Longleaf uniola	15
			Switchcane	10
Mc	Favorable	---	Pinehill bluestem	33
McRaven	Normal	1,500	Switchcane	27
	Unfavorable	---	Longleaf uniola	20
MeA, MeB2, MeC2, MeD2, MeD3, MeF2, MeF3	Favorable	---	Beaked panicum	30
Memphis	Normal	1,600	Longleaf uniola	15
	Unfavorable	---	Switchcane	10
			Pinehill bluestem	20
Mh:*				
Memphis	Favorable	---	Beaked panicum	30
	Normal	1,600	Longleaf uniola	15
	Unfavorable	---	Switchcane	10
			Pinehill bluestem	20
Udorthents.				
Mo	Favorable	---	Pinehill bluestem	33
Morganfield	Normal	1,500	Switchcane	27
	Unfavorable	---	Longleaf uniola	20
Oa	Favorable	---	Beaked panicum	30
Oaklimeter	Normal	1,600	Pinehill bluestem	20
	Unfavorable	---	Switchcane	10
			Longleaf uniola	15
OG:*				
Oaklimeter	Favorable	---	Beaked panicum	30
	Normal	1,600	Pinehill bluestem	20
	Unfavorable	---	Switchcane	10
			Longleaf uniola	15
Ariel	Favorable	---	Beaked panicum	30
	Normal	1,600	Pinehill bluestem	20
	Unfavorable	---	Switchcane	10
			Longleaf uniola	15
Gillsburg	Favorable	---	Pinehill bluestem	20
	Normal	1,500	Switchcane	10
	Unfavorable	---	Beaked panicum	30
			Longleaf uniola	15

See footnote at end of table.

TABLE 8.--WOODLAND UNDERSTORY VEGETATION--Continued

Map symbol and soil name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
		Lb/acre		Pct
PoA, PoB2, PoC2, PoC3 Providence	Favorable	---	Beaked panicum	30
	Normal	1,600	Pinehill bluestem	25
	Unfavorable	---	Longleaf uniola	16
			Switchcane	16
PrD2,* PrD3:* Providence	Favorable	---	Beaked panicum	30
	Normal	1,600	Pinehill bluestem	25
	Unfavorable	---	Longleaf uniola	16
			Switchcane	16
Lexington	Favorable	---	Beaked panicum	30
	Normal	1,600	Pinehill bluestem	25
	Unfavorable	---	Longleaf uniola	15
			Switchcane	15
Pu:* Providence	Favorable	---	Beaked panicum	30
	Normal	1,600	Pinehill bluestem	25
	Unfavorable	---	Longleaf uniola	16
			Switchcane	16
Udorthents.				
Re Riedtown	Favorable	---	Beaked panicum	30
	Normal	1,600	Pinehill bluestem	25
	Unfavorable	---	Longleaf uniola	16
			Switchcane	16
SeB2, SeD3 Siwell	Favorable	---	Longleaf uniola	16
	Normal	1,600	Beaked panicum	30
	Unfavorable	---	Pinehill bluestem	25
			Switchcane	16
SpD2,* SpD3,* SpE2:* Smithdale	Favorable	---	Longleaf uniola	30
	Normal	1,200	Pinehill bluestem	20
	Unfavorable	---	Beaked panicum	20
			Panicum	12
Providence	Favorable	---	Beaked panicum	30
	Normal	1,600	Pinehill bluestem	25
	Unfavorable	---	Longleaf uniola	16
			Switchcane	16
SR:* Smithdale	Favorable	---	Longleaf uniola	30
	Normal	1,200	Pinehill bluestem	20
	Unfavorable	---	Beaked panicum	20
			Panicum	12
Providence	Favorable	---	Beaked panicum	30
	Normal	1,600	Pinehill bluestem	25
	Unfavorable	---	Longleaf uniola	16
			Switchcane	16
TpB2, TpC2, TpD3 Tippah	Favorable	---	Longleaf uniola	16
	Normal	1,600	Beaked panicum	30
	Unfavorable	---	Pinehill bluestem	25
			Switchcane	16

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ad-------------------- Adler	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Slight------------	Moderate: flooding.
Ar-------------------- Ariel	Severe: flooding.	Moderate: wetness, percs slowly.	Moderate: wetness, flooding, percs slowly.	Slight------------	Moderate: flooding.
Bb-------------------- Bonn	Severe: wetness, percs slowly.	Severe: wetness, excess sodium, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, erodes easily.	Severe: excess sodium, wetness.
Bc:*					
Bruno-----------------	Severe: flooding.	Slight----------	Moderate: flooding.	Slight------------	Moderate: droughty, flooding.
Ariel-----------------	Severe: flooding.	Moderate: wetness, percs slowly.	Moderate: wetness, flooding, percs slowly.	Slight------------	Moderate: flooding.
BdA------------------- Bude	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
BrB2------------------ Byram	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
BrC2, BrC3------------ Byram	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness.
BrD3------------------ Byram	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
Ca-------------------- Calhoun	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, erodes easily.	Severe: wetness.
CbA, CbB-------------- Calloway	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
CC:*					
Cascilla--------------	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
Calhoun---------------	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness, erodes easily.	Severe: wetness, flooding.
CD:*					
Columbus--------------	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: flooding.	Severe: flooding.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
CD:*					
Daleville	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Gb: Gillsburg	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
GrA: Grenada	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
GrB2: Grenada	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
LoA: Loring	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Slight	Slight.
LoB2: Loring	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight	Slight.
LoC2, LoC3: Loring	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: slope.	Slight	Slight.
LoD2, LoD3: Loring	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Mc: McRaven	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
MeA: Memphis	Slight	Slight	Slight	Severe: erodes easily.	Slight.
MeB2: Memphis	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
MeC2: Memphis	Slight	Slight	Severe: slope.	Severe: erodes easily.	Slight.
MeD2, MeD3: Memphis	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
MeF2, MeF3: Memphis	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Mh:*					
Memphis	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Udorthents.					
Mo: Morganfield	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
Oa: Oaklimeter	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
OG:*					
Oaklimeter	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.
Ariel	Severe: flooding.	Moderate: flooding, wetness, percs slowly.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
Gillsburg	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: flooding, wetness.	Severe: flooding.
Pa:*					
Pits.					
Udorthents.					
PoA Providence	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Slight	Moderate: wetness.
PoB2 Providence	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight	Moderate: wetness.
PoC2, PoC3 Providence	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: slope.	Slight	Moderate: wetness.
PrD2,* PrD3:*					
Providence	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
Lexington	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Pu:*					
Providence	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
Udorthents.					
Re Riedtown	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Slight	Moderate: wetness, flooding.
SeB2 Siwell	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Severe: erodes easily.	Slight.
SeD3 Siwell	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: slope.
SpD2,* SpD3,* SpE2:*					
Smithdale	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Providence	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
SR:*					
Smithdale	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Providence	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
TpB2 Tippah	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight	Slight.
TpC2, TpD3 Tippah	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: slope.	Slight	Slight.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
Ad-----------------Adler	Good	Good	Good	Good	Fair	Good	Poor	Poor	Good	Good	Poor.
Ar-----------------Ariel	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
Bb-----------------Bonn	Poor	Poor	Poor	Poor	---	---	Poor	Good	Poor	Poor	Fair.
Bc:*											
Bruno--------------	Poor	Poor	Fair	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Ariel--------------	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
BdA----------------Bude	Fair	Good	Good	Good	Good	---	Fair	Fair	Good	Good	Fair.
BrB2---------------Byram	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
BrC2, BrC3, BrD3---Byram	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Ca-----------------Calhoun	Poor	Fair	Fair	Good	---	---	Good	Good	Fair	Fair	Good.
CbA----------------Calloway	Fair	Good	Good	Good	---	---	Fair	Fair	Good	Good	Fair.
CbB----------------Calloway	Fair	Good	Good	Good	---	---	Poor	Poor	Good	Good	Poor.
CC:*											
Cascilla-----------	Poor	Fair	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
Calhoun------------	Very poor.	Fair	Fair	Good	---	Good	Good	Good	Poor	Fair	Good.
CD:*											
Columbus-----------	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Daleville----------	Poor	Fair	Fair	Good	Fair	Good	Good	Good	Fair	Good	Good.
Gb-----------------Gillsburg	Fair	Good	Good	Good	---	---	Fair	Fair	Good	Good	Fair.
GrA, GrB2----------Grenada	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
LoA, LoB2----------Loring	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LoC2, LoC3, LoD2, LoD3---------------Loring	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Mc-----------------McRaven	Fair	Good	Good	Good	---	---	Fair	Good	Good	Good	Fair.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
MeA, MeB2 Memphis	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MeC2, MeD2, MeD3 Memphis	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MeF2, MeF3 Memphis	Very poor.	Poor	Good	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Mh:* Memphis	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Udorthents.											
Mo Morganfield	Good	Good	Good	Good	---	---	Poor	Very poor.	Good	Good	Very poor.
Oa Oaklimeter	Good	Good	Good	Good	Poor	---	Poor	Poor	Good	Good	Poor.
OG:* Oaklimeter	Poor	Fair	Good	Good	Poor	---	Poor	Poor	Fair	Good	Poor.
Ariel	Poor	Fair	Fair	Good	Good	---	Poor	Very poor.	Fair	Good	Very poor.
Gillsburg	Poor	Fair	Fair	Good	---	---	Fair	Fair	Fair	Good	Fair.
Pa:* Pits.											
Udorthents.											
PoA, PoB2 Providence	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
PoC2, PoC3 Providence	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
PrD2,* PrD3:* Providence	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
Lexington	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Pu:* Providence	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
Udorthents.											
Re Riedtown	Good	Good	Good	Good	---	---	Poor	Poor	Good	Good	Poor.
SeB2 Siwell	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
SeD3 Siwell	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
SpD2,* SpD3,* SpE2:* Smithdale	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
SpD2,* SpD3,* SpE2:*											
Providence	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
SR:*											
Smithdale	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
Providence	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
TpB2 Tippah	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
TpC2, TpD3 Tippah	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
Ad: Adler	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.
Ar: Ariel	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.
Bb: Bonn	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, low strength, wetness.
Bc:*					
Bruno	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Ariel	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.
BdA: Bude	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.
BrB2: Byram	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness.
BrC2, BrC3: Byram	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Moderate: wetness.
BrD3: Byram	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope.
Ca: Calhoun	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.
CbA, CbB: Calloway	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.
CC:*					
Cascilla	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.
Calhoun	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.
CD:*					
Columbus	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.
Daleville	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
Gb: Gillsburg	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.
GrA, GrB2: Grenada	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: low strength.
LoA, LoB2: Loring	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: low strength.
LoC2, LoC3: Loring	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: low strength.
LoD2, LoD3: Loring	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.
Mc: McRaven	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.
MeA, MeB2: Memphis	Slight	Slight	Slight	Slight	Severe: low strength.
MeC2: Memphis	Slight	Slight	Slight	Moderate: slope.	Severe: low strength.
MeD2, MeD3: Memphis	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.
MeF2, MeF3: Memphis	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
Mh:*					
Memphis	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.
Udorthents.					
Mo: Morganfield	Moderate: cutbanks cave, wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Oa: Oaklimeter	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.
OG:*					
Oaklimeter	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.
Ariel	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.
Gillsburg	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.
Pa:*					
Pits.					
Udorthents.					

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
PoA, PoB2---------- Providence	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength.
PoC2, PoC3--------- Providence	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength.
PrD2,* PrD3:*					
Providence--------	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.
Lexington---------	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.
Pu:*					
Providence--------	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.
Udorthents.					
Re----------------- Riedtown	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.
SeB2--------------- Siwell	Moderate: too clayey, wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.
SeD3--------------- Siwell	Moderate: too clayey, wetness, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: slope, shrink-swell.	Severe: shrink-swell.
SpD2,* SpD3,* SpE2:*					
Smithdale--------	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
Providence-------	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.
SR:*					
Smithdale---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Providence--------	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.
TpB2--------------- Tippah	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Severe: low strength.
TpC2, TpD3--------- Tippah	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Moderate: wetness, shrink-swell, slope.	Severe: low strength.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ad------------------- Adler	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
Ar------------------- Ariel	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
Bb------------------- Bonn	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, excess sodium.	Severe: flooding, wetness.	Poor: wetness, excess sodium.
Bc:* Bruno---------------	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Poor: seepage, too sandy.
Ariel---------------	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
BdA------------------ Bude	Severe: wetness, percs slowly.	Slight-----------	Severe: wetness.	Severe: wetness.	Poor: hard to pack, wetness.
BrB2, BrC2, BrC3---- Byram	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Poor: hard to pack.
BrD3----------------- Byram	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Poor: hard to pack.
Ca------------------- Calhoun	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
CbA------------------ Calloway	Severe: wetness, percs slowly.	Slight-----------	Severe: wetness.	Severe: wetness.	Poor: wetness.
CbB------------------ Calloway	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
CC:* Cascilla-----------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.
Calhoun------------	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
CD:* Columbus-----------	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness, thin layer.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CD:*					
Daleville	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Gb: Gillsburg	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
GrA: Grenada	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
GrB2: Grenada	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
LoA, LoB2, LoC2, LoC3: Loring	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Fair: wetness.
LoD2, LoD3: Loring	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: slope, wetness.
Mc: McRaven	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
MeA: Memphis	Slight	Moderate: seepage.	Slight	Slight	Good.
MeB2, MeC2: Memphis	Slight	Moderate: seepage, slope.	Slight	Slight	Good.
MeD2, MeD3: Memphis	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
MeF2, MeF3: Memphis	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Mh:*					
Memphis	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
Udorthents.					
Mo: Morganfield	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
Oa: Oaklimeter	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
OG:*					
Oaklimeter	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
OG:*					
Ariel	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
Gillsburg	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Pa:* Pits.					
Udorthents.					
PoA Providence	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
PoB2, PoC2, PoC3 Providence	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
PrD2,* PrD3:*					
Providence	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: too clayey, slope, wetness.
Lexington	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey, slope.
Pu:*					
Providence	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: too clayey, slope, wetness.
Udorthents.					
Re Riedtown	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
SeB2 Siwell	Severe: wetness, percs slowly.	Moderate: slope.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
SeD3 Siwell	Severe: wetness, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
SpD2,* SpD3,* SpE2:*					
Smithdale	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey, slope.
Providence	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: too clayey, slope, wetness.
SR:*					
Smithdale	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
SR:*					
Providence	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: too clayey, slope, wetness.
TpB2, TpC2 Tippah	Severe: wetness, percs slowly.	Severe: wetness.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
TpD3 Tippah	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
Ad: Adler	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Ar: Ariel	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Bb: Bonn	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, excess sodium.
Bc:*				
Bruno	Good	Probable	Improbable: too sandy.	Poor: thin layer.
Ariel	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
BdA: Bude	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
BrB2, BrC2, BrC3: Byram	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
BrD3: Byram	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
Ca: Calhoun	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
CbA, CbB: Calloway	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
CC:*				
Cascilla	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Calhoun	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
CD:*				
Columbus	Fair: wetness.	Probable	Improbable: too sandy.	Fair: thin layer.
Daleville	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Gb: Gillsburg	Fair: low strength, thin layer, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
GrA, GrB2: Grenada	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
LoA, LoB2, LoC2, LoC3: Loring	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
LoD2, LoD3: Loring	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
Mc: McRaven	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
MeA, MeB2, MeC2: Memphis	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
MeD2, MeD3: Memphis	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
MeF2, MeF3: Memphis	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Mh:*				
Memphis	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
Udorthents.				
Mo: Morganfield	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
Oa: Oaklimeter	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
OG:*				
Oaklimeter	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Ariel	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Gillsburg	Fair: low strength, thin layer, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Pa:*				
Pits.				
Udorthents.				
PoA, PoB2, PoC2, PoC3: Providence	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
PrD2,* PrD3:*				
Providence	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
Lexington	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
Pu:*				
Providence	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
Udorthents.				
Re: Riedtown	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
SeB2: Siwell	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
SeD3: Siwell	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer, slope.
SpD2,* SpD3,* SpE2:*				
Smithdale	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
Providence	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
SR:*				
Smithdale	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Providence	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
TpB2, TpC2, TpD3: Tippah	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
Ad----------------- Adler	Moderate: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Flooding--------	Erodes easily, wetness.	Erodes easily.
Ar----------------- Ariel	Moderate: seepage.	Severe: piping.	Severe: slow refill.	Flooding--------	Erodes easily, wetness.	Erodes easily.
Bb----------------- Bonn	Slight----------	Severe: wetness, excess sodium.	Severe: no water.	Percs slowly, excess sodium.	Erodes easily, wetness, percs slowly.	Wetness, excess sodium, erodes easily.
Bc:*						
Bruno-------------	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Too sandy-------	Droughty.
Ariel-------------	Moderate: seepage.	Severe: piping.	Severe: slow refill.	Flooding--------	Erodes easily, wetness.	Erodes easily.
BdA---------------- Bude	Slight----------	Severe: wetness.	Severe: no water.	Percs slowly---	Erodes easily, wetness, rooting depth.	Wetness, erodes easily, rooting depth.
BrB2, BrC2, BrC3-- Byram	Moderate: seepage.	Moderate: piping, hard to pack, wetness.	Severe: no water.	Slope-----------	Erodes easily, wetness.	Erodes easily, rooting depth.
BrD3--------------- Byram	Moderate: seepage.	Moderate: piping, hard to pack, wetness.	Severe: no water.	Slope-----------	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
Ca----------------- Calhoun	Slight----------	Severe: piping, wetness.	Severe: no water.	Percs slowly---	Erodes easily, wetness.	Wetness, erodes easily, percs slowly.
CbA, CbB----------- Calloway	Moderate: seepage.	Severe: thin layer.	Severe: no water.	Percs slowly---	Erodes easily, wetness, rooting depth.	Wetness, erodes easily, rooting depth.
CC:*						
Cascilla----------	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
Calhoun-----------	Slight----------	Severe: piping, wetness.	Severe: no water.	Percs slowly, flooding.	Erodes easily, wetness.	Wetness, erodes easily, percs slowly.
CD:*						
Columbus----------	Moderate: seepage.	Moderate: thin layer, piping, wetness.	Severe: cutbanks cave.	Flooding--------	Erodes easily, wetness.	Erodes easily.
Daleville---------	Slight----------	Severe: wetness.	Severe: slow refill.	Percs slowly, flooding.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Gb----------------- Gillsburg	Moderate: seepage.	Severe: piping, wetness.	Severe: slow refill.	Flooding--------	Erodes easily, wetness.	Wetness, erodes easily.
GrA---------------- Grenada	Moderate: seepage.	Severe: piping.	Severe: no water.	Percs slowly---	Erodes easily, wetness, percs slowly.	Erodes easily, rooting depth, percs slowly.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
GrB2: Grenada	Moderate: seepage.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Erodes easily, wetness, percs slowly.	Erodes easily, rooting depth, percs slowly.
LoA: Loring	Moderate: seepage.	Moderate: piping.	Severe: no water.	Favorable	Erodes easily, wetness.	Erodes easily, rooting depth.
LoB2, LoC2, LoC3: Loring	Moderate: seepage.	Moderate: piping.	Severe: no water.	Slope	Erodes easily, wetness.	Erodes easily, rooting depth.
LoD2, LoD3: Loring	Moderate: seepage.	Moderate: piping.	Severe: no water.	Slope	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
Mc: McRaven	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding	Erodes easily, wetness.	Wetness, erodes easily.
MeA: Memphis	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
MeB2, MeC2: Memphis	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
MeD2, MeD3, MeF2, MeF3: Memphis	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Mh:*						
Memphis	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Udorthents.						
Mo: Morganfield	Moderate: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Flooding	Erodes easily	Erodes easily.
Oa: Oaklimeter	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding	Erodes easily, wetness.	Erodes easily.
OG:*						
Oaklimeter	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding	Erodes easily, wetness.	Erodes easily.
Ariel	Moderate: seepage.	Severe: piping.	Severe: slow refill.	Flooding	Erodes easily, wetness.	Erodes easily.
Gillsburg	Moderate: seepage.	Severe: piping, wetness.	Severe: slow refill.	Flooding	Erodes easily, wetness.	Wetness, erodes easily.
Pa:*						
Pits.						
Udorthents.						
PoA: Providence	Moderate: seepage.	Moderate: thin layer, piping, wetness.	Severe: no water.	Favorable	Erodes easily, wetness.	Erodes easily, rooting depth.
PoB2, PoC2, PoC3: Providence	Moderate: seepage.	Moderate: thin layer, piping, wetness.	Severe: no water.	Slope	Erodes easily, wetness.	Erodes easily, rooting depth.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
PrD2,* PrD3:*						
Providence	Moderate: seepage.	Moderate: thin layer, piping, wetness.	Severe: no water.	Slope	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
Lexington	Severe: seepage.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Pu:*						
Providence	Moderate: seepage.	Moderate: thin layer, piping, wetness.	Severe: no water.	Slope	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
Udorthents.						
Re Riedtown	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding	Erodes easily, wetness.	Erodes easily.
SeB2 Siwell	Moderate: seepage.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope.	Erodes easily, wetness.	Erodes easily, percs slowly.
SeD3 Siwell	Moderate: seepage.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
SpD2,* SpD3,* SpE2:*						
Smithdale	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope.
Providence	Moderate: seepage.	Moderate: thin layer, piping, wetness.	Severe: no water.	Slope	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
SR:*						
Smithdale	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope.
Providence	Moderate: seepage.	Moderate: thin layer, piping, wetness.	Severe: no water.	Slope	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
TpB2, TpC2, TpD3 Tippah	Slight	Moderate: hard to pack, wetness.	Severe: no water.	Percs slowly, slope.	Erodes easily, wetness.	Erodes easily, percs slowly.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Ad-----------------Adler	0-6	Silt loam---------	ML, CL-ML	A-4	0	100	100	100	95-100	<28	NP-7
	6-60	Silt loam, silt, very fine sandy loam.	ML, CL, CL-ML	A-4	0	100	100	95-100	60-95	<30	NP-10
Ar-----------------Ariel	0-32	Silt loam---------	ML, CL-ML	A-4	0	100	100	90-100	85-95	<30	NP-7
	32-72	Silt loam, loam	ML, CL, CL-ML	A-4	0	100	100	85-100	70-90	<30	NP-10
Bb-----------------Bonn	0-18	Silt loam---------	ML, CL-ML	A-4	0	100	100	95-100	75-100	<28	NP-7
	18-46	Silt loam, silty clay loam.	CL	A-6, A-7	0	95-100	90-100	85-100	65-100	30-44	12-22
	46-72	Silt loam, silty clay loam.	CL	A-6, A-4	0	100	95-100	90-100	75-100	28-40	8-18
Bc:*											
Bruno-------------	0-5	Sandy loam--------	SM, ML	A-2, A-4	0	100	100	60-85	30-60	<25	NP-3
	5-65	Sand, loamy sand	SP-SM, SM	A-2	0	100	100	60-80	10-30	---	NP
Ariel-------------	0-32	Silt loam---------	ML, CL-ML	A-4	0	100	100	90-100	85-95	<30	NP-7
	32-72	Silt loam, loam	ML, CL, CL-ML	A-4	0	100	100	85-100	70-90	<30	NP-10
BdA----------------Bude	0-23	Silt loam---------	CL	A-6	0	100	100	95-100	85-96	25-40	11-25
	23-36	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	95-100	84-98	35-50	15-30
	36-62	Silt loam, clay loam, silty clay loam.	CL, CH	A-7, A-6	0	100	100	95-100	75-90	35-65	15-40
BrB2, BrC2, BrC3, BrD3-------------Byram	0-5	Silt loam---------	ML, CL-ML, CL	A-4	0	100	100	95-100	90-100	<30	NP-10
	5-20	Silt loam, silty clay loam.	CL, CH	A-6, A-7	0	100	100	90-100	85-98	30-54	11-30
	20-44	Silt loam, silty clay loam.	CL, CH, ML	A-6, A-7	0	100	100	90-100	85-98	30-54	11-34
	44-56	Silt loam, silty clay loam.	CL, CH	A-6, A-7	0	100	100	90-100	85-98	30-54	11-30
	56-72	Silty clay, clay	CH	A-7	0	100	100	90-100	80-98	55-135	40-100
Ca-----------------Calhoun	0-23	Silt loam---------	CL-ML, ML, CL	A-4	0	100	100	100	95-100	<31	NP-10
	23-52	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	95-100	30-45	11-24
	52-65	Silt loam---------	CL, CL-ML	A-6, A-4	0	100	100	100	90-100	25-40	5-20
CbA, CbB-----------Calloway	0-30	Silt loam---------	CL-ML, CL	A-4, A-6	0	100	100	100	90-100	25-35	5-15
	30-53	Silt loam, silty clay loam.	CL	A-6	0	100	100	100	90-95	30-40	12-20
	53-60	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	100	100	100	90-100	25-35	5-15
CC:*											
Cascilla----------	0-4	Silt loam---------	ML, CL-ML, CL	A-4, A-6	0	100	100	95-100	75-95	20-38	3-15
	4-56	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	100	100	95-100	75-100	20-39	5-15
	56-70	Fine sandy loam, loam, silt loam.	SM, ML, CL-ML, SM-SC	A-4	0	100	100	80-95	45-85	<30	NP-7
Calhoun-----------	0-23	Silt loam---------	CL-ML, ML, CL	A-4	0	100	100	100	95-100	<31	NP-10
	23-52	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	95-100	30-45	11-24
	52-65	Silt loam---------	CL, CL-ML	A-6, A-4	0	100	100	100	90-100	25-40	5-20

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
CD:*											
Columbus	0-5	Loam	ML, CL-ML, CL	A-4	0	100	100	90-100	70-90	<30	3-10
	5-40	Clay loam, loam, sandy clay loam.	CL, SC	A-4, A-6	0	100	90-100	80-95	40-80	22-35	8-15
	40-65	Sandy loam, loamy sand, sand.	SM, SP-SM	A-2, A-4	0	100	90-100	50-85	10-45	<20	NP-4
Daleville	0-10	Sandy loam	ML, CL-ML, SM-SC, SM	A-4	0	100	100	70-85	40-60	<30	NP-7
	10-65	Clay loam, loam, sandy clay loam.	CL	A-6	0	100	100	90-100	70-80	28-38	11-20
Gb Gillsburg	0-48	Silt loam	CL-ML, CL	A-4	0	100	100	100	95-100	20-28	5-10
	48-72	Silt loam, loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	100	100	100	90-100	20-38	5-16
GrA, GrB2 Grenada	0-5	Silt loam	ML, CL-ML	A-4	0	100	100	95-100	90-100	<30	NP-6
	5-22	Silt loam, silty clay loam.	CL	A-6, A-4	0	100	100	95-100	90-100	27-40	8-19
	22-25	Silt loam	CL-ML, CL	A-4	0	100	100	95-100	90-100	20-30	5-10
	25-54	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-7, A-4	0	100	100	95-100	90-100	25-45	5-24
	54-70	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-7, A-4	0	100	100	95-100	90-100	25-45	5-24
LoA, LoB2, LoC2, LoC3, LoD2, LoD3 Loring	0-4	Silt loam	ML, CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	<35	NP-15
	4-30	Silt loam, silty clay loam.	CL, ML	A-6, A-7, A-4	0	100	100	95-100	90-100	32-48	8-20
	30-52	Silt loam, silty clay loam.	CL, ML	A-4, A-6, A-7	0	100	100	95-100	90-100	30-45	8-22
	52-70	Silt loam	CL, ML	A-4, A-6, A-7	0	100	100	95-100	70-100	28-45	7-20
Mc McRaven	0-7	Silt loam	ML, CL-ML	A-4	0	100	100	90-100	70-90	<30	NP-7
	7-30	Silt loam	ML, CL-ML	A-4	0	100	100	90-100	70-90	<30	NP-7
	30-70	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4	0	100	100	90-100	70-90	<30	NP-10
MeA, MeB2, MeC2, MeD2, MeD3, MeF2, MeF3 Memphis	0-6	Silt loam	ML, CL-ML, CL	A-4	0	100	100	100	90-100	<30	NP-10
	6-24	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	100	90-100	35-48	15-25
	24-76	Silt loam	ML, CL	A-4, A-6	0	100	100	100	90-100	30-40	6-15
Mh:*											
Memphis	0-6	Silt loam	ML, CL-ML, CL	A-4	0	100	100	100	90-100	<30	NP-10
	6-24	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	100	90-100	35-48	15-25
	24-76	Silt loam	ML, CL	A-4, A-6	0	100	100	100	90-100	30-40	6-15
Udorthents.											
Mo Morganfield	0-7	Silt loam	ML, CL, CL-ML	A-4	0	100	100	95-100	65-95	<30	NP-10
	7-60	Silt loam, silt, very fine sandy loam.	ML, CL, CL-ML	A-4	0	100	100	95-100	65-95	<30	NP-10

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Oa------------------ Oaklimeter	0-5	Silt loam--------	ML, CL, CL-ML	A-4	0	100	100	90-100	70-90	<30	NP-8
	5-20	Very fine sandy loam, silt loam, loam.	ML, CL, CL-ML	A-4	0	100	100	85-95	60-85	<30	NP-8
	20-70	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4	0	100	100	90-100	90-100	<30	NP-10
OG:* Oaklimeter------	0-5	Silt loam--------	ML, CL, CL-ML	A-4	0	100	100	90-100	70-90	<30	NP-8
	5-20	Very fine sandy loam, silt loam, loam.	ML, CL, CL-ML	A-4	0	100	100	85-95	60-85	<30	NP-8
	20-70	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4	0	100	100	90-100	90-100	<30	NP-10
Ariel-----------	0-32	Silt loam--------	ML, CL-ML	A-4	0	100	100	90-100	85-95	<30	NP-7
	32-72	Silt loam, loam	ML, CL, CL-ML	A-4	0	100	100	85-100	70-90	<30	NP-10
Gillsburg-------	0-48	Silt loam--------	CL-ML, CL	A-4	0	100	100	100	95-100	20-28	5-10
	48-72	Silt loam, loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	100	100	100	90-100	20-38	5-16
Pa:* Pits.											
Udorthents.											
PoA, PoB2, PoC2, PoC3------------ Providence	0-6	Silt loam--------	ML, CL, CL-ML	A-4	0	100	100	100	85-100	<30	NP-10
	6-22	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	85-100	30-45	11-20
	22-36	Silt loam, silty clay loam.	CL	A-6	0	100	100	90-100	70-90	25-40	11-20
	36-52	Loam, clay loam, sandy clay loam.	CL, SC	A-6, A-4	0	100	95-100	70-95	40-80	20-35	8-18
	52-70	Sandy loam, sandy clay loam, loam.	SM, SC, CL, ML	A-2, A-4	0	100	95-100	60-85	30-80	<30	NP-10
PrD2:* Providence------	0-6	Silt loam--------	ML, CL, CL-ML	A-4	0	100	100	100	85-100	<30	NP-10
	6-22	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	85-100	30-45	11-20
	22-36	Silt loam, silty clay loam.	CL	A-6	0	100	100	90-100	70-90	25-40	11-20
	36-52	Loam, clay loam, sandy clay loam.	CL, SC	A-6, A-4	0	100	95-100	70-95	40-80	20-35	8-18
	52-70	Sandy loam, sandy clay loam, loam.	SM, SC, CL, ML	A-2, A-4	0	100	95-100	60-85	30-80	<30	NP-10
Lexington-------	0-4	Silt loam--------	ML, CL, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	70-95	25-42	5-16
	4-40	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	95-100	90-100	75-95	27-45	11-25
	40-72	Sandy loam, loam	SC, SM-SC, CL, CL-ML	A-2, A-4, A-6	0	100	95-100	50-85	20-65	22-35	5-15

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
PrD3:* Providence-------	0-6	Silt loam---------	ML, CL, CL-ML	A-4	0	100	100	100	85-100	<30	NP-10
	6-22	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	85-100	30-45	11-20
	22-36	Silt loam, silty clay loam.	CL	A-6	0	100	100	90-100	70-90	25-40	11-20
	36-52	Loam, clay loam, sandy clay loam.	CL, SC	A-6, A-4	0	100	95-100	70-95	40-80	20-35	8-18
	52-70	Sandy loam, sandy clay loam, loam.	SM, SC, CL, ML	A-2, A-4	0	100	95-100	60-85	30-80	<30	NP-10
Lexington--------	0-4	Silt loam---------	ML, CL, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	70-95	25-42	5-16
	4-40	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	95-100	90-100	75-95	27-45	11-25
	40-72	Sandy loam, loam	SC, SM-SC, CL, CL-ML	A-2, A-4, A-6	0	100	95-100	50-85	20-65	22-35	5-15
Pu:* Providence-------	0-6	Silt loam---------	ML, CL, CL-ML	A-4	0	100	100	100	85-100	<30	NP-10
	6-22	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	85-100	30-45	11-20
	22-36	Silt loam, silty clay loam.	CL	A-6	0	100	100	90-100	70-90	25-40	11-20
	36-52	Loam, clay loam, sandy clay loam.	CL, SC	A-6, A-4	0	100	95-100	70-95	40-80	20-35	8-18
	52-70	Sandy loam, sandy clay loam, loam.	SM, SC, CL, ML	A-2, A-4	0	100	95-100	60-85	30-80	<30	NP-10
Udorthents.											
Re---------------- Riedtown	0-6	Silt loam---------	ML, CL-ML	A-4	0	100	100	90-100	70-90	<30	NP-7
	6-32	Silt loam---------	ML, CL, CL-ML	A-4	0	100	100	90-100	70-90	<30	NP-10
	32-80	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4	0	100	100	90-100	70-90	<30	NP-10
SeB2, SeD3-------- Siwell	0-5	Silt loam---------	ML, CL, CL-ML	A-4	0	100	100	95-100	90-100	<30	NP-10
	5-26	Silt loam, silty clay loam.	CL, CH	A-6, A-7	0	100	100	95-100	90-100	25-55	15-32
	26-38	Silty clay, silty clay loam.	CL, CH	A-7	0	100	100	90-100	85-95	48-70	25-45
	38-70	Clay--------------	CH	A-7	0	100	100	90-100	85-98	55-115	40-100
SpD2,* SpD3,* SpE2:* Smithdale-------	0-9	Fine sandy loam	SM, SM-SC	A-4	0	100	85-100	60-80	36-49	<20	NP-5
	9-28	Clay loam, sandy clay loam, loam.	SM-SC, SC, CL, CL-ML	A-6, A-4	0	100	85-100	80-95	45-75	23-38	7-15
	28-80	Loam, sandy loam	SM, ML, CL, SC	A-4	0	100	85-100	65-80	36-70	<30	NP-10
Providence------	0-6	Silt loam---------	ML, CL, CL-ML	A-4	0	100	100	100	85-100	<30	NP-10
	6-22	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	85-100	30-45	11-20
	22-36	Silt loam, silty clay loam.	CL	A-6	0	100	100	90-100	70-90	25-40	11-20
	36-52	Loam, clay loam, sandy clay loam.	CL, SC	A-6, A-4	0	100	95-100	70-95	40-80	20-35	8-18
	52-70	Sandy loam, sandy clay loam, loam.	SM, SC, CL, ML	A-2, A-4	0	100	95-100	60-85	30-80	<30	NP-10

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
SR:* Smithdale	0-13	Sandy loam	SM, SM-SC	A-4	0	100	85-100	60-80	36-49	<20	NP-5
	13-29	Clay loam, sandy clay loam, loam.	SM-SC, SC, CL, CL-ML	A-6, A-4	0	100	85-100	80-95	45-75	23-38	7-15
	29-80	Loam, sandy loam	SM, ML, CL, SC	A-4	0	100	85-100	65-80	36-70	<30	NP-10
Providence	0-6	Silt loam	ML, CL, CL-ML	A-4	0	100	100	100	85-100	<30	NP-10
	6-22	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	85-100	30-45	11-20
	22-36	Silt loam, silty clay loam.	CL	A-6	0	100	100	90-100	70-90	25-40	11-20
	36-52	Loam, clay loam, sandy clay loam.	CL, SC	A-6, A-4	0	100	95-100	70-95	40-80	20-35	8-18
	52-70	Sandy loam, sandy clay loam, loam.	SM, SC, CL, ML	A-2, A-4	0	100	95-100	60-85	30-80	<30	NP-10
TpB2, TpC2, TpD3- Tippah	0-4	Silt loam	CL, CL-ML	A-4	0	100	100	90-100	70-90	20-30	4-10
	4-35	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	98-100	90-100	85-95	30-45	11-22
	35-68	Silty clay loam, silty clay, clay.	CH	A-7	0	100	99-100	80-100	60-95	50-65	25-40

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
Ad------------------ Adler	0-6	10-25	1.50-1.55	0.6-2.0	0.20-0.23	5.6-7.8	Low-----------	0.43	5	---
	6-60	5-18	1.50-1.55	0.6-2.0	0.20-0.23	5.6-7.8	Low-----------	0.43		
Ar------------------ Ariel	0-32	12-18	1.40-1.50	0.6-2.0	0.20-0.22	4.5-5.5	Low-----------	0.43	5	.5-2
	32-72	7-27	1.40-1.50	0.2-0.6	0.16-0.20	4.5-5.5	Low-----------	0.43		
Bb------------------ Bonn	0-18	5-15	1.30-1.50	0.2-0.6	0.15-0.23	4.5-7.3	Low-----------	0.55	1	.5-2
	18-46	18-35	1.40-1.75	<0.06	0.08-0.14	5.6-9.0	Low-----------	0.55		
	46-72	15-35	1.40-1.75	<0.2	0.08-0.14	6.6-9.0	Low-----------	0.55		
Bc:*										
Bruno-------------	0-5	3-10	1.20-1.40	6.0-20	0.10-0.15	5.1-7.8	Low-----------	0.17	5	.5-2
	5-65	2-8	1.20-1.40	6.0-20	0.05-0.10	5.1-7.8	Low-----------	0.17		
Ariel-------------	0-32	12-18	1.40-1.50	0.6-2.0	0.20-0.22	4.5-5.5	Low-----------	0.43	5	.5-2
	32-72	7-27	1.40-1.50	0.2-0.6	0.16-0.20	4.5-5.5	Low-----------	0.43		
BdA----------------- Bude	0-23	---	---	0.6-2.0	0.18-0.23	4.5-6.0	Low-----------	0.49	3	---
	23-36	---	---	0.06-0.2	0.10-0.12	4.5-6.0	Moderate------	0.43		
	36-62	---	---	0.06-0.2	0.10-0.12	4.5-6.0	Moderate------	0.37		
BrB2, BrC2, BrC3, BrD3------------- Byram	0-5	5-12	1.35-1.45	0.6-2.0	0.20-0.23	4.5-6.0	Low-----------	0.43	3	.5-2
	5-20	20-32	1.40-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Moderate------	0.43		
	20-44	20-32	1.40-1.60	0.2-0.6	0.06-0.13	4.5-6.0	Moderate------	0.37		
	44-56	20-35	1.40-1.60	0.6-2.0	0.20-0.22	5.6-7.3	Moderate------	0.43		
	56-72	40-80	1.40-1.55	<0.06	0.10-0.15	6.1-8.4	Very high-----	0.24		
Ca------------------ Calhoun	0-23	10-27	1.30-1.65	0.2-0.6	0.21-0.23	4.5-6.0	Low-----------	0.49	5	.5-4
	23-52	10-35	1.30-1.70	0.06-0.2	0.20-0.22	4.5-5.5	Moderate------	0.43		
	52-65	10-27	1.40-1.70	0.2-0.6	0.21-0.23	4.5-7.8	Low-----------	0.43		
CbA, CbB---------- Calloway	0-30	10-30	1.40-1.55	0.6-2.0	0.20-0.23	4.5-6.0	Low-----------	0.49	3	.5-2
	30-53	10-32	1.35-1.55	0.06-0.2	0.09-0.12	4.5-6.0	Moderate------	0.43		
	53-60	16-32	1.45-1.55	0.06-0.2	0.09-0.12	5.1-7.8	Low-----------	0.43		
CC:*										
Cascilla----------	0-4	5-20	1.40-1.50	0.6-2.0	0.18-0.22	4.5-5.5	Low-----------	0.43	5	1-3
	4-56	18-30	1.45-1.50	0.6-2.0	0.16-0.20	4.5-5.5	Low-----------	0.43		
	56-70	5-25	1.40-1.50	0.6-2.0	0.16-0.20	4.5-5.5	Low-----------	0.43		
Calhoun-----------	0-23	10-27	1.30-1.65	0.2-0.6	0.21-0.23	4.5-6.0	Low-----------	0.49	3	.5-4
	23-52	10-35	1.30-1.70	0.06-0.2	0.20-0.22	4.5-5.5	Moderate------	0.43		
	52-65	10-27	1.40-1.70	0.2-0.6	0.21-0.23	4.5-7.8	Low-----------	----		
CD:*										
Columbus----------	0-5	10-16	1.50-1.55	0.6-2.0	0.20-0.22	4.5-5.5	Low-----------	0.37	4	2-3
	5-40	18-33	1.55-1.60	0.6-2.0	0.12-0.15	4.5-5.5	Low-----------	0.20		
	40-65	6-12	1.35-1.40	6.0-20	0.05-0.10	4.5-5.5	Low-----------	0.17		
Daleville---------	0-10	5-15	1.40-1.50	0.6-2.0	0.10-0.14	4.5-6.5	Low-----------	0.24	5	.5-2
	10-65	20-35	1.40-1.50	0.06-0.2	0.16-0.20	4.5-5.5	Moderate------	0.37		
Gb------------------ Gillsburg	0-48	6-18	1.40-1.50	0.6-2.0	0.20-0.22	4.5-5.5	Low-----------	0.43	5	1-3
	48-72	10-18	1.40-1.55	0.2-0.6	0.16-0.18	4.5-5.5	Low-----------	0.43		
GrA, GrB2--------- Grenada	0-5	12-16	1.40-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low-----------	0.43	3	.5-2
	5-22	18-30	1.40-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low-----------	0.43		
	22-25	12-16	1.35-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low-----------	0.43		
	25-54	15-32	1.45-1.60	0.06-0.2	0.10-0.12	4.5-6.0	Low-----------	0.37		
	54-70	15-32	1.45-1.60	0.06-0.2	0.10-0.12	5.1-7.3	Low-----------	0.37		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
LoA, LoB2, LoC2, LoC3, LoD2, LoD3----------- Loring	0-4	8-18	1.30-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low-----------	0.49	3	.5-2
	4-30	18-35	1.40-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low-----------	0.43		
	30-52	12-25	1.50-1.70	0.06-0.2	0.06-0.13	4.5-6.0	Low-----------	0.43		
	52-70	10-25	1.30-1.60	0.2-2.0	0.06-0.13	4.5-6.5	Low-----------	0.43		
Mc--------------- McRaven	0-7	3-12	1.30-1.50	0.6-2.0	0.20-0.22	5.6-7.3	Low-----------	0.43	5	1-3
	7-30	6-18	1.40-1.55	0.6-2.0	0.20-0.22	5.6-7.3	Low-----------	----		
	30-70	6-30	1.40-1.55	0.6-2.0	0.20-0.22	6.1-7.8	Low-----------	----		
MeA, MeB2, MeC2, MeD2, MeD3, MeF2, MeF3------ Memphis	0-6	8-22	1.30-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low-----------	0.37	5	1-2
	6-24	20-35	1.30-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low-----------	0.37		
	24-76	12-25	1.30-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low-----------	0.37		
Mh:* Memphis---------	0-6	8-22	1.30-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low-----------	0.37	5	1-2
	6-24	20-35	1.30-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low-----------	0.37		
	24-76	12-25	1.30-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low-----------	0.37		
Udorthents.										
Mo--------------- Morganfield	0-7	2-5	1.40-1.50	0.6-2.0	0.20-0.23	5.6-7.8	Low-----------	0.43	5	1-3
	7-60	5-18	1.40-1.55	0.6-2.0	0.20-0.23	5.6-7.8	Low-----------	0.43		
Oa--------------- Oaklimeter	0-5	10-16	1.40-1.50	0.6-2.0	0.20-0.22	4.5-5.5	Low-----------	0.43	5	.5-2
	5-20	7-18	1.40-1.50	0.6-2.0	0.15-0.20	4.5-5.5	Low-----------	0.43		
	20-70	7-30	1.40-1.50	0.6-2.0	0.20-0.20	4.5-5.5	Low-----------	0.43		
OG:* Oaklimeter-------	0-5	10-16	1.40-1.50	0.6-2.0	0.20-0.22	4.5-5.5	Low-----------	0.43	5	.5-2
	5-20	7-18	1.40-1.50	0.6-2.0	0.15-0.20	4.5-5.5	Low-----------	0.43		
	20-70	7-30	1.40-1.50	0.6-2.0	0.20-0.20	4.5-5.5	Low-----------	0.43		
Ariel------------	0-32	12-18	1.40-1.50	0.6-2.0	0.20-0.22	4.5-5.5	Low-----------	0.43	5	.5-2
	32-72	7-27	1.40-1.50	0.2-0.6	0.16-0.20	4.5-5.5	Low-----------	0.43		
Gillsburg--------	0-48	6-18	1.40-1.50	0.6-2.0	0.20-0.22	4.5-5.5	Low-----------	0.43	5	1-3
	48-72	10-18	1.40-1.55	0.2-0.6	0.16-0.18	4.5-5.5	Low-----------	0.43		
Pa:* Pits.										
Udorthents.										
PoA, PoB2, PoC2, PoC3------------ Providence	0-6	5-12	1.30-1.40	0.6-2.0	0.20-0.22	4.5-6.0	Low-----------	0.49	3	.5-3
	6-22	18-30	1.40-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low-----------	0.43		
	22-36	20-30	1.40-1.60	0.2-0.6	0.08-0.10	4.5-6.0	Moderate-----	0.32		
	36-52	12-25	1.40-1.60	0.2-0.6	0.08-0.10	4.5-6.0	Low-----------	0.32		
	52-70	10-27	1.40-1.60	0.6-2.0	0.10-0.15	4.5-6.0	Low-----------	0.32		
PrD2:* Providence------	0-6	5-12	1.30-1.40	0.6-2.0	0.20-0.22	4.5-6.0	Low-----------	0.49	3	.5-3
	6-22	18-30	1.40-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low-----------	0.43		
	22-36	20-30	1.40-1.60	0.2-0.6	0.08-0.10	4.5-6.0	Moderate-----	0.32		
	36-52	12-25	1.40-1.60	0.2-0.6	0.08-0.10	4.5-6.0	Low-----------	0.32		
	52-70	10-27	1.40-1.60	0.6-2.0	0.10-0.15	4.5-6.0	Low-----------	0.32		
Lexington--------	0-4	12-30	1.30-1.50	0.6-2.0	0.17-0.22	4.5-6.0	Low-----------	0.43	3	.5-2
	4-40	20-33	1.40-1.55	0.6-2.0	0.16-0.21	4.5-6.0	Low-----------	0.43		
	40-72	15-29	1.30-1.50	2.0-6.0	0.06-0.12	4.5-6.0	Low-----------	0.24		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
PrD3:*										
Providence-------	0-6	5-12	1.30-1.40	0.6-2.0	0.20-0.22	4.5-6.0	Low-----------	0.49	3	.5-3
	6-22	18-30	1.40-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low-----------	0.43		
	22-36	20-30	1.40-1.60	0.2-0.6	0.08-0.10	4.5-6.0	Moderate------	0.32		
	36-52	12-25	1.40-1.60	0.2-0.6	0.08-0.10	4.5-6.0	Low-----------	0.32		
	52-70	10-27	1.40-1.60	0.6-2.0	0.10-0.15	4.5-6.0	Low-----------	0.32		
Lexington--------	0-4	12-30	1.30-1.50	0.6-2.0	0.17-0.22	4.5-6.0	Low-----------	0.43	3	.5-2
	4-40	20-33	1.40-1.55	0.6-2.0	0.16-0.21	4.5-6.0	Low-----------	0.43		
	40-72	15-29	1.30-1.50	2.0-6.0	0.06-0.12	4.5-6.0	Low-----------	0.24		
Pu:*										
Providence-------	0-6	5-12	1.30-1.40	0.6-2.0	0.20-0.22	4.5-6.0	Low-----------	0.49	3	.5-3
	6-22	18-30	1.40-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low-----------	0.43		
	22-36	20-30	1.40-1.60	0.2-0.6	0.08-0.10	4.5-6.0	Moderate------	0.32		
	36-52	12-25	1.40-1.60	0.2-0.6	0.08-0.10	4.5-6.0	Low-----------	0.32		
	52-70	10-27	1.40-1.60	0.6-2.0	0.10-0.15	4.5-6.0	Low-----------	0.32		
Udorthents.										
Re---------------- Riedtown	0-6	3-12	1.30-1.50	0.6-2.0	0.20-0.22	5.1-7.3	Low-----------	0.43	5	1-3
	6-32	10-18	1.40-1.55	0.6-2.0	0.20-0.22	5.6-8.4	Low-----------	----		
	32-80	10-18	1.40-1.55	0.6-2.0	0.20-0.22	5.6-8.4	Low-----------	----		
SeB2, SeD3-------- Siwell	0-5	5-12	1.35-1.45	0.6-2.0	0.20-0.22	4.5-6.0	Low-----------	0.43	4	.5-2
	5-26	20-30	1.40-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Moderate------	0.43		
	26-38	30-55	1.40-1.55	0.06-0.2	0.16-0.18	6.1-8.4	High----------	0.24		
	38-70	40-80	1.40-1.55	<0.06	0.10-0.15	6.6-8.4	Very high-----	0.24		
SpD2,* SpD3,* SpE2,* SR:*										
Smithdale-------	0-9	2-15	1.40-1.50	2.0-6.0	0.14-0.16	4.5-5.5	Low-----------	0.28	5	---
	9-28	18-33	1.40-1.55	0.6-2.0	0.15-0.17	4.5-5.5	Low-----------	0.24		
	28-80	12-27	1.40-1.55	2.0-6.0	0.14-0.16	4.5-5.5	Low-----------	0.28		
Providence------	0-6	5-12	1.30-1.40	0.6-2.0	0.20-0.22	4.5-6.0	Low-----------	0.49	3	.5-3
	6-22	18-30	1.40-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low-----------	0.43		
	22-36	20-30	1.40-1.60	0.2-0.6	0.08-0.10	4.5-6.0	Moderate------	0.32		
	36-52	12-25	1.40-1.60	0.2-0.6	0.08-0.10	4.5-6.0	Low-----------	0.32		
	52-70	10-27	1.40-1.60	0.6-2.0	0.10-0.15	4.5-6.0	Low-----------	0.32		
TpB2, TpC2, TpD3- Tippah	0-4	5-20	1.35-1.45	0.6-2.0	0.20-0.22	4.5-6.0	Low-----------	0.43	5	.5-2
	4-35	20-35	1.40-1.50	0.6-2.0	0.19-0.21	4.5-6.0	Moderate------	0.43		
	35-68	30-55	1.40-1.55	0.06-0.2	0.16-0.18	4.5-6.0	High----------	0.24		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Map symbol and soil name	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hard-ness	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In			
Ad------------------ Adler	C	Occasional	Brief-----	Jan-Apr	2.0-3.0	Apparent	Jan-Apr	>60	---	Moderate	Low.
Ar------------------ Ariel	C	Occasional	Brief-----	Jan-Apr	2.0-3.0	Apparent	Jan-Apr	>60	---	Low------	Moderate.
Bb------------------ Bonn	D	Occasional	Brief-----	Jan-Apr	0-2.0	Perched	Dec-Apr	>60	---	High-----	Low.
Bc:*											
Bruno-------------	A	Occasional	Brief-----	Jan-Apr	4.0-6.0	Apparent	Dec-Apr	>60	---	Low------	Low.
Ariel-------------	C	Occasional	Brief-----	Jan-Apr	2.0-3.0	Apparent	Jan-Apr	>60	---	Low------	Moderate.
BdA---------------- Bude	C	None--------	---	---	0.5-1.5	Perched	Jan-Apr	>60	---	High-----	High.
BrB2, BrC2, BrC3, BrD3------------- Byram	C	None--------	---	---	1.5-2.5	Perched	Dec-Apr	>60	---	High-----	Moderate.
Ca------------------ Calhoun	D	None--------	---	---	0-2.0	Perched	Dec-Apr	>60	---	High-----	Moderate.
CbA, CbB----------- Calloway	C	None--------	---	---	1.0-2.0	Perched	Jan-Apr	>60	---	High-----	Moderate.
CC:*											
Cascilla----------	B	Frequent----	Brief to long.	Jan-Apr	>6.0	---	---	>60	---	Low------	Moderate.
Calhoun-----------	D	Frequent----	Brief to long.	Dec-Jun	0-2.0	Perched	Dec-Apr	>60	---	High-----	Moderate.
CD:*											
Columbus----------	C	Frequent----	Brief to long.	Nov-Apr	2.0-3.0	Apparent	Dec-Apr	>60	---	High-----	High.
Daleville---------	D	Frequent----	Brief to long.	Nov-Apr	0.5-1.0	Apparent	Nov-May	>60	---	High-----	High.
Gb------------------ Gillsburg	C	Occasional	Brief-----	Jan-Mar	1.0-1.5	Apparent	Jan-Apr	>60	---	High-----	High.
GrA, GrB2---------- Grenada	C	None--------	---	---	1.5-2.5	Perched	Jan-Apr	>60	---	Moderate	Moderate.
LoA, LoB2, LoC2, LoC3, LoD2, LoD3- Loring	C	None--------	---	---	2.0-3.0	Perched	Dec-Mar	>60	---	Moderate	Moderate.
Mc------------------ McRaven	C	Occasional	Brief-----	Nov-Mar	1.0-1.5	Apparent	Nov-Mar	>60	---	High-----	Moderate.
MeA, MeB2, MeC2, MeD2, MeD3, MeF2, MeF3-------------- Memphis	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Mh:*											
Memphis-----------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Udorthents.											

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In			
Mo------------------ Morganfield	B	Occasional	Brief-----	Jan-Apr	3.0-4.0	Apparent	Jan-Apr	>60	---	Low-------	Low.
Oa------------------ Oaklimeter	C	Occasional	Brief-----	Nov-Apr	1.5-2.5	Apparent	Nov-Mar	>60	---	Moderate	High.
OG:*											
Oaklimeter--------	C	Frequent----	Brief to very long.	Nov-Apr	1.5-2.5	Apparent	Nov-Mar	>60	---	Moderate	High.
Ariel-------------	C	Frequent----	Brief to very long.	Jan-Apr	2.0-3.0	Apparent	Jan-Apr	>60	---	Low------	Moderate.
Gillsburg---------	C	Frequent----	Brief to very long.	Jan-Apr	1.0-1.5	Apparent	Jan-Apr	>60	---	High-----	High.
Pa:*											
Pits.											
Udorthents.											
PoA, PoB2, PoC2, PoC3-------------- Providence	C	None--------	---	---	1.5-3.0	Perched	Jan-Mar	>60	---	Moderate	Moderate.
PrD2,* PrD3:*											
Providence--------	C	None--------	---	---	1.5-3.0	Perched	Jan-Mar	>60	---	Moderate	Moderate.
Lexington---------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Pu:*											
Providence--------	C	None--------	---	---	1.5-3.0	Perched	Jan-Mar	>60	---	Moderate	Moderate.
Udorthents.											
Re------------------ Riedtown	C	Occasional	Brief-----	Nov-Mar	1.5-3.5	Apparent	Nov-Mar	>60	---	Moderate	Low.
SeB2, SeD3--------- Siwell	C	None--------	---	---	2.5-3.0	Perched	Jan-Mar	>60	---	High-----	Moderate.
SpD2,* SpD3,* SpE2,* SR:*											
Smithdale-------	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
Providence------	C	None--------	---	---	1.5-3.0	Perched	Jan-Mar	>60	---	Moderate	Moderate.
TpB2, TpC2, TpD3-- Tippah	C	None--------	---	---	2.0-2.5	Perched	Dec-Apr	>60	---	High-----	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--PHYSICAL ANALYSES

[Analyzed by the Soil Genesis Laboratory of the Mississippi Agricultural and Forestry Experiment Station]

Soil series and sample number	Horizon	Depth	Particle size distribution: Very coarse sand (2.0-1.0 mm)	Coarse sand (1.0-0.5 mm)	Medium sand (0.5-0.25 mm)	Fine sand (0.25-0.10 mm)	Very fine sand (0.10-0.05 mm)	Total sand (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)
		In	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct
Ariel:[1]										
S79MS-089-07	Ap	0-6	0.4	0.1	0.3	0.6	0.6	2.0	76.5	21.5
	B21	6-13	0.0	0.1	0.3	0.6	0.4	1.4	75.7	22.9
	B22	13-25	0.0	0.0	0.0	0.2	0.9	1.1	83.8	15.2
	A2b	25-32	0.0	0.0	0.2	0.7	0.8	1.7	74.9	23.4
	B21b	32-52	0.0	0.0	0.3	3.1	3.8	7.2	77.6	15.2
	B22b	52-72	0.0	0.0	0.1	1.6	2.5	4.2	78.1	17.7
Bonn:[1]										
S79MS-089-04	Ap	0-4	1.4	0.6	1.4	2.6	0.5	6.5	80.0	13.5
	A2	4-18	0.4	0.5	1.2	2.2	0.9	5.2	75.9	18.9
	B&A	18-23	0.6	0.5	0.9	1.8	0.5	4.3	72.0	23.7
	B21tg	23-38	0.3	0.4	0.9	1.8	0.7	4.1	68.3	27.6
	B22tg	38-46	0.4	0.6	0.9	1.8	0.6	4.3	68.1	27.6
	B3	46-55	0.2	0.4	1.1	2.2	0.2	4.1	75.3	20.6
	Cg	55-72	0.4	0.5	1.2	2.6	1.0	5.7	75.1	19.2
Byram:[1]										
S80MS-089-03	Ap	0-5	0.4	0.9	0.7	0.6	0.6	3.2	78.7	18.1
	B21t	5-14	0.1	0.3	0.3	0.3	0.4	1.5	65.3	33.6
	B22t	14-20	0.1	0.3	0.3	0.3	0.3	1.4	69.4	29.3
	Bx1	20-30	0.2	0.5	0.3	0.3	0.4	1.7	80.5	17.8
	Bx2	30-44	0.1	0.5	0.4	0.5	0.4	1.9	79.9	18.2
	B23t	44-56	0.1	0.1	0.2	0.3	0.3	1.0	62.0	37.0
	IIC	56-72	0.1	0.1	0.2	0.3	0.4	1.1	51.9	47.0
Calhoun:[1]										
S80MS-089-02	Ap	0-7	0.5	0.5	0.5	0.5	0.8	2.8	84.8	12.4
	A21g	7-15	0.2	0.2	0.2	0.3	0.4	1.3	83.6	15.1
	A22g	15-23	0.3	0.4	0.3	0.3	0.6	1.9	81.2	16.9
	B21tg	23-34	0.5	0.5	0.3	0.3	0.3	1.9	67.4	30.7
	B22tg	34-44	0.5	1.3	0.9	0.6	0.7	4.0	68.7	27.3
	B3g	44-52	0.6	1.5	1.2	0.9	0.1	5.3	67.6	27.1
	Cg	52-65	0.4	1.0	0.8	0.7	0.7	3.6	73.7	22.7
Calhoun:[2]										
S80MS-089-04	A1	0-5	0.1	0.5	0.8	0.7	0.5	2.6	68.8	28.6
	A2	5-10	0.0	0.1	0.6	0.8	0.8	2.4	71.0	26.6
	B21tg	10-22	0.0	0.1	0.4	0.6	0.7	1.9	69.4	28.7
	B22tg	22-33	0.0	0.1	0.2	0.4	0.5	1.1	61.7	37.1
	B23tg	33-46	0.2	0.2	0.1	0.3	0.6	1.4	68.1	30.5
	B24tg	46-60	0.2	0.4	0.6	0.5	0.7	2.4	66.6	31.0
	B25tg	60-72	0.0	0.1	0.4	0.7	0.8	2.0	60.4	37.6
Calloway:[3]										
S79MS-089-06	Ap	0-6	3.1	2.6	1.5	1.4	0.1	8.7	82.7	8.6
	B	6-16	0.6	1.2	1.0	0.7	0.2	3.7	71.9	24.4
	A2	16-27	0.5	1.1	0.9	0.8	0.6	3.9	73.5	22.6
	Bx1	27-35	0.4	1.0	0.9	0.8	0.6	3.7	63.8	32.5
	Bx2	35-55	0.2	0.6	0.5	0.6	0.2	2.1	73.5	24.4
	Bx3	55-65	0.1	0.2	0.3	0.5	0.3	1.4	80.0	18.6
	C	65-72	0.2	0.2	0.4	1.0	0.4	2.2	79.9	17.9

See footnotes at end of table.

TABLE 18.--PHYSICAL ANALYSES--Continued

Soil series and sample number	Horizon	Depth	Particle size distribution: Very coarse sand (2.0-1.0 mm)	Coarse sand (1.0-0.5 mm)	Medium sand (0.5-0.25 mm)	Fine sand (0.25-0.10 mm)	Very fine sand (0.10-0.05 mm)	Total sand (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)
		In	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct
Gillsburg:[1]										
S80MS-089-01	Ap	0-5	0.7	0.6	0.7	2.6	2.8	7.4	83.8	8.8
	B21	5-15	0.3	0.4	0.4	0.5	1.1	2.7	86.7	10.6
	B22	15-30	1.0	1.1	0.7	0.9	0.6	4.3	81.0	14.7
	A2b	30-48	1.9	1.7	1.0	0.9	0.5	6.0	75.4	18.6
	A&B	48-60	0.6	0.9	0.7	1.4	0.8	4.4	70.9	24.7
	Btgb	60-72	0.5	0.7	0.6	1.4	0.8	4.0	70.8	25.2
Siwell:[1]										
S79MS-089-05	Ap	0-5	0.9	1.5	1.0	0.8	1.1	5.3	70.7	24.0
	B21t	5-13	0.4	0.5	0.4	0.4	0.4	2.1	64.4	33.5
	B22t	13-19	0.3	1.0	0.7	0.5	0.6	3.1	69.2	27.7
	B23t	19-26	0.2	0.7	0.6	0.5	0.4	2.4	64.9	32.7
	IIB24t	26-38	0.3	0.6	0.4	0.6	0.5	2.4	48.2	49.4
	IIC1	38-54	0.3	0.3	0.3	0.4	0.6	1.9	25.4	72.7
	IIC2	54-70	1.6	1.2	0.7	0.5	0.8	4.8	17.4	77.8

[1] Location of pedon sampled is the same given for typical pedon in "Soil series and their morphology."

[2] Calhoun silt loam: 0.5 mile south of Rice Road on Old Canton Road, 1.5 miles southeast on Reservoir Road, and 400 feet south of trailer park; SE1/4NW1/4 sec. 34, T. 7 N., R. 2 E.

[3] Calloway silt loam: 4 miles south of Canton on U.S. Highway 51, west 0.4 mile on county road, south 0.2 mile on field road, and 400 feet west of railroad; NW1/4NW1/4 sec. 15, T. 8 N., R. 2 E.

TABLE 19.--CHEMICAL ANALYSES

[Analyzed by the Soil Genesis Laboratory of the Mississippi Agricultural and Forestry Experiment Station]

Soil series and sample number	Horizon	Depth	Reaction	Extractable cations: Calcium	Magnesium	Potassium	Sodium	Extractable acidity	Sum of cations	Base saturation by sum cations
		In	pH	--------Milliequivalents per 100 grams--------						Percent
Ariel:[1]										
S79MS-089-07	Ap	0-6	4.9	4.7	1.7	0.4	0.0	8.4	15.2	44.7
	B21	6-13	5.0	5.4	2.0	0.2	0.1	8.1	15.8	48.7
	B22	13-25	5.1	3.8	1.6	0.1	0.1	5.2	10.8	51.9
	A2b	25-32	5.0	4.7	2.1	0.1	0.1	7.6	14.6	47.9
	B21b	32-52	4.9	3.4	1.6	0.1	0.1	6.2	11.4	45.6
	B22b	52-72	5.0	3.2	1.5	0.2	0.1	5.7	10.7	46.7
Bonn:[1]										
S79MS-089-04	Ap	0-4	4.9	2.4	1.2	0.1	0.2	7.3	11.2	34.8
	A2	4-18	4.9	1.2	0.7	0.1	0.4	8.8	11.2	21.4
	B&A	18-23	5.2	2.1	1.4	0.1	1.1	9.8	14.5	32.7
	B21tg	23-38	5.0	6.0	3.4	0.2	3.5	7.8	20.9	62.7
	B22tg	38-46	5.3	8.6	4.1	0.1	5.9	3.7	22.4	83.5
	B3	46-55	6.8	7.5	3.2	0.2	6.0	1.6	18.5	91.3
	Cg	55-72	7.4	8.0	3.1	0.1	5.9	1.0	18.1	94.5
Byram:[1]										
S80MS-089-03	Ap	0-5	5.6	6.6	1.7	0.2	0.1	6.0	14.6	58.9
	B21t	5-14	4.9	4.9	2.2	0.2	0.2	12.2	19.7	38.1
	B22t	14-20	4.8	2.8	2.0	0.1	0.2	12.1	17.2	29.6
	Bx1	20-30	4.9	1.3	1.4	0.1	0.4	8.9	12.1	26.4
	Bx2	30-44	5.3	3.1	2.3	0.1	0.6	8.2	14.3	42.6
	B23t	44-56	5.9	14.7	9.5	0.3	2.3	3.9	30.7	87.3
	IIC	56-72	6.8	20.2	12.9	0.3	2.7	2.5	38.6	93.5
Calhoun:[1]										
S80MS-089-02	Ap	0-7	5.3	3.6	1.5	0.7	0.2	6.4	12.4	48.4
	A21g	7-15	4.7	2.5	1.0	0.1	0.1	8.2	11.9	31.1
	A22g	15-23	4.7	2.9	1.3	0.2	0.1	8.0	12.5	36.0
	B21tg	23-34	4.7	5.4	3.1	0.3	0.1	9.5	18.4	48.4
	B22tg	34-44	4.8	7.9	5.2	0.3	0.2	8.6	22.2	61.3
	B3g	44-52	5.0	8.5	5.7	0.2	0.3	7.3	22.0	66.8
	Cg	52-65	5.5	8.5	5.6	0.2	0.4	4.8	19.5	75.4
Calhoun:[2]										
S80MS-089-04	A1	0-5	4.6	4.5	2.0	0.4	0.1	16.4	23.4	29.9
	A2	5-10	4.8	5.4	2.3	0.1	0.1	9.3	17.2	45.9
	B21tg	10-22	5.2	5.8	2.6	0.1	0.4	9.3	18.2	48.9
	B22tg	22-33	4.7	7.1	4.4	0.2	1.3	11.3	24.3	53.5
	B23tg	33-46	4.3	6.9	5.2	0.1	2.8	7.7	22.8	66.2
	B24tg	46-60	4.1	21.1	6.9	0.2	5.9	6.2	40.3	84.6
	B25tg	60-72	4.5	10.3	8.5	0.2	5.2	6.9	31.1	77.8
Calloway:[3]										
S79MS-089-06	Ap	0-6	6.1	6.5	0.8	0.1	0.2	4.2	11.8	64.4
	B	6-16	4.8	4.0	2.6	0.2	0.3	10.4	17.5	40.6
	A'2	16-27	4.9	3.9	3.8	0.2	0.8	9.2	17.9	48.6
	Bx1	27-35	5.0	7.5	6.6	0.3	1.6	10.5	26.5	60.4
	Bx2	35-55	5.2	6.9	5.8	0.2	1.4	5.9	20.2	70.8
	Bx3	55-65	5.9	6.6	4.6	0.1	1.3	4.1	16.7	75.4
	C	65-72	6.5	6.3	4.1	0.2	1.4	2.8	14.8	81.1
Gillsburg:[1]										
S80MS-089-01	Ap	0-5	5.7	3.4	0.8	0.4	0.1	3.3	8.0	58.7
	B21	5-15	4.7	2.4	1.0	0.1	0.1	4.5	8.1	44.4
	B22	15-30	4.3	1.9	1.0	0.1	0.1	6.3	9.4	33.0
	A2b	30-48	4.8	1.5	1.4	0.1	0.9	7.9	11.8	33.0
	A&B	48-60	5.2	5.3	5.0	0.2	2.6	5.4	18.5	70.8
	Btgb	60-72	5.7	7.0	6.0	0.2	3.1	3.2	19.5	83.6

See footnotes at end of table.

TABLE 19.--CHEMICAL ANALYSES--Continued

Soil series and sample number	Horizon	Depth	Reaction	Extractable cations				Extractable acidity	Sum of cations	Base saturation by sum cations
				Calcium	Magnesium	Potassium	Sodium			
		In	pH	Milliequivalents per 100 grams						Percent
Siwell:[1]										
S79MS-089-05	Ap	0-5	5.3	6.7	2.8	0.2	0.3	7.5	17.5	57.1
	B21t	5-13	5.1	6.1	3.2	0.2	0.3	11.1	20.9	47.1
	B22t	13-19	5.0	4.4	2.2	0.1	0.2	9.1	16.0	43.1
	B23t	19-26	5.3	5.7	3.5	0.2	0.4	11.5	21.3	46.0
	IIB24t	26-38	5.6	16.1	8.2	0.3	1.4	8.4	34.4	75.6
	IIC1	38-54	7.6	45.0	17.3	0.4	2.3	5.3	70.3	92.5
	IIC2	54-70	7.7	46.1	18.6	0.6	2.6	1.3	69.2	98.1

[1]Location of pedon sampled is the same given for typical pedon in "Soil series and their morphology."

[2]Calhoun silt loam: 0.5 mile south of Rice Road on Old Canton Road, 1.5 miles on Reservoir Road, and 400 feet south of trailer park; SE1/4NW1/4 sec. 34, T. 7 N., R. 2 E.

[3]Calloway silt loam: 4 miles south of Canton on U.S. Highway 51, west 0.4 mile on county road, south 0.2 mile on field road, and 400 feet west of railroad; NW1/4NW1/4 sec. 15, T. 8 N., R. 2 E.

TABLE 20.--ENGINEERING INDEX TEST DATA

[Tests by the Mississippi State Highway Department Testing Division, Jackson, Mississippi]

Soil name, report number, horizon, and depth in inches	Classification		Grain size distribution								Liquid limit	Plasticity index	Moisture density		Shrinkage		Volume change	Specific gravity (-) No. 10
			Percentage passing sieve-			Percentage smaller than-												
	AASHTO	Unified	No. 10	No. 40	No. 60	.074 mm	.05 mm	.02 mm	.005 mm	.002 mm			Max. dry density	Optimum moisture	Limit	Ratio		
											Pct		Lb/ft3	Pct	Pct	Pct		
Byram silt loam:[1] (S80MS-089-03)																		
B2t----------5 to 20 (Combined B21t&B22t)	A-7 (19)	CL	100	98	98	97	92	62	29	13	42	16	101.8	20.0	19	1.66	37	2.75
Bx2---------30 to 44	A-6 (13)	ML	100	98	97	96	91	57	22	16	37	11	103.5	19.0	22	1.59	24	2.80
IIC---------56 to 72	A-7 (49)	CH	100	99	99	98	93	71	44	39	65	44	99.0	23.6	14	1.85	96	2.75
Siwell silt loam:[1] (S79MS-089-05)																		
B2t----------5 to 26 (Combined B21t,B22t, &B23t)	A-7 (26)	CL	100	98	97	97	86	64	32	27	49	23	100.6	19.8	18	1.71	51	2.75
IIC1--------38 to 54	A-7 (78)	CH	100	99	99	98	93	84	68	64	98	66	89.9	26.8	7	1.98	169	2.80

[1]Location of pedon sampled is the same given for typical pedon in "Soil series and their morphology."

TABLE 21.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Adler	Coarse-silty, mixed, nonacid, thermic Aquic Udifluvents
Ariel	Coarse-silty, mixed, thermic Fluventic Dystrochrepts
*Bonn	Fine-silty, mixed, thermic Glossic Natraqualfs
Bruno	Sandy, mixed, thermic Typic Udifluvents
Bude	Fine-silty, mixed, thermic Glossaquic Fragiudalfs
Byram	Fine-silty, mixed, thermic Typic Fragiudalfs
Calhoun	Fine-silty, mixed, thermic Typic Glossaqualfs
Calloway	Fine-silty, mixed, thermic Glossaquic Fragiudalfs
*Cascilla	Fine-silty, mixed, thermic Fluventic Dystrochrepts
*Columbus	Fine-loamy, siliceous, thermic Aquic Hapludults
Daleville	Fine-loamy, siliceous, thermic Typic Paleaquults
*Gillsburg	Coarse-silty, mixed, acid, thermic Aeric Fluvaquents
Grenada	Fine-silty, mixed, thermic Glossic Fragiudalfs
Lexington	Fine-silty, mixed, thermic Typic Paleudalfs
Loring	Fine-silty, mixed, thermic Typic Fragiudalfs
McRaven	Coarse-silty, mixed, nonacid, thermic Aeric Fluvaquents
Memphis	Fine-silty, mixed, thermic Typic Hapludalfs
Morganfield	Coarse-silty, mixed, nonacid, thermic Typic Udifluvents
Oaklimeter	Coarse-silty, mixed, thermic Fluvaquentic Dystrochrepts
Providence	Fine-silty, mixed, thermic Typic Fragiudalfs
Riedtown	Coarse-silty, mixed, thermic Fluvaquentic Eutrochrepts
Siwell	Fine-silty, mixed, thermic Typic Hapludalfs
Smithdale	Fine-loamy, siliceous, thermic Typic Paleudults
Tippah	Fine-silty, mixed, thermic Aquic Paleudalfs
Udorthents	Coarse-loamy, siliceous, thermic Udorthents

* This soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

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