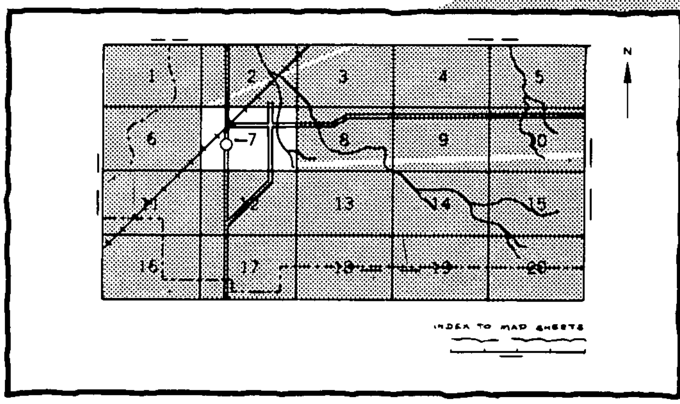
SOIL SURVEY OF

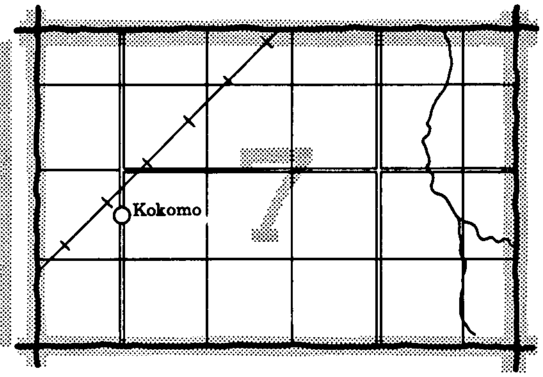
Union County, Mississippi

United States Department of Agriculture
Soil Conservation Service and Forest Service
In cooperation with
Mississippi Agricultural and Forestry Experiment Station

HOW TO USE

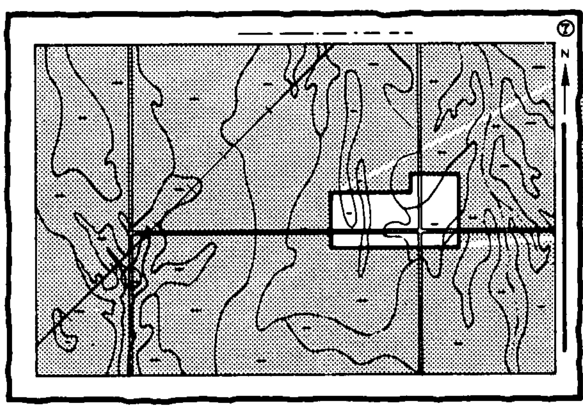
1. Locate your area of interest on the "Index to Map Sheets" (the last page of this publication).

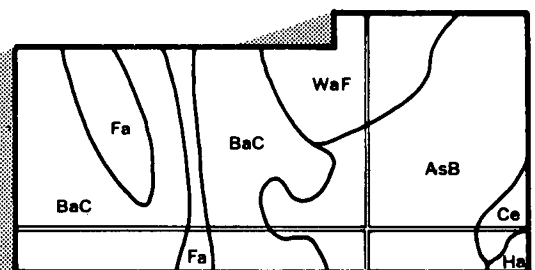




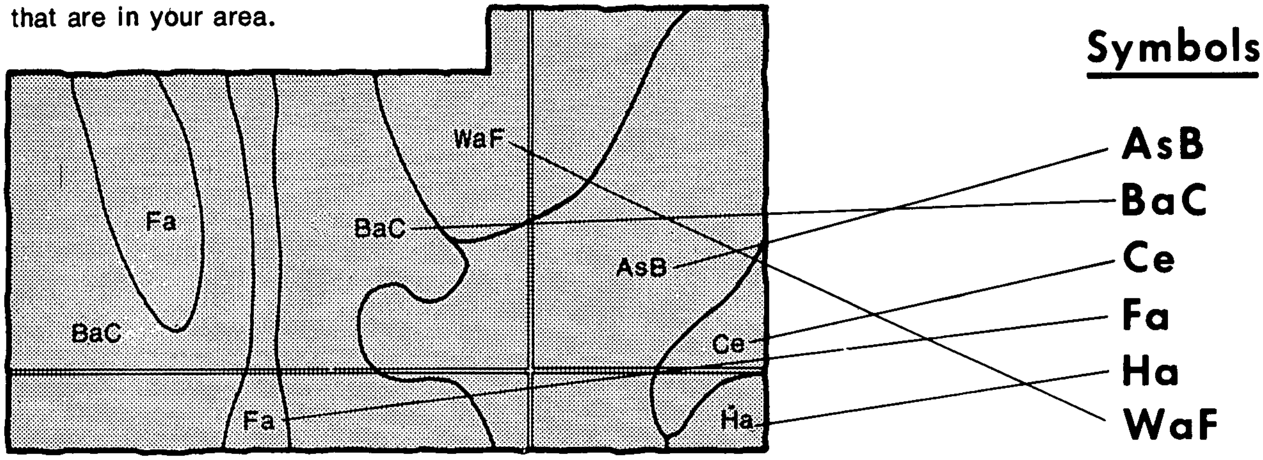
2. Note the number of the map sheet and turn to that sheet.

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



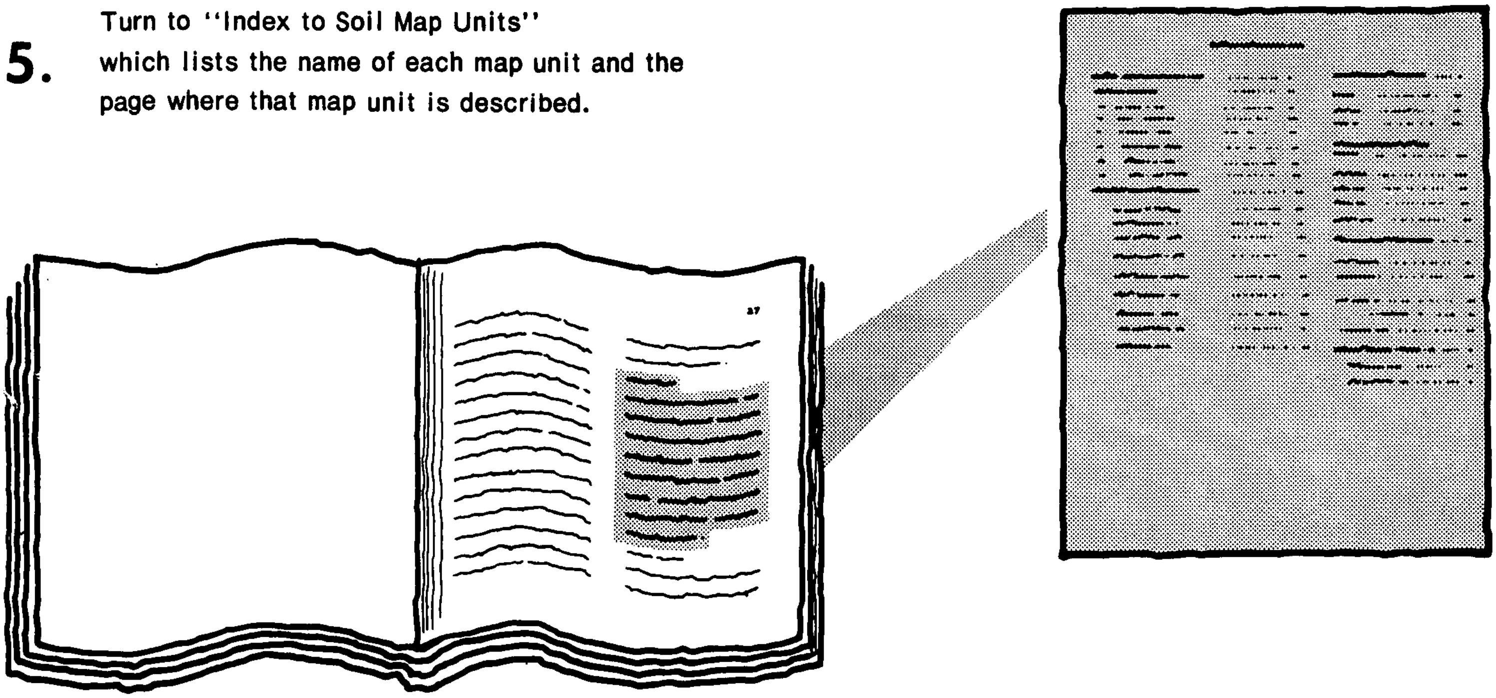


4. List the map unit symbols that are in your area.

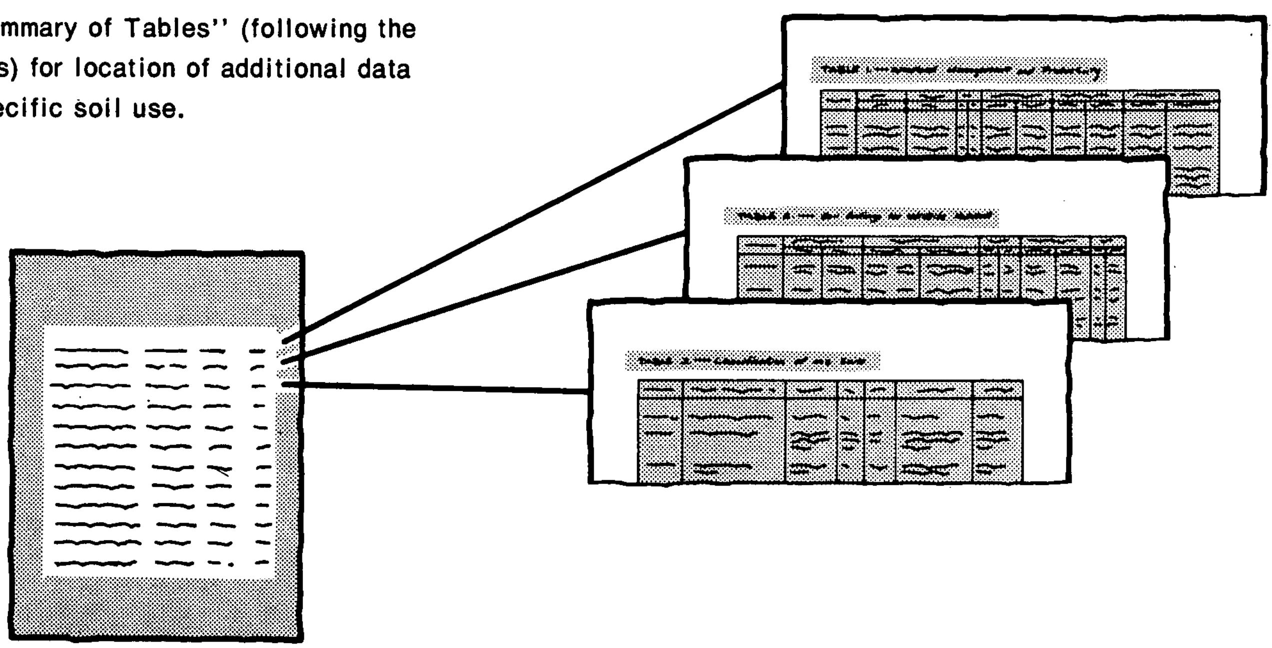


THIS SOIL SURVEY

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

Major fieldwork for this soil survey was completed in the period 1965-74. Soil names and descriptions were approved in 1975. Unless otherwise indicated, statements in the publication refer to conditions in the survey area in 1974. This survey was made cooperatively by the Soil Conservation Service, the Forest Service, and the Mississippi Agricultural and Forestry Experiment Station. It is part of the technical assistance furnished to the Union County Soil and Water Conservation District.

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

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Issued April 1979

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Foreword

The Soil Survey of Union County, Mississippi, contains much information useful in any land-planning program. Of prime importance are the predictions of soil behavior for selected land uses. Also highlighted are limitations or hazards to land uses that are inherent in the soil, improvements needed to overcome these limitations, and the impact that selected land uses will have on the environment.

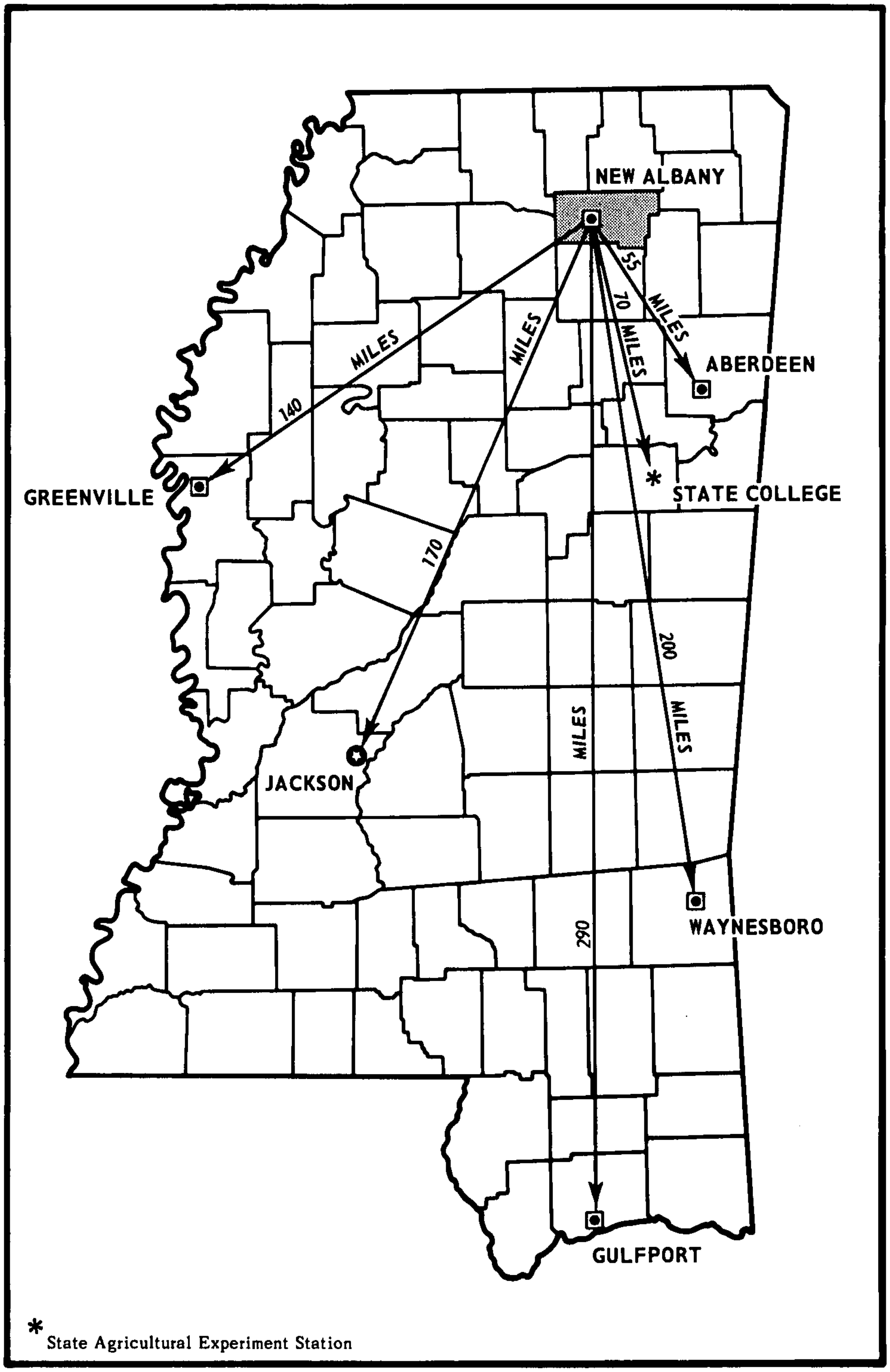
This soil survey has been prepared for many different users. Farmers, ranchers, foresters, and agronomists can use it to determine the potential of the soil and the management practices required for food and fiber production. Planners, community officials, engineers, developers, builders, and homebuyers can use it to plan land use, select sites for construction, develop soil resources, or identify any special practices that may be needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the soil survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur even within short distances. Soils may be seasonally wet or subject to flooding. They may be shallow to bedrock. They may be too unstable to be used as a foundation for buildings or roads. Very clayey or wet soils are poorly suited to 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 kind of soil is shown on detailed soil maps. Each kind of soil in the survey area is described, and much information is given about each soil for specific uses. Additional information or assistance in using this publication can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

This soil survey can be useful in the conservation, development, and productive use of soil, water, and other resources.

W. L. Heard
State Conservationist
Soil Conservation Service



Location of Union County in Mississippi.

SOIL SURVEY OF UNION COUNTY, MISSISSIPPI

By A. H. Wynn, J. R. Woodruff, W. E. Bright, and H. C. Lane,
Soil Conservation Service

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

UNION COUNTY is in the northeastern part of Mississippi (see map on facing page). New Albany, the county seat, has a population of 6,426. The county has a total area of 270,080 acres, or 422 square miles, and a population of 19,096.

The county is largely in the Southern Coastal Plain major land resource area. A small part is in the Mississippi Blackland Prairie. It is bounded on the north by Benton and Tippah Counties, on the east by Prentiss and Lee Counties, on the south by Pontotoc County, and on the west by Lafayette and Marshall Counties. The county extends 29 miles east and west at its widest point and 16 miles north and south.

General nature of the county

In this section general information concerning the county is given. Discussed are climate; history and development; physiography, relief, and drainage; and farming.

Climate

Union County has a warm, humid climate and abundant rainfall. The average minimum temperatures in December, January, and February are near freezing. Rain falls throughout the year and is usually heaviest during winter and spring and lightest in fall. Annual precipitation is usually adequate for all crops.

Table 1 shows temperature and precipitation data for the period 1931-52, recorded at Tupelo in adjoining Lee County. Tables 2 and 3 show probable dates of the first freeze in fall and the last in spring and the length of the growing season.

In winter the average temperature is 45 degrees F, and the average daily minimum is 36 degrees. The lowest temperature during the entire period of record was -14 degrees at Tupelo on January 27, 1940. In summer, the average temperature is 81 degrees, and the average daily maximum is 92 degrees. The highest temperature was 109 degrees, recorded on July 29, 1930.

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

As shown in Table 1, the total annual precipitation is about 53.01 inches. Of this total, 28.94 inches, or 55 percent, usually falls during the period March through September, which includes the growing season for most crops. Two years in 10, the March-September rainfall is less than 17.10 inches. The most rainfall in one month during the period of record was 15.24 inches at Tupelo in January 1949. Average annual snowfall is 2.2 inches.

The year-round relative humidity is 60 to 100 percent about 64 percent of the time. Prevailing winds are south-southwesterly.

During the past 50 years, there have been 8 tornadoes in the county, at least 16 damaging thunderstorms, and 7 severe hailstorms.

History and development

Union County was originally part of the hunting grounds claimed by the Chickasaw Indians. These people lived largely by hunting and fishing, but they did practice a primitive form of farming. The principal crops were corn, vegetables, and tobacco. They moved west of the Mississippi River after the Pontotoc Treaty of 1836.

White settlers moved into the area in large numbers during the 1830's and 1840's. They came largely from the seaboard states and from Alabama and Tennessee. They practiced a subsistence-type farming; cotton was the main cash crop. One of the early settlements was a trading post a short distance north of the present city of New Albany. Later a sawmill was established at the site of New Albany and the trading post gradually declined.

Union County was formed in 1870 from parts of Pontotoc and Tippah Counties. Additional territory was annexed from Lee County in 1874, bringing Union County to its present size. The county seat, New Albany, was incorporated in 1850 when Union County was still part of Pontotoc County. The population of Union County was 13,030 in 1880. By 1890 it had increased to 15,606.

About 1886 the St. Louis-San Francisco Railroad came through New Albany. A short time later its tracks were crossed by what is now the Illinois Central Gulf Railroad.

Union County is now the center of a prosperous farming section. Many of its farmers are employed part time off the farm. The county has a wide diversity of industry: local plants manufacture furniture, clothing, automotive parts, various metal products, and other items.

Physiography, relief, and drainage

Union County lies within the Coastal Plain physiographic province of the United States. Most of the ridgetops are covered by a thin mantle of silty material ranging in thickness from a few inches to several feet. The eastern part of the county consists of clayey material underlain by calcareous, partially decomposed marine fossils.

Most of the county is hilly. Ridgetops are generally narrow, but in places they are comparatively wide. The Flatwoods has rolling topography with broad upland flats in many places. Flood plains are relatively wide, especially along the major streams, where they are more than a mile wide in many places.

The Tallahatchie River and its tributaries, flowing in a general westerly direction, drain the western two-thirds of the county. The Hatchie River, flowing north, drains a small area in the northeastern part. Small tributaries flowing to the Tombigbee River drain the eastern part of the county.

Farming

The early white settlers of Union County practiced a subsistence-type farming; cotton was the main cash crop. As time passed, the economy became more dependent on cotton. Clean-tillage practices used in growing cotton left the fields bare most of the year. This resulted in severe erosion; much land that was once productive had to be abandoned.

Cotton is still a major cash crop, but farming in the county has become more diversified. Soybeans and livestock are now important. The major streams have been channeled, so cultivation of clean-tilled crops has been shifted from the uplands to the flood plains. Much of the uplands is now used for pasture.

Figures released by the Mississippi Cooperative Extension Service indicated that 11,800 acres of cotton, 39,400 acres of soybeans, and 4,000 acres of corn were planted in Union County in 1974. There were 9,900 head of beef cattle, 3,300 head of dairy cattle, and 5,400 head of hogs and pigs.

How this survey was made

Soil scientists made this survey to learn what kinds of soil are in the survey area, where they are, and how they can be used. The soil scientists went into the area knowing they likely would locate many soils they already knew something about and perhaps identify some they had never seen before. 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; the kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material, which has been changed very little by leaching or by the action of plant roots (*10*).

The soil scientists recorded the characteristics of the profiles they studied, and they compared those profiles with others in counties nearby and in places more distant. Thus, through correlation, they classified and named the soils according to nationwide, uniform procedures.

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

The areas shown on a soil map are called soil map units. Some map units are made up of one kind of soil, others are made up of two or more kinds of soil, and a few have little or no soil material at all. Map units are discussed in the sections "General soil map for broad land use planning" and "Soil maps for detailed planning."

While a soil survey is in progress, samples of soils are taken as needed for laboratory measurements and for engineering tests. The soils are field tested, and interpretations of their behavior are modified as necessary during the course of the survey. New interpretations are added to meet local needs, mainly through field observations of different kinds of soil in different uses under different levels of management. Also, data are assembled from other sources, such as test results, records, field experience, and information available from state and local specialists. For example, data on crop yields under defined practices 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 is readily available to different groups of users, among them farmers, managers of rangeland and woodland, engineers, planners, developers and builders, homebuyers, and those seeking recreation.

General soil map for broad land use planning

The general soil map at the back of this publication shows, in color, map units that have a distinct pattern of soils and of relief and drainage. Each map unit 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 provides a broad perspective of the soils and landscapes in the survey area. It provides a basis for comparing the potential of large areas for general kinds of land use. Areas that are, for the most part, suited to certain kinds of farming or to other land uses can be identified on the map. Likewise, areas of soils having properties that are distinctly unfavorable for certain land uses can be located.

Because of its small scale, the map does not show the kind of soil at a specific site. Thus, it 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 kinds of soil in any one map unit differ from place to place in slope, depth, stoniness, drainage, or other characteristics that affect their management.

The soils in the survey area vary widely in their potential for major land uses. Table 4 shows the extent of the map units shown on the general soil map and gives general ratings of the potential of each, in relation to the other map units, for major land uses. Soil properties that pose limitations to the use are indicated. The ratings of soil potential are based on the assumption that practices in common use in the survey area are being used to overcome soil limitations. These ratings reflect the ease of overcoming the soil limitations and the probability of soil problems persisting after such practices are used.

Each map unit is rated for *cultivated crops, pasture and hay, woodland, urban uses, intensive recreation,* and *extensive recreation.* Cultivated farm crops are those grown extensively by farmers in the survey area. Pasture and hay refers to land that produces forage for grazing and hay. Woodland refers to land that is producing either trees native to the area or introduced species. Urban uses include residential, commercial, and industrial developments. Intensive recreation areas include campsites, picnic areas, ballfields, and other areas that are subject to heavy foot traffic. Extensive recreation areas include those used for nature study and as wilderness.

1. Arkabutla-Mantachie-Jena association

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

This association is on flood plains along the Tallahatchie River, Mud Creek, Hell Creek, Locks Creek, and their tributaries. The flood plains are relatively wide; in places along the Tallahatchie River they are more than a mile wide. They are subject to occasional overflow, mainly in winter or early spring. Most of the streams have been channeled. Slopes are dominantly less than 1 percent.

This association makes up about 15 percent of Union County. It is about 47 percent Arkabutla soils, 27 percent Mantachie soils, and 17 percent Jena soils. The remaining 9 percent is largely Cascilla and Urbo soils.

The silty Arkabutla soils are on wide flats at lower elevations of the flood plains. They are somewhat poorly drained. The loamy Mantachie soils are mostly near old stream channels but in places are at lower elevations on broad flats along the larger streams. They are somewhat poorly drained. The loamy Jena soils are at higher elevations along old stream runs. They are well drained.

This association is used almost entirely for row crops, but a small acreage is in pasture and woodland. The soils of this association have high potential for most locally grown row crops, grasses, and legumes. Surface drainage in the form of row arrangement and field ditches is needed to remove excess surface water. Occasional flooding causes slight to moderate damage.

This association has very high potential for woodland. Wetness causes severe equipment limitations, but these can be overcome by harvesting during the drier seasons. This association has low potential for most urban uses because of the possibility of overflow. It has high potential for openland and woodland wildlife habitat but only medium potential for wetland wildlife habitat. Potential for recreational use is low; however, recreational activities during drier seasons or those that require facilities less subject to damage by wetness or flooding are feasible.

2. Jena-Mantachie association

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

This association is on flood plains on the upper part of the Tallahatchie River, Okonatie Creek, King Creek, Jasper Creek, and their tributaries. The flood plains are relatively wide. They are subject to occasional overflow, mainly in winter or early spring. Most of the streams have been channeled. Slopes are dominantly less than 1 percent.

This association makes up about 5 percent of Union County. It is about 60 percent Jena soils and 30 percent Mantachie soils. The remaining 10 percent is Arkabutla and Cascilla soils.

Jena soils are at higher elevations near old stream channels. They are well drained. Mantachie soils are at lower elevations near old stream channels. They are somewhat poorly drained.

This association is used almost entirely for row crops, but a small acreage is in pasture and woodland. The soils of this association have high potential for most locally grown row crops, grasses, and legumes. Surface drainage in the form of row arrangement and field ditches is needed to remove excess surface water. Occasional flooding causes slight to moderate damage.

This association has very high potential for woodland. Wetness causes an equipment limitation, but this can be overcome by harvesting during the drier seasons. The association has low potential for most urban uses because of the possibility of flooding. It has high potential for openland and woodland wildlife habitat but low potential for wetland wildlife habitat. Potential for most recreational uses is low. Recreational activities during drier seasons or those that require facilities less subject to damage from overflow are feasible.

3. Mantachie-Marietta-Jena association

Nearly level, somewhat poorly drained and well drained, acid, loamy soils and moderately well drained, nonacid, loamy soils; on flood plains

This association is on flood plains in the eastern part of the county. The flood plains are relatively wide. They are subject to occasional overflow, mainly in winter or early spring. Most of the streams have been channeled. Slopes are dominantly less than 1 percent.

This association makes up about 4 percent of the county. It is about 65 percent Mantachie soils, 20 percent Marietta soils, and 15 percent Jena soils.

Mantachie soils are at lower elevations near stream channels. They are somewhat poorly drained. Marietta soils are on broad flats on the larger flood plains. They are moderately well drained. Jena soils are at the higher elevations along old stream channels. They are well drained.

This association is used almost entirely for row crops (fig. 1) and pasture. A small part is in woodland. The soils of this association have high potential for most locally grown row crops, grasses, and legumes. Surface drainage in the form of row arrangement and field ditches is needed to remove excess surface water. Occasional flooding causes slight to moderate damage.

This association has very high potential for woodland. Wetness causes an equipment limitation, but this can be overcome by harvesting during the drier seasons. The association has low potential for most urban uses because of the possibility of flooding. It has high potential for openland and woodland wildlife habitat but low potential for wetland wildlife habitat. Potential for most recreational uses is low; however, activities during drier seasons or those that require facilities less subject to damage from overflow are feasible.

4. Providence-Smithdale-Sweatman association

Undulating, moderately well drained, silty soils that have a fragipan; hilly, well drained, loamy soils; and rolling, well drained soils that have a clayey subsoil; on uplands

This association is in the western and north-central parts of the county. The landscape is rugged; it consists of narrow ridgetops, usually less than a quarter of a mile wide, and steep side slopes commonly dissected by short drainageways. Narrow flood plains extend far back into the association.

This association makes up about 25 percent of the county. It is about 35 percent Providence soils, 30 percent Smithdale soils, and 7 percent Sweatman soils. The remaining 28 percent is Bude, Pooleville, Talla, and Tippah soils and various moderately well drained and somewhat poorly drained soils on the flood plains.

Providence soils are largely on ridgetops. They are moderately well drained and silty and have a fragipan. Smithdale soils are on the steeper side slopes in hilly terrain. They are well drained and loamy. Sweatman soils are on some of the ridgetops and on the upper parts of side slopes. They are well drained and have a clayey subsoil underlain by stratified material.

Most of this association is in woodland, but where slopes are favorable a large acreage is in crops and pasture. This part has medium potential for most locally grown row crops and high potential for grasses and legumes. Steepness of slope and the erosion hazard are the main limitations.

This association has moderately high potential for woodland. Most of the soils in it have no significant limitations for woodland use or management, but the Sweatman soils have moderate equipment limitations. Parts of the association have high or medium potential for urban uses, but because of slopes or other undesirable soil characteristics, most of it has low potential. This association has high potential for both openland and woodland wildlife habitat but low potential for wetland wildlife habitat. Most of the association has low potential for recreational development mainly because of slope; some parts, however, have medium or high potential.

5. Tippah-Falkner-Wilcox association

Undulating, moderately well drained and somewhat poorly drained, silty soils in which the lower part of the subsoil is clayey and somewhat poorly drained soils that have a clayey subsoil; on uplands

This association is in the west-central part of the county. The topography is generally undulating, but in many places it is broad upland flats that have short, strongly sloping sides. Flood plains are narrow.

This association makes up about 13 percent of the county. It is about 30 percent Tippah soils, 20 percent Falkner soils, and 10 percent Wilcox soils. The remainder is Bude, Pooleville, Providence, and Talla soils on the uplands and Arkabutla and Cascilla soils on the flood plains.

Tippah soils are on ridgetops and side slopes. They are moderately well drained and silty, and the lower part of the subsoil is clayey. Falkner soils are on broad upland flats. They are somewhat poorly drained and silty, and they overlie clay. Wilcox soils are on ridgetops and gentle side slopes. They are somewhat poorly drained and have a clayey subsoil.

Most of this association is used for pasture or crops, but a considerable part is in woodland. The association has medium potential for most locally grown row crops and high potential for grasses and legumes.

This association has moderately high potential for woodland. Falkner and Wilcox soils have moderate equipment limitations. This association has low potential for most urban uses. The principal limitations are high shrink-swell potential, wetness, and low bearing strength. This association has high potential for both openland and woodland wildlife habitat but low potential for wetland wildlife habitat. This association has medium potential for most recreational uses. Wetness and clayey soils are the main limitations.

6. Atwood-Smithdale association

Undulating, well drained, silty soils and hilly, well drained, loamy soils; on uplands

This association is in the central part of the county. The topography is undulating to hilly; it consists of relatively wide ridgetops and steep side slopes commonly dissected by short drainageways. Narrow flood plains extend far back into the association.

This association makes up about 13 percent of the county. It is about 45 percent Atwood soils and 40 percent Smithdale soils. The remaining 15 percent is largely Providence soils on the uplands and Jena and Cascilla soils on the flood plains.

Atwood soils are on the ridgetops and upper parts of side slopes. They are well drained and silty. Smithdale soils are on side slopes. They are well drained and loamy.

Most of this association, part of which is called the Pontotoc Ridge, is used for crops and pasture, but a large part, mostly on steep side slopes, is in woodland. The soils on broad ridgetops have high potential for most locally grown row crops, grasses, and legumes. A small acreage is in truck crops, nursery stock, and orchards.

The association has moderately high potential for woodland. No significant limitations affect woodland use or management. This association generally has high potential for most urban uses. Certain areas, however, because of slope, have low potential. The association has high potential for both openland and woodland wildlife habitat but low potential for wetland wildlife habitat. Most of the association has high potential for recreational uses.

7. Smithdale-Sweatman association

Hilly, well drained soils that have a loamy and clayey subsoil; on uplands

This association is in the east-central part of the county. The topography is hilly; it consists of narrow ridgetops and steep side slopes dissected by many short drainageways. Flood plains are narrow.

This association makes up about 16 percent of the county. It is about 45 percent Smithdale soils and 20 percent Sweatman soils. The remaining 35 percent is Oktibbeha, Ora, Providence, and Tippah soils on the uplands and Jena and Marietta soils on the flood plains.

Smithdale soils are on the steeper side slopes. They are well drained and loamy. Sweatman soils are on ridgetops and the more gentle side slopes. They are well drained and have a clayey subsoil underlain by stratified material.

This association is almost entirely in mixed hardwood and pine forest. With the exception of a few small areas on the wider ridgetops and flood plains, it has low potential for crops and pasture.

This association has moderately high potential for woodland. It has low potential for most urban uses because of slope and the high shrink-swell potential of some of the soils. It has medium potential for openland wildlife habitat, high potential for woodland wildlife habitat, and very low potential for wetland wildlife habitat. It has low potential for most recreational uses, mainly because of slope.

8. Providence-Oktibbeha-Tippah association

Undulating and rolling, moderately well drained and well drained, silty soils that have a fragipan or in which the lower part of the subsoil is clayey and well drained, clayey soils underlain by calcareous material; on uplands

This association is in the eastern part of the county. The landscape is undulating to rolling; it consists of relatively wide ridgetops and strongly sloping side slopes. In many places along the major streams is a sharp slope break or escarpment that extends down to the flood plains.

This association makes up 9 percent of the county. It is 35 percent Providence soils, 20 percent Oktibbeha soils, and 15 percent Tippah soils. The remaining 30 percent is largely Ora, Smithdale, Sweatman, and Talla soils.

Providence soils are largely on ridgetops and side slopes. They are silty, are moderately well drained, and have a fragipan. Oktibbeha soils are on ridgetops and side slopes. They are clayey, are well drained, and are underlain by calcareous material. Tippah soils are largely on side slopes. They are silty, are moderately well drained, and are underlain by clayey material.

This association is dominantly in pasture, but a considerable acreage is in scrub hardwoods and cedar. Cropland is largely confined to the narrow flood plains. This association has medium potential for row crops and high potential for grasses and legumes.

The association has moderately high potential for woodland, but some soils have equipment limitations. The potential for urban use generally is low; some areas, however, have medium or high potential. This association has high potential for both openland and woodland wildlife habitat but low potential for wetland wildlife habitat. The association generally has medium potential for most recreational uses. Certain parts, however, have low potential.

Broad land use considerations

The soils in the county vary widely in their potential for major land uses, as indicated in table 4. For each land use, general ratings of the potential of each soil area in relation to the other soil areas are indicated. Kinds of soil limitations are also indicated in general terms. The ratings of soil potential reflect the relative cost of such practices and the hazard of soil-related problems after such practices are installed.

Approximately 31 percent of the land in the county is used for cultivated crops, dominantly soybeans, cotton, and corn. This cropland is scattered throughout the county, but it is concentrated largely in soil associations 1, 2, 3, and 6, which have high potential for crops. Soil associations 1, 2, and 3 are flooded occasionally, largely in winter and early spring, causing slight to moderate crop damage. Wetness is the major limitation in growing crops. The main soils in associations 1, 2, and 3 are Arkabutla, Jena, Mantachie, and Marietta soils. Soil association 6 is on uplands; the erosion hazard is the chief limitation in growing crops. Atwood soils are the main soils used for cultivated crops in association 6.

Approximately 13 percent of the land in the county is in pasture. Soil associations 1, 2, 3, 4, 5, 6, and 8 have high potential for grasses and legumes. The major soils of these associations are Arkabutla, Jena, Mantachie, and Marietta soils on flood plains and Atwood, Falkner, Oktibbeha, Providence, Smithdale, Sweatman, Tippah, and Wilcox soils on uplands.

Approximately 48 percent of the land in the county is used as woodland. Soil associations 1, 2, and 3 have very high potential for trees, and soil associations 4, 5, 6, 7, and 8 have moderately high potential. Some of the soils have moderate or severe equipment limitations that can be overcome by harvesting during the drier seasons or by using special equipment.

Approximately 10,400 acres in the county is classified as urban or built-up areas. In general, areas of gently sloping to strongly sloping Atwood and Providence soils have the highest potential for urban uses. These soils are mainly in soil associations 4, 6, and 8. Low strength, wetness, moderate shrink-swell potential, and steep slopes are the principal limitations that might be encountered. Providence soils are slowly permeable; this is a limitation for septic tank absorption fields. Most of these limitations can be overcome by proper design and careful installation procedures. Soils on flood plains—those in associations 1, 2, and 3—have low potential for urban development because of flooding. Hilly areas of Smithdale soils have low potential because of steep slopes and the presence of clayey soils such as Falkner, Oktibbeha, Sweatman, and Tippah soils, which have high shrink-swell potential. Sites that are suitable for houses or small commercial buildings, however, can often be selected from within these areas.

Potential for recreation ranges from low to high, depending on the intensity of expected use. Soil association 6 has high potential for intensive recreational development. Associations 1, 2, and 3, have low potential because of flooding. Associations 4 and 7 are hilly and steep, so slopes limit their potential for intensive recreational development. All of these associations, however, are suitable for extensive recreational uses such as hiking or horseback riding. Small areas suitable for intensive development can often be selected from within associations that have low potential. Potentials for wildlife are discussed in the section, "Use and management of the soils."

Soil maps for detailed planning

The map units shown on the detailed soil maps at the back of this publication represent the kinds of soil in the survey area. They are described in this section. The descriptions together with the soil maps can be useful in determining the potential of a soil and in managing it for food and fiber production; in planning land use and developing soil resources; and in enhancing, protecting, and preserving the environment. More information for each map unit, or soil, is given in the section "Use and management of the soils."

Preceding the name of each map unit is the symbol that identifies the soil on the detailed soil maps. Each soil description includes general facts about the soil and a brief description of the soil profile. In each description, the principal hazards and limitations are indicated, and the management concerns and practices needed are discussed.

The map units on the detailed soil maps represent an area on the landscape made up mostly of the soil or soils for which the unit is named. Most of the delineations shown on the detailed soil map are phases of soil series.

Soils that have a similar profile make up a *soil series*. Except for allowable differences in texture of the surface layer or of the underlying substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement in the profile. A soil series commonly is named for a town or geographic feature near the place where a soil of that series was first observed and mapped.

Soils of one series can differ in texture of the surface layer or in the underlying substratum and in slope, erosion, stoniness, salinity, wetness, or other characteristics that affect their use. On the basis of such differences, a soil series is divided into phases. The name of a *soil phase* commonly indicates a feature that affects use or management. For example, Providence silt loam, 2 to 5 percent slopes, eroded, is one of several phases within the Providence series.

Some map units are made up of two or more dominant kinds of soil. Such map units are called soil complexes and soil associations.

A *soil complex* consists of areas of two or more soils that are so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area includes some of each of the two or more dominant soils, and the pattern and proportion are somewhat similar in all areas. Sweatman-Providence-Smithdale complex, 12 to 17 percent slopes, is an example.

A *soil association* is made up of soils that are geographically associated and are shown as one unit on the map because it is not practical to separate them. A soil association has considerable regularity in geographic pattern and in the kinds of soil that are a part of it. The extent of the soils can differ appreciably from one delineation to another; nevertheless, interpretations can be made for use and management of the soils. Smithdale-Sweatman association, hilly, is an example.

Most map units include small, scattered areas of soils other than those that appear in the name of the map unit. Some of these soils have properties that differ substantially from those of the dominant soil or soils and thus could significantly affect use and management of the map unit. These soils are described in the description of each map unit. Some of the more unusual or strongly contrasting soils that are included are identified by a special symbol on the soil map.

The acreage and proportionate extent of each map unit are given in table 5, and additional information on properties, limitations, capabilities, and potentials for many soil uses is given for each kind of soil in other tables in this survey. (See "Summary of tables.") Many of the terms used in describing soils are defined in the Glossary.

Ar—Arkabutla silt loam. This somewhat poorly drained soil is on broad flood plains. Slopes are 0 to 2 percent.

Typically, the surface layer is brown silt loam about 7 inches thick. The upper part of the subsoil is mottled brown, gray, and yellowish brown silt loam about 8 inches thick. Below this to a depth of about 55 inches the subsoil is gray silt loam mottled in shades of brown and yellow.

Included with this soil in mapping were small areas of Cascilla, Mantachie, and Urbo soils.

This soil is strongly acid or very strongly acid throughout, except for the surface layer in limed areas. Permeability is moderate. Available water capacity is very high. Runoff is slow. The soil can be tilled only within a narrow range of moisture content without crusting and packing. Occasional flooding causes slight to moderate crop damage.

Most of this soil is used for crops or pasture. A small acreage is in woodland.

This soil has high potential for most locally grown crops and pasture plants. Proper row arrangement and field ditches are needed to remove excess surface water. Return of crop residues helps to maintain organic matter content and improve soil tilth.

The soil has very high potential for green ash, eastern cottonwood, cherrybark oak, loblolly pine, sweetgum, yellow-poplar, and American sycamore. There are moderate equipment limitations in managing and harvesting trees, but these can be overcome by use of special equipment and by harvesting during the drier seasons.

This soil has low potential for urban use because of wetness and flood hazard. Capability unit IIw-1.

AtB2—Atwood silt loam, 2 to 5 percent slopes, eroded. This well drained soil is on ridgetops.

Typically, the surface layer is brown silt loam 5 inches thick. The upper part of the subsoil is reddish brown silty clay loam about 40 inches thick; the lower part is reddish brown clay loam. A layer of reddish brown sandy clay loam is between depths of 70 and 87 inches.

In many fields, the surface layer has been thinned by erosion and the subsoil has been mixed into the plow layer. A few rills and shallow gullies are often present after heavy rain. These are usually destroyed by tillage.

Included with this soil in mapping were a few small areas of Providence soils. Also included were a few areas of severely eroded soils.

This soil is medium acid to strongly acid. Permeability is moderate. Available water capacity is very high. Runoff is medium. The erosion hazard is moderate.

Most of this soil is in cultivated crops or pasture. A small acreage is in woodland.

The soil has high potential for most locally grown row crops, grasses, and legumes. Seedbed preparation and tillage are sometimes problems because the silty soil crusts and packs. Return of crop residues to the soil helps to maintain organic matter content and improve soil tilth. Other conservation practices such as crop rotation, contour farming, terraces, minimum tillage, and vegetated outlets help to control erosion.

This soil has high potential for cherrybark oak, Shumard oak, sweetgum, yellow-poplar, and loblolly pine. There are no significant limitations in woodland use or management.

This soil has high potential for urban uses. Low bearing strength and moderate shrink-swell potential are the main limitations. Good design and careful installation can compensate for these limitations. The silty subsoil is slowly permeable, causing a moderate limitation for septic tank filter fields. Where septic tanks are necessary, the absorption area should be enlarged or the filter field modified to fit the situation. Capability unit IIe-1.

AtC2—Atwood silt loam, 5 to 8 percent slopes, eroded. This well drained soil is on ridgetops and on the upper parts of side slopes.

Typically, the surface layer is brown silt loam about 5 inches thick. The upper part of the subsoil is reddish brown silty clay loam about 40 inches thick; the lower part is reddish brown clay loam. A layer of reddish brown sandy clay loam is between depths of 70 and 87 inches.

In most fields, the surface layer has been thinned by erosion and the subsoil has been mixed into the plow layer. A few rills and shallow gullies are often present after heavy rainfall. These are usually destroyed by tillage.

Included with this soil in mapping were a few small areas of Providence and Smithdale soils. Also included were a few areas of severely eroded soils.

This soil is medium acid to strongly acid. Permeability is moderate. Available water capacity is very high. Runoff is rapid. The erosion hazard is severe. The soil can be tilled only within a medium range of moisture conditions without crusting or packing.

Most of this soil is in cultivated crops or pasture. A considerable acreage is woodland.

The soil has medium potential for most locally grown row crops, grasses, and legumes. Seedbed preparation and tillage are sometimes problems because the silty soil crusts and packs. Return of crop residues to the soil helps to maintain organic matter content and improve soil tilth. Other conservation practices such as crop rotation, contour farming, terraces, minimum tillage, and vegetated outlets help to control erosion.

This soil has high potential for cherrybark oak, Shumard oak, sweetgum, yellow-poplar, and loblolly pine. There are no significant limitations in woodland use or management.

This soil has high potential for urban uses. Low bearing strength and moderate shrink-swell potential are limitations. Good design and careful installation can compensate for these limitations. The silty subsoil is slowly permeable, causing a moderate limitation for septic tank filter fields. Where septic tanks are necessary, the absorption area should be enlarged or the filter field modified to fit the situation. Capability unit IIIe-1.

AtD3—Atwood silt loam, 8 to 12 percent slopes, severely eroded. This well drained soil is largely on side slopes.

Typically, the surface layer is brown silt loam 2 inches thick. The upper part of the subsoil is reddish brown silty clay loam 27 inches thick; the lower part is red loam to a depth of 53 inches, red clay loam to a depth of 63 inches, and red sandy clay loam to a depth of 71 inches. A layer of red sandy loam with strong brown mottles is between depths of 71 and 82 inches.

In most fields, the original surface layer has been removed by erosion and the plow layer consists largely of material from the upper part of the subsoil. The soil generally has a few deep gullies and numerous rills and small gullies.

Included with this soil in mapping were a few small areas of Providence and Smithdale soils.

The soil is medium acid to strongly acid. Permeability is moderate. Available water capacity is very high. Runoff is very rapid. The erosion hazard is severe.

Most of this soil is used for pasture or woodland. A small acreage is in row crops.

This soil has low potential for row crops because of the steep slopes and severe erosion hazard. For best protection from erosion, it should be covered by trees, grasses, or legumes. It has medium potential for grasses and legumes. Good management includes proper stocking, controlled grazing, and weed control. To facilitate mowing and other cultural practices, it is sometimes desirable to smooth and shape gullies.

This soil has high potential for cherrybark oak, Shumard oak, sweetgum, yellow-poplar, and loblolly pine. There are no significant limitations for woodland use or management.

This soil has medium potential for most urban uses. Low bearing strength and moderate shrink-swell potential are limitations. Good design and careful installation can compensate for these limitations. Slope is also a limitation for many uses. Capability unit VIe-1.

Bu—Bude silt loam. This somewhat poorly drained soil is on broad upland flats and stream terraces. Slopes are 0 to 2 percent.

Typically, the surface layer is dark brown silt loam 6 inches thick. The subsoil is yellowish brown silt loam with grayish mottles to a depth of 18 inches. This layer is mottled in shades of gray and brown below a depth of 18 inches. A compact, brittle silt loam or silty clay loam layer mottled in shades of brown, gray, and yellow is below a depth of 28 inches. This layer is clay loam from a depth of 40 inches to below a depth of 60 inches.

Included with this soil in mapping were small areas of Pooleville and Talla soils.

This soil is very strongly acid to medium acid. Permeability is moderate above the fragipan and slow in the fragipan. Available water capacity is high. Runoff is slow. The erosion hazard is slight. A seasonal high water table is above the fragipan during winter and early spring. The soil can be tilled over a wide range of moisture content.

Most of this soil is used for crops. A considerable acreage is in pasture, and the remainder is in woodland.

This soil has high potential for most locally grown row crops (fig. 2), grasses, and legumes. Seedbed preparation and cultivation are often delayed because of wetness caused by slow runoff and the perched water table. Return of crop residues helps to maintain organic matter content and improve soil tilth. Proper row arrangement and field ditches are needed to remove excess surface water.

This soil has high potential for cherrybark oak, Shumard oak, sweetgum, yellow-poplar, and loblolly pine. There are moderate equipment limitations because of wetness. These can be overcome by using special equipment and harvesting during the drier season.

The soil has medium potential for urban uses, mainly because of wetness and low bearing strength. These can be overcome by drainage, suitable design, and careful construction. Capability unit IIw-2.

Ca—Cascilla silt loam. This well drained soil is on flood plains. Slopes are 0 to 2 percent.

Typically, the surface layer is dark brown silt loam 6 inches thick. The upper part of the subsoil is yellowish brown silt loam to a depth of 15 inches, dark yellowish brown silt loam to a depth of 29 inches, and dark brown silt loam to a depth of 46 inches. The lower part is mottled light brownish gray and brown silt loam between depths of 46 and 72 inches.

Included with this soil in mapping were small areas of Arkabutla, Jena, and Urbo soils.

The soil is strongly acid and very strongly acid. Permeability is moderate. Available water capacity is very high. Runoff is slow, and the erosion hazard is slight. The soil can be tilled within a relatively wide range of moisture content. Occasional flooding causes slight to moderate damage to crops.

Almost all of this soil is used for crops. A very small acreage is in pasture and woodland.

This soil has high potential for most locally grown row crops, grasses, and legumes. Suitable conservation practices include return of crop residues to help to maintain organic matter content and improve soil tilth and proper row arrangement and field outlets to remove excess surface water.

This soil has very high potential for cherrybark oak, Nuttall oak, eastern cottonwood, sweetgum, American sycamore, yellow-poplar, and loblolly pine. There are no significant limitations affecting woodland use or management.

This soil has low potential for urban use because of the possibility of flooding. Capability unit IIw-3.

FaA—Falkner silt loam, 0 to 2 percent slopes. This somewhat poorly drained soil is on broad upland flats.

Typically, the surface layer is brown silt loam about 6 inches thick. The upper part of the subsoil is light yellowish brown silt loam with gray and strong brown mottles and extends to a depth of about 21 inches. The lower part is gray silty clay mottled in shades of brown, yellow, and red; it is silty clay loam below a depth of 36 inches.

Included with this soil in mapping were small areas of Pooleville, Tippah, and Wilcox soils.

This soil is strongly acid to very strongly acid. Permeability is slow. Available water capacity is high. Runoff is slow. The erosion hazard is slight. A seasonal high water table is above the clayey layer during winter and early spring. The soil can be tilled only within a narrow range of moisture content without crusting and packing.

Most of this soil is used for crops or pasture. The remainder ls largely woodland.

This soil has medium potential for row crops, grasses, and legumes. Seedbed preparation and tillage are often delayed because of wetness caused by slow runoff and a seasonal high water table. Return of crop residues helps to maintain organic matter content and improve soil tilth. Proper row arrangement and field ditches are needed to remove excess surface water.

The soil has high potential for cherrybark oak, sweetgum, and loblolly and shortleaf pine. There are moderate equipment restrictions because of wetness. These can be overcome by use of special equipment and by harvesting during drier seasons.

This soil has low potential for most urban uses. The major limitations are high shrink-swell potential, low bearing strength, and wetness. These can be partially overcome by suitable design and careful construction. Capability unit IIw-2.

FaB—Falkner silt loam, 2 to 5 percent slopes. This somewhat poorly drained soil is on uplands.

Typically, the surface layer is brown silt loam about 6 inches thick. The upper part of the subsoil is light yellowish brown silt loam with gray and strong brown mottles and extends to a depth of about 21 inches. The lower part is gray silty clay mottled in shades of brown, yellow, and red; it is silty clay loam below a depth of 36 inches.

Included with this soil in mapping were small areas of Pooleville, Tippah, and Wilcox soils. Also included were a few small areas of moderately eroded soils.

This soil is strongly acid through very strongly acid. Permeability is slow. Available water capacity is high. Runoff is medium. The erosion hazard is moderate. A seasonal high water table is above the clayey layer during winter and early spring. The soil can be tilled only within a narrow range of moisture content without crusting and packing.

Most of this soil is used for row crops and pasture. The remainder is largely woodland.

This soil has medium potential for row crops, grasses, and legumes. Seedbed preparation and tillage are often delayed because of wetness. The return of crop residues helps to maintain organic matter content and improve soil tilth. Contour farming, terraces, minimum tillage, and vegetated outlets help to control erosion.

The soil has high potential for cherrybark oak, sweetgum, and loblolly and shortleaf pine. There are moderate equipment limitations because of wetness. This can be overcome by use of special equipment and by harvesting during drier seasons.

The soil has low potential for most urban uses. Major limitations are high shrink-swell potential and low bearing strength. Suitable design and careful construction can help to compensate for these limitations. Capability unit IIIe-2.

Je—Jena silt loam. This well drained soil is on flood plains. Slopes are 0 to 2 percent.

Typically, the surface layer is brown silt loam to a depth of 13 inches and yellowish brown silt loam below. A layer of yellowish brown fine sandy loam is between depths of 21 and 33 inches. It is underlain by a layer of yellowish brown sandy loam that extends to below a depth of 60 inches.

Included with this soil in mapping were small areas of Cascilla, Mantachie, and Marietta soils.

This soil is strongly acid or very strongly acid. Permeability is moderate. Available water capacity is medium. Runoff is slow. The soil can be tilled over a wide range of moisture content. Occasional flooding causes slight to moderate crop damage.

Most of this soil has been cleared and is used for crops. A small acreage is in pasture.

This soil has high potential for most locally grown row crops, grasses, and legumes. Return of crop residues helps to maintain organic matter content and improve soil tilth. Proper row arrangement and field ditches are needed to remove excess surface water.

This soil has high potential for eastern cottonwood, American sycamore, sweetgum, and loblolly pine. There are no significant limitations for woodland use or management.

This soil has low potential for urban uses because of the flood hazard. Capability unit IIw-4.

Ma—Mantachie silt loam. This somewhat poorly drained soil is on flood plains. Slopes are 0 to 2 percent.

Typically, the surface layer is dark brown silt loam 5 inches thick. The subsurface layer is silt loam mottled in shades of brown and gray. The subsoil is loam mottled in shades of gray and brown and is between depths of 10 and 17 inches. A layer of gray loam with medium to large brownish mottles extends to below a depth of 60 inches.

Included with this soil in mapping were small areas of Arkabutla, Jena, and Marietta soils.

This soil is strongly acid or very strongly acid. Permeability is moderate. Available water capacity is high. Runoff is slow, and water tends to pond in low areas. The soil can be tilled over a wide range of moisture content. Occasional flooding causes slight to moderate crop damage.

Most of this soil has been cleared and is largely used for crops. A small part is in pasture.

This soil has high potential for most locally grown row crops, grasses (fig. 3), and legumes. Return of crop residues helps to maintain organic matter content and improve soil tilth. Proper row arrangement and field ditches are needed to remove excess surface water.

This soil has high potential for cherrybark oak, sweetgum, yellow-poplar, green ash, eastern cottonwood, and loblolly pine. There are severe equipment limitations because of wetness. These limitations can be overcome by using special equipment and by harvesting during drier seasons.

This soil has low potential for most urban uses because of wetness and a flood hazard. Capability unit IIw-1.

Mr—Marietta loam. This moderately well drained soil is on broad flood plains. Slopes are 0 to 2 percent.

Typically, the surface layer is brown loam about 6 inches thick. The subsoil is brown loam, 22 inches thick, that is mottled in shades of gray and brown in the lower part. A layer of grayish brown loam is between depths of 28 and 54 inches. A layer of light brownish gray loam extends to below a depth of 70 inches.

Included with this soil in mapping are small areas of Jena and Mantachie soils.

This soil is medium acid to slightly acid. Permeability is moderate. Available water capacity is high. Runoff is slow, and water tends to pond on low areas. The soil can be tilled only within a narrow range of moisture content without crusting or packing. Occasional flooding causes slight to moderate crop damage.

This soil has been cleared and is used for crops or pasture.

This soil has high potential for most locally grown row crops, grasses, and legumes. Return of crop residues helps to maintain organic matter content and improve the soil tilth. Proper row arrangement and field ditches are needed to remove excess surface water.

This soil has high potential for eastern cottonwood, sweetgum, yellow-poplar, green ash, and American sycamore. The soil has moderate equipment limitations because of wetness. These limitations can be overcome by using special equipment and by harvesting during drier seasons.

The soil has low potential for most urban uses because of wetness and the flood hazard. Capability unit IIw-5.

OkB2—Oktibbeha silt loam, 2 to 5 percent slopes, eroded. This well drained soil is on ridgetops.

Typically, the surface layer is brownish silt loam about 6 inches thick. The upper part of the subsoil is yellowish red clay that is mottled in shades of red, brown, and yellow below a depth of 17 inches. The lower part, below a depth of 25 inches, is clay mottled in shades of brown, yellow, and gray. Below a depth of 37 inches is a grayish clay substratum that contains chalk fragments, which increase in size and number with depth.

In many fields, the surface layer has been thinned by erosion and the subsoil has been mixed into the plow layer. A few rills are often present after heavy rain. These are usually destroyed by tillage.

Included with this soil in mapping were small areas of Ora, Smithdale, and Sweatman soils.

This soil is strongly acid or very strongly acid in the upper part of the profile and neutral to moderately alkaline in the lower part. Permeability is very slow. Available water capacity is medium. Runoff is medium, and the erosion hazard is moderate. The soil can be tilled only within a narrow range of moisture content without crusting and packing.

Most of this soil is used for pasture. A small acreage is in crops, and the remainder is in woodland.

This soil has medium potential for most locally grown row crops, mainly because of its clay texture. It has high potential for grasses and legumes. Return of crop residues helps to maintain organic matter content. Contour farming, terraces, minimum tillage, crop rotations, and vegetated outlets help to control erosion.

This soil has moderately high potential for southern red oak, loblolly pine, and eastern redcedar. There are moderate seedling mortality and equipment limitations because of soil texture. These can be partially overcome by harvesting when moisture conditions are favorable and by using special equipment.

This soil has low potential for most urban uses mainly because of the high shrink-swell potential. Proper design and careful installation procedures help to offset this limitation. Capability unit IIIe-3.

OkC2—Oktibbeha silt loam, 5 to 8 percent slopes, eroded. This well drained soil is on ridgetops and side slopes.

Typically, the surface layer is brownish silt loam about 6 inches thick. The upper part of the subsoil is yellowish red clay that is mottled in shades of red, brown, and yellow below a depth of 11 inches. The lower part, below a depth of 25 inches, is clay mottled in shades of brown, yellow, and gray. Below a depth of 37 inches is a grayish clay substratum that contains chalk fragments, which increase in size and number with depth.

In many places the surface layer has been thinned by sheet erosion and the subsoil has been mixed into the plow layer. A few rills and shallow gullies are often present after heavy rain. These are usually destroyed by tillage.

Included with this soil in mapping were small areas of Ora, Smithdale, and Sweatman soils. Also included were a few small areas of severely eroded soils.

This soil is strongly acid or very strongly acid in the upper part of the profile and neutral to moderately alkaline in the lower part. Permeability is very slow. Available water capacity is medium. Runoff is rapid, and the erosion hazard is severe. The soil can be tilled only within a narrow range of moisture content without crusting and packing.

Most of this soil is in pasture. A small acreage is in crops, and the remainder is in woodland.

This soil has low potential for row crops mainly because of surface texture and a severe erosion hazard. It has high potential for grasses and legumes. Return of crop residues helps to maintain organic matter content. Contour farming, terraces, minimum tillage, crop rotation, and vegetated outlets help to control erosion.

This soil has moderately high potential for southern red oak, loblolly pine, and eastern redcedar. There are moderate seedling mortality and equipment limitations because of soil texture. These can be partially overcome by harvesting when moisture conditions are favorable and by using special equipment.

This soil has low potential for most urban uses because of the high shrink-swell potential. Proper design and careful installation procedures help to offset this limitation. Capability unit IVe-1.

OkD2—Oktibbeha silt loam, 8 to 12 percent slopes, eroded. This well drained soil is on side slopes.

Typically, the surface layer is brownish silt loam about 6 inches thick. The upper part of the subsoil is yellowish red clay that is mottled in shades of red, brown, and yellow below a depth of 11 inches. The lower part, below a depth of 25 inches, is clay mottled in shades of brown, yellow, and gray. Below a depth of 37 inches is a grayish clay substratum that contains chalk fragments, which increase in size and number with depth.

In many places the surface layer has been thinned by sheet erosion and the subsoil has been mixed into the plow layer. A few rills and shallow gullies are often present.

Included with this soil in mapping were small areas of Ora, Smithdale, and Sweatman soils. Also included were a few small areas of severely eroded soils.

This soil is strongly acid or very strongly acid in the upper part of the profile and neutral to moderately alkaline in the lower part. Permeability is very slow. Available water capacity is medium. Runoff is very rapid, and the erosion hazard is severe.

Most of this soil is in pasture and woodland. A small acreage is used for crops.

The soil has low potential for crops. Because of slope and a severe erosion hazard, it should be kept under permanent vegetation. The soil has medium potential for grasses and legumes. When it is used for pasture, management practices include proper stocking, controlled grazing, and weed control.

This soil has moderately high potential for southern red oak, loblolly pine, and eastern redcedar. There are moderate seedling mortality and equipment limitations. These can be partially overcome by harvesting when moisture conditions are favorable or by using special equipment.

The soil has low potential for most urban uses mainly because of the high shrink-swell potential. Proper design and careful construction help to offset this limitation. Capability unit VIe-2.

OmE2—Oktibbeha-Sweatman-Smithdale complex, 12 to 20 percent slopes, eroded. This complex consists of areas of Oktibbeha, Sweatman, and Smithdale soils that are so intermingled that it is impractical to separate them at the scale used for mapping. The soils are moderately steep. Individual areas range in size from about 40 to 200 acres.

Oktibbeha and Sweatman soils are on ridgetops and the more gentle side slopes. Smithdale soils are on the steeper side slopes.

In most areas the surface layer has been thinned by erosion, and a few rills and shallow gullies, and an occasional deep gully are present.

Included with these soils in mapping were a few small areas of Atwood and Tippah soils. Also included were areas of severely eroded soils that have outcrops of clayey, calcareous material.

Oktibbeha soils make up 37 percent of the complex, Sweatman soils make up 25 percent, and Smithdale soils make up 24 percent. All of these soils are well drained.

Typically, the surface layer of Oktibbeha soils is brownish silt loam about 6 inches thick. The upper part of the subsoil is yellowish red clay that is mottled in shades of red, brown, and yellow below a depth of 11 inches. The lower part, below a depth of 25 inches, is clay mottled in shades of brown, yellow, and gray. Below a depth of 37 inches is a grayish clay substratum that contains chalk fragments, which increase in size and number with depth.

Oktibbeha soils are strongly acid or very strongly acid in the upper part and neutral to moderately alkaline in the lower part. Permeability is very slow, and available water capacity is medium. Runoff is very rapid. The erosion hazard is severe.

Typically, the surface layer of Sweatman soils is brownish fine sandy loam about 7 inches thick. The upper part of the subsoil is red clay 25 inches thick. The lower part, between depths of 32 and 45 inches, is mottled pale brown and red clay loam. Stratified layers of reddish yellow and light brownish gray fine sandy loam and sandy clay loam extend to below a depth of 57 inches. A thin layer of partially decayed organic matter is on the surface in many places.

Sweatman soils are strongly acid or very strongly acid. Permeability is moderately slow. Available water capacity is high. Runoff is rapid, and the erosion hazard is severe.

Typically, the surface layer of Smithdale soils is brownish sandy loam 4 inches thick. The upper 4 inches of the subsoil is yellowish red loam, the middle 17 inches sandy clay loam, and the lower part is yellowish red sandy loam that extends from a depth of 25 inches to below a depth of 76 inches.

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

Most of this complex is in woodland. The rest is in pasture.

These soils are not suitable for row crops because of steep slopes and a very severe erosion hazard. They have low potential for grasses and legumes. When the soils are used for pasture, suitable conservation practices include proper stocking, carefully controlled grazing, and weed control.

These soils have moderately high potential for loblolly and shortleaf pine. They have moderate equipment limitations because of the clayey texture. These can be overcome by harvesting during drier seasons and by using special equipment.

These soils have low potential for most urban uses. The major limitations are steep slopes and high shrink-swell potential. With special design and careful installation, many areas within the complex can be used for urban purposes. Capability unit VIIe-1.

OrD3—Ora fine sandy loam, 8 to 12 percent slopes, severely eroded. This moderately well drained soil is on side slopes.

Typically, the surface layer is brown fine sandy loam 2 inches thick. The upper part of the subsoil is yellowish red loam, and the lower part is yellowish red sandy clay loam below a depth of about 14 inches. A compact and brittle, yellowish red sandy clay loam fragipan is between depths of 22 and 52 inches. A brownish sandy loam substratum extends to below a depth of 64 inches.

In most places, the original surface layer has been removed by erosion and the subsoil has been exposed. Rills, shallow gullies, and a few deep gullies are present in most places.

Included with this soil in mapping were small areas of Smithdale, Oktibbeha, and Providence soils. Also included were a few areas of moderately eroded soils.

The soil is strongly acid or very strongly acid. Permeability is moderate in the upper part and moderately slow in the fragipan. Available water capacity is medium. Runoff is rapid, and the erosion hazard is severe.

Most of this soil is used for pasture. A small acreage is crops, and the remainder is in woodland.

The soil is not suitable for row crops, because of the severe erosion hazard. It should be kept under permanent vegetation. It has medium potential for grasses and legumes. Good management includes proper stocking, controlled grazing, and weed control. Shaping and smoothing of gullies is desirable in many places.

This soil has moderately high potential for sweetgum and loblolly and shortleaf pine. There are no significant limitations for woodland use or management.

This soil has medium potential for most urban uses. The main limitations are low bearing strength and slope. These can be overcome by proper design and by careful installation procedures. Use of this soil as a septic tank absorption field is unfeasible because of slow permeability and moderately steep slopes. Capability unit VIe-1.

Po—Pooleville silt loam. This somewhat poorly drained soil is on broad upland flats and stream terraces. Slopes are 0 to 2 percent.

Typically, the surface layer is dark brown silt loam 4 inches thick. The upper part of the subsoil is yellowish brown silt loam that is mottled in shades of gray and yellow to a depth of 26 inches and is mottled in shades of brown and gray to a depth of 42 inches. The lower part of the subsoil, to a depth of 74 inches, is silty clay loam mottled in shades of gray and brown. The brown part of this layer is slightly firm and brittle.

Included with this soil in mapping were a few small areas of Bude, Falkner, and Talla soils.

The soil is strongly acid or very strongly acid. Permeability is moderately slow. Available water capacity is high. Runoff is slow to medium, and the erosion hazard is slight. A seasonal high water table is at a depth of 20 to 30 inches during winter and early spring. The soil can be tilled over a fairly wide range of moisture content.

Most of this soil is used for crops. A small acreage is in pasture, and the remainder is in woodland.

This soil has high potential for most locally grown row crops, grasses, and legumes. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Return of crop residues helps to maintain organic matter content and improve soil tilth.

The soil has high potential for cherrybark oak, Shumard oak, sweetgum, yellow-poplar, and loblolly pine. There are moderate equipment limitations because of wetness. These can be overcome by harvesting in drier seasons and by using special equipment.

This soil has medium potential for most urban uses. Low bearing strength and wetness are the main limitations. These can be overcome by proper design and careful installation procedures. Wetness makes use as a septic tank absorption field unfeasible. Capability unit IIw-6.

PrB2—Providence silt loam, 2 to 5 percent slopes, eroded. This moderately well drained soil is on ridgetops.

Typically, the surface layer is brown silt loam about 4 inches thick. The subsoil is yellowish red silt loam about 14 inches thick. A compact and brittle fragipan extends to below a depth of 62 inches; the upper part is silt loam mottled in shades of red and brown, and the lower part is loam.

In most places, the surface layer has been thinned by sheet erosion and subsoil material has been mixed into the plow layer. A few rills and shallow gullies are often present after heavy rainfall. These are usually erased by tillage.

Included with this soil in mapping were a few small areas of Atwood, Ora, Tippah, and Sweatman soils. Also included were a few small areas of severely eroded soils.

The soil is medium acid to very strongly acid. Permeability is moderate in the upper part but moderately slow in the fragipan. Available water capacity is medium. Runoff is medium, and the erosion hazard is moderate. A perched water table is above the fragipan in winter and early spring. The soil can be tilled only within a moderate range of moisture content without crusting and packing.

Most of this soil is used for crops or pasture. The remainder is in woodland.

This soil has high potential for most locally grown row crops, grasses, and legumes. Return of crop residues helps to maintain organic matter content and improve the soil tilth. Other conservation practices such as crop rotation, contour farming, terraces, minimum tillage, and vegetated outlets help to control erosion.

This soil has moderately high potential for Shumard oak, sweetgum, yellow-poplar, and loblolly pine. There are no significant limitations in woodland use or management.

This soil has high potential for urban uses. Low bearing strength is the main limitation, but proper design and careful installation help to offset this. The seasonal high water table is a severe limitation for use of this soil as a septic tank absorption field. Capability unit IIe-2.

PrC2—Providence silt loam, 5 to 8 percent slopes, eroded. This moderately well drained soil is on ridgetops and side slopes.

Typically, the surface layer is brown silt loam about 4 inches thick. The subsoil is yellowish red silt loam about 14 inches thick. A compact and brittle fragipan extends to below a depth of 62 inches; the upper part is silt loam mottled in shades or red and brown, and the lower part is loam.

In most places, the surface layer has been thinned by sheet erosion and subsoil material has been mixed into the plow layer. A few rills and shallow gullies are present in many places after heavy rainfall. These are usually erased by tillage.

Included with this soil in mapping were a few small areas of Atwood, Ora, Tippah, and Sweatman soils. Also included were a few small areas of severely eroded soils.

The soil is medium acid to very strongly acid. Permeability is moderate in the upper part but moderately slow in the fragipan. Available water capacity is medium. Runoff is medium, and the erosion hazard is moderate. A perched water table is above the fragipan in winter and early spring. The soil can be tilled only within a moderate range of moisture content without crusting and packing.

Most of this soil is used for crops or pasture. The remainder is in woodland.

This soil has medium potential for most locally grown row crops and high potential for grasses and legumes. Return of crop residues helps to maintain organic matter content and improve the soil tilth. Other conservation practices such as crop rotation, contour farming, terraces, minimum tillage, and vegetated outlets help to control erosion.

This soil has moderately high potential for Shumard oak, sweetgum, yellow-poplar, and loblolly pine. There are no significant limitations in woodland use or management.

This soil has high potential for urban uses. Low bearing strength is the main limitation, but proper design and careful installation help to offset this. The seasonal high water table and slope are severe limitations for use as a septic tank absorption field. Capability unit IIIe-4.

PrD3—Providence silt loam, 8 to 12 percent slopes, severely eroded. This moderately well drained soil is on side slopes.

Typically, the surface layer is brown silt loam about 4 inches thick. The subsoil is yellowish red silt loam about 14 inches thick. A compact and brittle fragipan extends to below a depth of 62 inches; the upper part is silt loam mottled in shades of red and brown, and the lower part is loam.

In most fields, the original surface layer has been removed by erosion. Rills, shallow gullies, and a few deep gullies are usually present.

Included with this soil in mapping were a few small areas of Atwood, Ora, Tippah, and Sweatman soils. Also included were a few small areas of moderately eroded soils.

The soil is medium acid to very strongly acid. Permeability is moderate in the upper part but moderately slow in the fragipan. Available water capacity is medium. Runoff is rapid, and the erosion hazard is severe. A perched water table is above the fragipan in winter and early spring.

Most of this soil is used for pasture or woodland. A small part is used for crops.

This soil has low potential for row crops, because of slopes and the severe erosion hazard. For best protection, it should be under permanent vegetation. It has medium potential for grasses and legumes. Good management includes proper stocking, controlled grazing, and weed control. To facilitate mowing and other cultural practices, it is sometimes desirable to smooth and shape gullies.

This soil has moderately high potential for Shumard oak, sweetgum, yellow-poplar, and loblolly pine. There are no significant limitations in woodland use or management.

This soil has medium potential for urban uses. Low bearing strength and slope are the main limitations, but proper design and careful installation procedures help to offset this. Capability unit VIe-1.

SdF—Smithdale sandy loam, 17 to 35 percent slopes. This well drained soil is on side slopes.

Typically, the surface layer is brownish sandy loam 4 inches thick. The upper part of the subsoil is yellowish red loam over sandy clay loam at a depth of 8 inches. The lower part of the subsoil, below a depth of 25 inches, is yellowish red sandy loam that extends to below a depth of 76 inches.

In places, the surface layer has been thinned by erosion and rills, shallow gullies, and a few deep gullies are present.

Included with this soil in mapping were a few small areas of Atwood, Ora, Providence, and Sweatman soils. Also included were a few areas of severely eroded soils.

This soil is strongly acid or very strongly acid. Permeability is moderate. Available water capacity is medium. Runoff is rapid, and the erosion hazard is severe.

Most of this soil is in woodland. A considerable acreage is in pasture, and a small acreage is used for crops.

Because of slopes and the severe erosion hazard, this soil is not suitable for crops. It should be kept in permanent vegetation such as trees, grasses (fig. 4), and legumes. It has low potential for grasses and legumes. When the soil is used for pasture, suitable practices are proper stocking, carefully controlled grazing, and weed control.

The soil has moderately high potential for loblolly pine. There are no significant limitations for woodland use and management.

This soil has low potential for most urban uses. Steep slopes are difficult to overcome. Special design and careful construction are essential. Capability unit VIIe-2.

SgF—Smithdale-Udorthents complex, gullied. This complex consists of Smithdale soils and gullied areas in such an intricate pattern that it is impractical to separate them at the scale used for mapping. It is mainly on side slopes. In many places, however, fingers of the gullies extend far into the ridgetops. Delineations of this complex range in size from about 10 to 1,000 acres. Slopes are 5 to 35 percent.

Included with these soils in mapping were small areas of Atwood and Providence soils on ridgetops and on the upper parts of side slopes.

Well drained Smithdale soils make up 49 percent of this complex, and Udorthents, which are gullied areas, make up 39 percent.

Typically, the surface layer of Smithdale soils is brownish sandy loam 4 inches thick. The upper 4 inches of the subsoil is yellowish red loam, the middle 17 inches is sandy clay loam, and the lower part is yellowish red sandy loam that extends from a depth of 25 inches to below a depth of 76 inches.

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

Typically, Udorthents formed in loamy material with a high content of sand. They normally are gullies that have vertical walls ranging in height from 2 to 15 feet. The wider gullies have flat bottoms in which there are stratified accumulations of variable textured material. These accumulations range from a few inches to several feet in thickness. Some gullies are V-shaped; there is little accumulation on the floors of these gullies. Most of these gullies are becoming stabilized.

Udorthents are strongly acid or very strongly acid. Permeability and available water capacity are variable. Runoff is rapid.

Almost all of this complex is in woodland, a large part of which is pine plantations (fig. 5).

This complex is not suitable for row crops. It has low potential for grasses and legumes. If the soils are used for pasture, good management includes proper stocking, carefully controlled grazing, and weed control. In places shaping and smoothing of gullies is feasible.

This complex has moderate potential for loblolly and shortleaf pine. The floors of some of the gullies have a high site index. Limitations for woodland use and management are severe. Seedlings have a high mortality rate, and gullies frequently impede the use of equipment.

This complex has low potential for urban use because of steep slopes and gullies. Capability unit VIIe-2.

SHF—Smithdale association, hilly. This association consists of well drained soils in a regular and repeating pattern. The topography is hilly; it consists of long, narrow ridgetops and steep side slopes dissected by numerous short drainageways. Slopes range from 6 to 45 percent. Areas of this unit range in size from about 200 to 1,800 acres.

Smithdale soils are on the side slopes.

Included with these soils in mapping are extensive areas of Atwood soils on the narrow ridgetops. Also included are areas of well drained to somewhat poorly drained alluvial soils in the narrow drainageways and on flood plains. Eroded spots, shallow gullies, and a few deep gullies are in some delineations.

Smithdale soils make up 73 percent of the association.

Typically, the surface layer of Smithdale soils is brownish sandy loam 4 inches thick. The upper 4 inches of the subsoil is yellowish red loam, the middle 17 inches is sandy clay loam, and the lower part is yellowish red sandy loam that extends from a depth of 25 inches to below a depth of 76 inches.

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

Most of this association is in woodland. A small part is in pasture and row crops.

Because of slope and a severe erosion hazard, this association is not suitable for row crops but should be kept under permanent vegetation. It has low potential for grasses and legumes. When the soils are used for pasture, care should be taken to not allow overgrazing.

This association has moderately high potential for loblolly and shortleaf pine. There are no significant limitations for woodland use or management.

This association has low potential for most urban uses. Slope is the main limitation. With onsite selection, proper design, and careful installation, many areas within the association can be used for urban purposes. Capability unit VIIe-2.

STF—Smithdale-Sweatman association, hilly. This association consists of well drained soils in a regular and repeating pattern. The topography is hilly; it consists of narrow ridgetops and steep side slopes dissected by numerous short drainageways. Slopes range from 12 to 40 percent. Areas of this association range in size from 200 to 1,800 acres.

Smithdale soils are on side slopes, and Sweatman soils are on ridgetops and the upper parts of side slopes. Eroded spots, shallow gullies, and a few deep gullies are present in most delineations.

Included with these soils in mapping were a few areas of Atwood, Oktibbeha, and Tippah soils on uplands and somewhat poorly drained and moderately well drained soils in the narrow drainageways.

Smithdale soils make up 51 percent of this association, and Sweatman soils make up 30 percent. Both soils are well drained.

Typically, the surface layer of Smithdale soils is brownish sandy loam 4 inches thick. The upper 4 inches of the subsoil is yellowish red loam, the middle 17 inches is sandy clay loam, and the lower part is yellowish red sandy loam that extends from a depth of 25 inches to below a depth of 76 inches.

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

Typically, the surface layer of Sweatman soils is brownish fine sandy loam about 7 inches thick. The upper part of the subsoil is red clay 25 inches thick. The lower part is mottled pale brown and red clay loam; it is between depths of 32 and 45 inches. Stratified layers of reddish yellow and light brownish gray fine sandy loam and sandy clay loam extend to below a depth of 57 inches. In many places a thin layer of partially decayed organic matter is on the surface.

Sweatman soils are strongly acid or very strongly acid. Permeability is moderately slow. Available water capacity is high. Runoff is rapid, and the erosion hazard is severe.

Almost all of this association is in woodland. A small acreage is in pasture and row crops.

Because of slope and a severe erosion hazard, these soils are not suitable for row crops but should be kept under permanent vegetation (fig. 6). The soils have low potential for grasses and legumes. When they are used for pasture, care should be taken to not allow overgrazing.

This association has moderately high potential for loblolly and shortleaf pine. Sweatman soils have moderate equipment restrictions, but these can be overcome by harvesting during drier seasons and by using special equipment.

This association has low potential for most urban uses. Steep slopes, low bearing strength, and high shrink-swell potential are limitations. With onsite selection, proper design, and careful installation, many areas within the association can be used for urban purposes. Capability unit VIIe-3.

SWF—Smithdale-Sweatman-Providence association, hilly. This association consists of well drained and moderately well drained soils in a regular and repeating pattern. The topography is hilly; it consists of narrow ridgetops and steep side slopes dissected by numerous short drainageways. Slopes range from 12 to 40 percent. Areas of this association range in size from 200 to 2,000 acres.

Smithdale soils are on the steeper side slopes, Sweatman soils are on ridgetops and on the upper parts of side slopes, and Providence soils are on ridgetops. Eroded spots, shallow gullies, and a few deep gullies are in most delineations.

Included with these soils in mapping were a few areas of Atwood, Tippah, and Wilcox soils on uplands. Also included were long, narrow areas of well drained to somewhat poorly drained alluvial soils in drainageways.

The well drained Smithdale soils make up 33 percent of this association, the well drained Sweatman soils make up 30 percent, and the moderately well drained Providence soils make up 27 percent.

Typically, the surface layer of Smithdale soils is brownish sandy loam 4 inches thick. The upper 4 inches of the subsoil is yellowish red loam, the middle 17 inches is sandy clay loam, and the lower part is yellowish red sandy loam that extends from a depth of 25 inches to below a depth of 76 inches.

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

Typically, the surface layer of Sweatman soils is brownish fine sandy loam about 7 inches thick. The upper part of the subsoil is red clay 25 inches thick. The lower part, between depths of 32 and 45 inches, is mottled pale brown and red clay loam. Stratified layers of reddish yellow and light brownish gray fine sandy loam and sandy clay loam extend to below a depth of 57 inches. In many places, a thin layer of partially decayed organic matter is on the surface.

Sweatman soils are strongly acid or very strongly acid. Permeability is moderately slow. Available water capacity is high. Runoff is rapid, and the erosion hazard is severe.

Typically, the surface layer of Providence soils is brown silt loam about 4 inches thick. The subsoil is yellowish red silt loam 14 inches thick. A firm, compact, and brittle fragipan extends to below a depth of 62 inches. The upper part of the fragipan is silt loam mottled in shades of red and brown, and the lower part is loam and sandy clay loam.

Providence soils are medium acid to very strongly acid. Permeability is moderate in the upper part of the soil but moderately slow in the fragipan. Available water capacity is medium. Runoff is rapid, and the erosion hazard is severe.

Almost all of this association is in woodland. A very small acreage is used for row crops and pasture.

Because of slope and a severe erosion hazard, this association is not suitable for row crops but should be kept under permanent vegetation. It has low potential for grasses and legumes. When the soil is used for pasture, care should be taken to prevent overgrazing.

This association has moderately high potential for loblolly and shortleaf pine. Areas of Providence soils also have medium potential for Shumard oak, sweetgum, and yellow-poplar. Part of the association has moderate equipment restrictions, but these can be overcome by harvesting during drier seasons and by using special equipment.

This association has low potential for most urban uses. Slope, low bearing strength, and high shrink-swell potential are some of the limitations that might be encountered. With onsite selection, proper design, and careful installation, many areas within the association can be used for this purpose. Capability unit VIIe-3.

SyE—Sweatman-Providence-Smithdale complex, 12 to 17 percent slopes. This complex consists of areas of Sweatman, Providence, and Smithdale soils that are so intermingled that it is impractical to separate them at the scale used for mapping. The soils are moderately steep and steep. Individual areas range in size from 40 to more than 160 acres.

Sweatman soils are on ridgetops and side slopes, Providence soils are on ridgetops, and Smithdale soils are on the steeper side slopes.

Included with these soils in mapping were a few small areas of Atwood, Tippah, and Wilcox soils. Also included were a few areas of moderately and severely eroded soils.

The well drained Sweatman soils make up 34 percent of this complex, the moderately well drained Providence soils make up 29 percent, and the well drained Smithdale soils make up 27 percent.

Typically, the surface layer of Sweatman soils is brownish fine sandy loam about 7 inches thick. The upper part of the subsoil is red clay 25 inches thick. The lower part, between depths of 32 and 45 inches, is mottled pale brown and red clay loam. Stratified layers of reddish yellow and light brownish gray fine sandy loam and sandy clay loam extend to below a depth of 57 inches. In many places a thin layer of partially decayed organic matter is on the surface.

Sweatman soils are strongly acid or very strongly acid. Permeability is moderately slow. Available water capacity is high. Runoff is rapid, and the erosion hazard is severe.

Typically, the surface layer of Providence soils is brown silt loam about 4 inches thick. The subsoil is yellowish red silt loam 14 inches thick. A firm, compact, and brittle fragipan extends to below a depth of 62 inches. The upper part of the fragipan is silt loam mottled in shades of red and brown, and the lower part is loam.

Providence soils are medium acid to very strongly acid. Permeability is moderate in the upper part of the soil but moderately slow in the fragipan. Available water capacity is medium. Runoff is rapid, and the erosion hazard is severe.

Typically, the surface layer of Smithdale soils is brownish sandy loam 4 inches thick. The upper 4 inches of the subsoil is yellowish red loam, the middle 17 inches is sandy clay loam, and the lower part is yellowish red sandy loam that extends from a depth of 25 inches to below a depth of 76 inches.

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

Most of this complex is in woodland. Small areas are in pasture.

This complex is not suitable for row crops because of steep slopes and a severe erosion hazard. It has low potential for grasses and legumes. When it is used for pasture, suitable conservation practices include proper stocking, carefully controlled grazing, and weed control.

This complex has moderately high potential for loblolly and shortleaf pine. Areas of Providence soils also have moderately high potential for Shumard oak, sweetgum, and yellow-poplar. Parts of this complex have moderate equipment limitations, but these can be overcome by harvesting during drier seasons and by using special equipment.

This complex has low potential for most urban uses. Slope, low bearing strength, and high shrink-swell potential are some of the limitations that might be encountered. With proper design and careful installation procedures, many areas can be used for urban purposes. Capability unit VIIe-4.

Ta—Talla silt loam. This somewhat poorly drained soil is on broad upland flats and stream terraces. Slopes are 0 to 2 percent.

Typically, the surface layer is brown silt loam about 6 inches thick. The subsurface layer, 18 inches thick, is silt loam mottled in shades of brown and gray. A subsoil of firm loam mottled in shades of brown and gray extends to below a depth of 79 inches.

Included with this soil in mapping were a few small areas of Bude and Pooleville soils. Also included were a few small areas of soils that have a high content of sodium near the surface.

This soil is strongly acid or very strongly acid. Permeability is moderately slow. Available water capacity is high. Between depths of 28 and 40 inches, this soil has horizons that are high in sodium. Runoff is slow, and water tends to pond in some areas. A seasonal high water table is at a depth of 1 to 3 feet during winter and early spring. The soil can be tilled well over a relatively wide range of moisture content.

Almost all of this soil is used for crops. A small acreage is in pasture and woodland.

This soil has high potential for most locally grown row crops, grasses, and legumes. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Return of crop residues helps to maintain organic matter content and soil tilth.

This soil has high potential for cherrybark oak, water oak, sweetgum, yellow-poplar, and loblolly pine. There are moderate equipment limitations because of wetness, but these can be overcome by harvesting during drier seasons and by using special equipment.

This soil has medium potential for most urban uses. Wetness and low bearing strength are the principal limitations. Proper design and careful installation help to offset these limitations. Capability unit IIw-7.

TpB2—Tippah silt loam, 2 to 5 percent slopes, eroded. This moderately well drained soil is on ridgetops.

Typically, the surface layer is brownish silt loam 6 inches thick. The upper part of the subsoil is yellowish red silt loam over strong brown silt loam at a depth of 22 inches. The lower part of the subsoil, between depths of 32 and 44 inches, is silty clay mottled in shades of brown and red. Yellowish red clay with grayish mottles extends to below a depth of 60 inches.

In most places, the surface layer has been thinned by erosion and subsoil material has been mixed into the plow layer. A few rills and shallow gullies are sometimes present after heavy rainfall. These are usually destroyed by tillage.

Included with this soil in mapping were a few small areas of Falkner, Providence, and Wilcox soils. Also included were a few small areas of severely eroded soils and a few areas of soils that have a grayish layer just above the clayey lower part of the subsoil.

The soil is medium acid to very strongly acid. Permeability is slow. Available water capacity is high. Runoff is medium, and the erosion hazard is moderate. A seasonal high water table is above the clayey layer during winter and early spring. The soil can be tilled only within a moderate range of moisture content without crusting and packing.

Most of this soil is in crops and pasture. A considerable acreage is in woodland.

This soil has high potential for most locally grown row crops, grasses, and legumes. Crop rotation, return of crop residues, contour farming, terraces, minimum tillage, and vegetated outlets help to control erosion, maintain organic matter content, and improve soil tilth.

The soil has moderately high potential for cherrybark oak, Shumard oak, sweetgum, yellow-poplar, and loblolly pine. There are no significant limitations in woodland use or management.

This soil has low potential for most urban uses because of a high shrink-swell potential and low bearing strength. Proper design and careful installation help to offset these limitations. Capability unit IIe-2.

TpC2—Tippah silt loam, 5 to 8 percent slopes, eroded. This moderately well drained soil is on ridgetops and side slopes.

Typically, the surface layer is brownish silt loam 6 inches thick. The upper part of the subsoil is yellowish red silt loam over strong brown silt loam at a depth of 22 inches. The lower part, between depths of 32 and 44 inches, is silty clay mottled in shades of brown and red. Yellowish red clay with grayish mottles extends to below a depth of 60 inches.

In most places, the surface layer has been thinned by erosion and subsoil material has been mixed into the plow layer. A few rills and shallow gullies are sometimes present after heavy rainfall. These are usually destroyed by tillage.

Included with this soil in mapping were a few small areas of Providence and Wilcox soils. Also included were a few small areas of severely eroded soils and a few areas of soils that have a grayish layer just above the clayey lower part of the subsoil.

The soil is medium acid to very strongly acid. Permeability is slow. Available water capacity is high. Runoff is rapid, and the erosion hazard is severe. A seasonal high water table is above the clayey layer during winter and early spring. The soil can be tilled only within a moderate range of moisture content without crusting and packing.

Most of this soil is in crops and pasture. A considerable acreage is in woodland.

This soil has medium potential for most locally grown row crops, grasses, and legumes. Crop rotation, return of crop residues, contour farming, terraces, minimum tillage, and vegetated outlets help to control erosion, maintain organic matter content, and improve soil tilth.

The soil has moderately high potential for cherrybark oak, Shumard oak, sweetgum, yellow-poplar, and loblolly pine. There are no significant limitations in woodland use or management.

This soil has low potential for most urban uses because of the high shrink-swell potential and low bearing strength. Proper design and careful installation help to offset these limitations. Capability unit IIIe-4.

TpD2—Tippah silt loam, 8 to 12 percent slopes, eroded. This moderately well drained soil is on side slopes.

Typically, the surface layer is brownish silt loam 6 inches thick. The upper part of the subsoil is yellowish red silt loam over strong brown silt loam at a depth of 22 inches. The lower part, between depths of 32 and 44 inches, is silty clay mottled in shades of brown and red. Yellowish red clay with grayish mottles extends to below a depth of 60 inches.

In most places, the surface layer has been thinned by erosion and subsoil material has been mixed into the plow layer. Rills and shallow gullies are present after heavy rainfall. These are usually destroyed by tillage.

Included with this soil in mapping were a few small areas of Providence and Wilcox soils. Also included were a few small areas of severely eroded soils and a few areas of soils that have a grayish layer just above the clayey lower part of the subsoil.

The soil is medium acid to very strongly acid. Permeability is slow. Available water capacity is high. Runoff is rapid, and the erosion hazard is severe. A seasonal high water table is above the clayey layer during winter and early spring. The soil can be tilled only within a moderate range of moisture content without crusting and packing.

Most of this soil is used for pasture and woodland. A small acreage is in crops.

This soil has low potential for row crops. It has medium potential for most locally grown grasses and legumes. Frequent rotation with close-growing crops, contour farming, terraces, minimum tillage, vegetated outlets, and return of crop residues help to control erosion, maintain organic matter content, and improve soil tilth. Good management for pasture includes proper stocking, controlled grazing, and weed control.

The soil has moderately high potential for cherrybark oak, Shumard oak, sweetgum, yellow-poplar, and loblolly pine. There are no significant limitations in woodland use and management.

The soil has low potential for most urban uses. High shrink-swell potential, low bearing strength, and slope are the main limitations, but these can be partially offset by proper design and careful installation. Capability unit IVe-2.

Ur—Urbo silty clay. This somewhat poorly drained soil is on flood plains. Slopes are 0 to 2 percent.

Typically, the surface layer is brown silty clay loam 7 inches thick. The subsoil is silty clay, 9 inches thick, that is mottled in shades of brown and gray. Olive gray clay with brownish mottles is between depths of 16 and 35 inches. Olive gray silty clay with grayish mottles extends to below a depth of 50 inches.

Included with this soil in mapping were small areas of Arkabutla and Cascilla soils.

This soil is strongly acid or very strongly acid. Permeability is very slow, and available water capacity is high. Runoff is slow, and water tends to pond in low places. A seasonal high water table is at a depth of 16 inches during winter and spring. The soil can be tilled only within a narrow range of moisture content without clodding. Occasional flooding causes moderate crop damage.

Almost all of this soil is used for crops. A very small acreage is in woodland.

This soil has high potential for most locally grown row crops, grasses, and legumes. Return of crop residues helps to maintain organic matter content and improve soil tilth. Proper row arrangement and field ditches are needed to remove excess surface water.

This soil has high potential for eastern cottonwood, sweetgum, American sycamore, yellow-poplar, and loblolly pine. There are moderate equipment limitations because of wetness, but these can be overcome by harvesting during drier seasons and by using special equipment.

This soil has low potential for most urban uses because of the flood hazard and wetness. Capability unit IIw-5.

WaB2—Wilcox silty clay loam, 2 to 5 percent slopes, eroded. This somewhat poorly drained soil is on ridgetops and side slopes.

Typically, the surface layer is dark brown silty clay loam 6 inches thick. The upper part of the subsoil is reddish brown silty clay, 4 inches thick, that contains grayish and brownish mottles. The lower part is clayey, it is mottled in shades of gray, brown, and red, and it extends to a depth of 40 inches. A clayey substratum mottled in shades of gray and brown extends to below a depth of 72 inches. This layer contains partially weathered shale fragments that become more numerous with depth.

In most places, the surface layer has been thinned by erosion and subsoil material has been mixed into the plow layer. A few rills and shallow gullies are sometimes present after heavy rainfall. These are usually destroyed by tillage.

Included with this soil in mapping were a few small areas of Tippah and Falkner soils.

This soil is strongly acid to extremely acid. Permeability is very slow. Available water capacity is high. Runoff is medium. The erosion hazard is moderate. A seasonal high water table is between depths of 18 and 36 inches during winter and early spring. Because of the high clay content, the soil can be tilled well only within a narrow range of moisture conditions.

Most of this soil is in woodland or pasture. A small part is used for crops.

This soil has medium potential for most locally grown row crops and high potential for most grasses and legumes. Crop rotation, return of crop residues, contour farming, terraces, vegetated outlets, and minimum tillage help to maintain organic matter content, improve soil tilth, and control erosion. Where the soil is used for pasture, suitable practices are proper stocking, controlled grazing, and weed control.

This soil has moderately high potential for loblolly pine. There are moderate equipment limitations because of the clayey texture. These can be overcome by harvesting during drier seasons and by using special equipment.

The soil has low potential for most urban uses. A high shrink-swell potential and wetness are the main limitations. Proper design and careful installation help to overcome these limitations. Capability unit IIIe-3.

WaC2—Wilcox silty clay loam, 5 to 8 percent slopes, eroded. This somewhat poorly drained soil is on ridgetops and side slopes.

Typically, the surface layer is dark brown silty clay loam 6 inches thick. The upper part of the subsoil is reddish brown silty clay, 4 inches thick, that contains grayish and brownish mottles. The clayey lower part of the subsoil is mottled in shades of gray, brown, and red and extends to a depth of 40 inches. A clayey substratum mottled in shades of gray and brown extends to below a depth of 72 inches. This layer contains partially weathered shale fragments that become more numerous with depth.

In most places, the surface layer has been thinned by erosion and subsoil material has been mixed into the plow layer. A few rills and shallow gullies are sometimes present after heavy rainfall, but these are usually destroyed by tillage.

Included with this soil in mapping were a few small areas of Tippah and Falkner soils. Also included were a few small areas of severely eroded soils.

This soil is strongly acid to extremely acid. Permeability is very slow. Available water capacity is high. Runoff is rapid. The erosion hazard is severe. There is a seasonal high water table between depths of 18 and 36 inches during winter and early spring. Because of the high clay content, the soil tills well only within a narrow range of moisture conditions.

Most of this soil is in woodland or pasture. A small acreage is used for crops.

This soil has low potential for most locally grown row crops and medium potential for most grasses and legumes. Frequent crop rotation, return of crop residues, contour farming, terraces, vegetated outlets, and minimum tillage help to maintain organic matter content, improve soil tilth, and control erosion. Where the soil is used for pasture, suitable practices are proper stocking, controlled grazing, and weed control.

This soil has moderately high potential for loblolly pine. There are moderate equipment limitations because of the clayey texture. These can be overcome by harvesting during the drier seasons and by using special equipment.

The soil has low potential for most urban uses. A high shrink-swell potential and wetness are the main limitations, but proper design and careful installation help to overcome these limitations. Capability unit IVe-1.

Use and management of the soils

The soil survey is a detailed inventory and evaluation of the most basic resource of the survey area—the soil. It is useful in adjusting land use, including urbanization, to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in uses of the land.

While a soil survey is in progress, soil scientists, conservationists, engineers, and others keep extensive notes about the nature of the soils and about unique aspects of behavior of the soils. These notes include data on erosion, drought damage to specific crops, yield estimates, flooding, the functioning of septic tank disposal systems, and other factors affecting the productivity, potential, and limitations of the soils under various uses and management. In this way, field experience and measured data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section is useful in planning use and management of soils for crops and pasture, rangeland, and woodland, as sites for buildings, highways and other transportation systems, sanitary facilities, and parks and other recreation facilities, and for wildlife habitat. From the data presented, the potential of each soil for specified land uses can be determined, soil limitations to these land uses can be identified, and costly failures in houses and other structures, caused by unfavorable soil properties, can be avoided. A site where soil properties are favorable can be selected, or practices that will overcome the soil limitations can be planned.

Planners and others using the soil survey can evaluate the impact of specific land uses on the overall productivity of the survey area or other broad planning area and on the environment. Productivity and the environment are closely related to the nature of the soil. Plans should maintain or create a land-use pattern in harmony with the natural soil.

Contractors can find information that is useful in locating sources of sand and gravel, roadfill, and topsoil. Other information indicates the presence of bedrock, wetness, or very firm soil horizons that cause difficulty in excavation.

Health officials, highway officials, engineers, and many other specialists also can find useful information in this soil survey. The safe disposal of wastes, for example, is closely related to properties of the soil. Pavements, sidewalks, campsites, playgrounds, lawns, and trees and shrubs are influenced by the nature of the soil.

Crops and pasture

HERMAN S. SAUCIER, conservation agronomist, Soil Conservation Service, helped to prepare this section.

The major management concerns in the use of the soils for crops and pasture are described in this section. In addition, the crops or pasture plants best suited to the soil, including some not commonly grown in the survey area, are discussed; 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 presented for each soil.

This section provides information about the overall agricultural potential of the survey area and about the management practices that are needed. The information is useful to equipment dealers, land improvement contractors, fertilizer companies, processing companies, planners, conservationists, and others. For each kind of soil, information about management is presented in the section "Soil maps for detailed planning." Planners of management systems for individual fields or farms should also consider the detailed information given in the description of each soil.

More than 119,000 acres in Union County was used for crops and pasture in 1967, according to the Conservation Needs Inventory (*15*). Of this total 34,300 acres was used for permanent pasture; 72,000 acres for field crops, mainly cotton, soybeans, and corn; 2,500 acres for rotation hay and pasture; and 6,000 acres for hay.

The potential of the soils in Union County for increased production of food is good. About 9,000 acres of potentially good cropland is currently used as woodland, and about 6,000 acres is used as pasture. Food production could also be increased considerably by extending the latest crop production technology to all cropland in the county. This soil survey can greatly facilitate the application of such technology.

Acreage in crops and pasture has gradually been decreasing as more and more land is used for urban development. It was estimated that in 1967 there was about 10,400 acres of urban and built-up land in the county; this figure has been growing at the rate of about 30 acres per year. The use of this soil survey to help make land-use decisions that will influence the future role of farming in the county is discussed in the section "General soil map for broad land use planning."

Soil erosion is the major soil concern on about one-third of the cropland in Union County. If slope is more than 2 percent, erosion is a hazard. Atwood, Oktibbeha, Providence, and Tippah soils, for example, have slopes of 2 to 12 percent.

Loss of the surface layer through erosion is damaging for two reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils with a clayey subsoil, such as the Falkner, Oktibbeha, Sweatman, and Wilcox soils, and on soils with a layer in or below the subsoil that limits the depth of the root zone. Such layers include fragipans, as in Bude, Providence, and Ora soils. Second, soil erosion on farmland results in sedimentation. Control of erosion minimizes sedimentation and improves the quality of water for recreation and for fish and wildlife.

In many sloping fields, preparing a good seedbed and tilling are difficult on clayey or fragipan spots because the original friable surface soil has been eroded away. Such spots are common in areas of severely eroded Providence and Tippah soils.

Erosion control practices provide protective surface cover, reduce runoff, and increase infiltration. A cropping system that keeps vegetative cover on the soil for extended periods can hold soil erosion losses to amounts that will not reduce the productive capacity of the soils. On livestock farms, which require pasture and hay, the legume and grass forage crops in the cropping system reduce erosion on sloping land and also provide nitrogen and improve tilth for the following crop.

Minimizing tillage and leaving crop residues on the surface help to increase infiltration and reduce the hazards of runoff and erosion. These practices can be adapted to most soils in the survey area, but are more difficult to use successfully on the eroded soils and on the soils that have a clayey surface layer, such as the Wilcox soils. No-tillage for corn and soybeans is effective in reducing erosion on sloping land and can be adapted to most soils in the survey area.

Terraces and diversions reduce the length of slope and reduce runoff and erosion. They are most practical on Atwood, Providence, and Tippah soils, which have regular slopes. Contouring is a widespread erosion control practice used in the survey area. It is best adapted to soils with smooth, uniform slopes.

Information for the design of erosion control practices for each kind of soil is contained in the Technical Guide, available in local offices of the Soil Conservation Service.

Soil drainage is the major management need on about two-thirds of the acreage used for crops in the survey area. Some soils are naturally so wet that the production of crops common to the area is generally not possible. Unless artificially drained, the somewhat poorly drained soils are so wet that crops are damaged during most years. In this category are the Arkabutla, Mantachie, Marietta, and Urbo soils, which make up about 50,924 acres.

Cascilla and Jena soils have good natural drainage most of the year. In many places small areas of poorly drained soils in swales are included in areas of better drained soils. Artificial drainage is needed in some of these wetter soils.

Information on drainage design for each kind of soil is contained in the Technical Guide, available in local offices of the Soil Conservation Service.

Soil fertility is naturally low in most soils of the uplands in the survey area. The soils on flood plains, such as Arkabutla, Cascilla, Jena, Mantachie, and Urbo soils, are strongly acid or very strongly acid and are naturally higher in plant nutrients than most upland soils. Marietta soils, on flood plains, are medium acid to mildly alkaline.

Many soils on uplands are naturally very strongly acid, and if they have never been limed they require applications of ground limestone to raise the pH sufficiently for good plant growth. Available phosphorus and potash levels are naturally low in most of these soils. On all soils additions of lime and fertilizer should be based on the results of soil tests, on the need of the crop, and on the expected level of yields. The Cooperative Extension Service can help to determine the kinds and amounts of fertilizer and lime to apply.

Soil tilth is an important factor in the germination of seeds and in the infiltration of water into the soil. Soils with good tilth are granular and porous.

Most of the soils used for crops in the survey area have a surface layer of silt loam that is light in color and low in content of organic matter. Generally the structure of such soils is weak, and intense rainfall causes the formation of a crust on the surface. The crust is hard when dry and nearly impervious to water. Once the crust forms, it reduces infiltration and increases runoff. Regular additions of crop residues, manure, and other organic material can help to improve soil structure and reduce crust formation.

Fall plowing is generally not a good practice in Union County. Many of the soils are nearly as dense and hard at planting time after fall plowing as they were before they were plowed. Also, about one-third of the cropland consists of sloping soils that are subject to damaging erosion if they are plowed in the fall.

Field crops suited to the soils and climate of the survey area include many that are not now commonly grown. Cotton, soybeans, and corn are the main row crops. Grain sorghum, peanuts, potatoes, and similar crops can be grown if economic conditions are favorable. Wheat and oats are the common close-growing crops.

Latest information and suggestions for growing special crops can be obtained from local offices of the Cooperative Extension Service and the Soil Conservation Service.

Yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. Absence of an estimated yield indicates that the crop is not suited to or not commonly grown on the soil or that a given crop is not commonly irrigated.

The estimated yields were based mainly on the experience and records of farmers, conservationists, and extension agents. Results of field trials and demonstrations and available yield data from nearby counties were also considered.

The yields were estimated assuming that the latest soil and crop management practices were used. Hay and pasture yields were estimated for the most productive varieties of grasses and legumes suited to the climate and the soil. A few farmers may be obtaining average yields higher than those shown in table 6.

The management needed to achieve the indicated yields of the various crops depends on the kind of soil and the crop. Such management provides drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate tillage practices, including time of tillage and seedbed preparation and tilling when soil moisture is favorable; 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 residues, barnyard manure, and green-manure crops; harvesting crops with the smallest possible loss; and timeliness of all fieldwork.

The estimated yields reflect the productive capacity of the soils 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 6 are grown in the survey area, but estimated yields are not included because the acreage of these crops is small. The local offices of the Soil Conservation Service and the Cooperative Extension Service can provide information about the management concerns and productivity of the soils for these crops.

Capability classification

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The soils are classed according to their limitations when they are used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops that require special management. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forest trees, or for engineering purposes (*12*).

In the capability system, all kinds of soil are grouped at three levels: capability class, subclass, and unit. These levels are defined in the following paragraphs. A survey area may not have soils of all classes.

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

Class I soils have few limitations that restrict their use.

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

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

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

Class V soils are not likely to erode but 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 landforms have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

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

The acreage of soils in each capability class and subclass is indicated in table 7. All soils in the survey area except those named at a level higher than the series are included. Some of the soils that are well suited to crops and pasture may be in low-intensity use, for example, soils in capability classes I and II. Data in this table can be used to determine the farming potential of such soils.

The capability unit is identified in the description of each soil map unit in the section "Soil maps for detailed planning." Capability units are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 or IIIe-6.

Woodland

JOSEPH V. ZARY, forester, helped to prepare this section.

This section contains information on the relationship between trees and their environment, particularly the soils on which they grow. It also includes information on the kind, amount, and condition of woodland resources and the industries they support. The section also includes interpretations that can be used by owners of woodland, foresters, forest managers, and agricultural workers to develop and carry out plans for profitable tree farming.

About 128,700 acres, or 48 percent of the total land area of Union County, is classified as commercial forest. Commercial forest is defined as land that is producing or is capable of producing crops of industrial wood and that has not been withdrawn from timber production. A total of 52,200 acres of commercial forest is owned by farmers and 68,700 acres by other private owners, and 7,800 acres is in national forest ownership (*14*).

According to the 1967 Conservation Needs Inventory for Mississippi, only 30,000 acres, or 23 percent of the 128,700 acres then classified as commercial forest land, was considered to have adequate treatment (*15*). The remaining 77 percent, or 98,700 acres, needs further conservation treatment. Establishment and reinforcement, including practices such as tree planting, site preparation, natural seeding, and direct seeding were needed on 70,000 acres. Timber stand improvement, including practices such as release, salvage and sanitation cuttings, and thinning, was needed on 20,900 acres. The treatments and practices mentioned are especially needed on woodland owned by farmers and other private individuals. This woodland totals 120,900 acres. Generally woodlands throughout the county are receiving low to medium levels of management and are producing far less than their growth potential. Establishment of the needed practices would nearly double present yields of tree crops and greatly increase income of the woodland owners.

The commercial forest may also be subdivided into forest types, which are stands of trees of similar character, composed of the same species, and growing under the same ecological and biological conditions. These forest types are named for the species which are present in the greatest abundance (*11*).

The oak-hickory forest type, composed mainly of upland oaks and hickories, is most important. It occupies approximately 63,800 acres throughout the county. Other trees commonly in this forest type are maple, elm, yellow-poplar, and some pine and black walnut (*11, 14, 18*).

The loblolly-shortleaf pine forest type, composed of loblolly pine or shortleaf pine, or both, is second in importance. It occupies approximately 24,600 acres. Other trees commonly include oaks, hickories, sweetgum, and blackgum.

The oak-pine forest type, composed mainly of upland oaks and mixtures of loblolly and shortleaf pines, ranks third in importance. It occupies about 22,400 acres. Other trees commonly include sweetgum, blackgum, hickories, and yellow-poplar.

The three forest types mentioned above occupy 110,800 acres, or about 86 percent of the total commercial forest acreage in the county. These forest types are so intermingled that it would be difficult to delineate the individual forest types either on a map or by geographic description.

The oak-gum-cypress forest type, composed mainly of bottom land hardwoods such as tupelo, blackgum, sweetgum, oaks, and southern cypress, singly or in combination, ranks fourth in importance. As of 1967, it occupied about 17,900 acres. Other trees commonly include willow, ash, elm, hackberry, maple, and cottonwood (*6*). Since 1967 much of the area occupied by this forest type has been cleared for row crops. Small remnants of this forest type may still be found along the several streams which flow into the Tallahatchie River. These include Jasper, King, Damnation, Lockes, Little Mud, Cane, Hell, Mubby, Cherry, Mud, Lappatubby, and Okonatie Creeks.

As of 1967, the woodlands of Union County supported a total of 105.4 million board feet of sawtimber, including 28.7 million board feet of softwood (pine) and 76.7 million board feet of hardwood (*14*). The hardwoods included 31.3 million board feet of oak, 15.8 million board feet of gum, and 29.6 million board feet of other hardwoods. Also, as of 1967, growing stock of all species totaled 59.2 million cubic feet, including 15.7 million cubic feet of softwood, mainly pine, and 43.5 million cubic feet of hardwood. The hardwood volume included 17.1 million cubic feet of oak, 12.0 million cubic feet of gum, and 14.4 million cubic feet of other hardwoods.

Also, as of 1967, the county's woodlands supported a total of 858,000 cords of growing stock, all species included. This volume included 209,000 cords of softwood, mainly pine, and 649,000 cords of hardwood. The hardwood volume included 255,000 cords of oak, 179,000 cords of gum, and 215,000 cords of other hardwoods.

As of 1966, the net annual growth of growing stock on the commercial forest land of Union County was 4.7 million cubic feet, all species included. This volume included 1.8 million cubic feet of softwood, mainly pine, and 2.9 million cubic feet of hardwood. The hardwood volume included 1.0 million cubic feet of oak, 0.6 million cubic feet of gum, and 1.3 million cubic feet of other hardwoods.

Also, as of 1966, the net annual growth of sawtimber on the commercial forest land of the county was 9.5 million board feet for all species. This volume included 3.2 million board feet of softwood (pine) and 6.3 million board feet of hardwood. The hardwoods included 3.6 million board feet of oak, 0.4 million board feet of gum, and 2.3 million board feet of other hardwoods.

As of 1966, timber removals from sawtimber on the commercial forest land of the county was 5.5 million board feet for all species. This volume included 1.4 million board feet of softwood (pine) and 4.1 million board feet of hardwood. The hardwood volume included 1.9 million board feet of oak, 0.4 million board feet of gum, and 1.8 million board feet of other hardwood.

In 1972, 12,348 standard cords of round pulpwood was produced on the commercial forest land of Union County (*3, 4*). This volume included 9,876 standard cords of softwood and 2,472 standard cords of hardwood. During the same year, saw-log production amounted to 3,302,000 board feet. Of this volume, 501,000 board feet was softwood (pine) and 2,801,000 feet was hardwood.

Union County's commercial forest land and the tree crops harvested therefrom help to support a substantial timber economy. In 1972, three small sawmills, each with an annual output of less than 3 million board feet, operated in the county (*3*). In 1972, approximately 29,000 pine poles, 58,000 pine posts, and 20,000 cubic feet of other miscellaneous products manufactured from hardwoods were produced in the county. One pulpwood dealer operated in Union County as of 1972 (*7*). Pulpwood procurement included pines and hardwoods in short roundwood and tree length sizes. Three secondary wood-using industries in the county were making furniture, and there was one wood preserving plant. Other wood-using industries and pulpwood yards in adjoining counties buy and process some of the wood produced in Union County.

Besides furnishing raw material for the wood-using industries and affording employment for hundreds of industrial workers, the commercial forest land of Union County provides food and shelter for wildlife and offers opportunity for recreation to many users annually. Moreover, this forest land provides watershed protection, helps to arrest soil erosion and reduce sedimentation, enhances the quality and value of water resources, and furnishes a limited amount of native forage for livestock.

The total environment of the tree is a complex integration of numerous interrelated physical and biological factors (*13*). Physical factors include climatic factors, including various measures of radiation, of precipitation, and of movement and composition of the air, and soil factors, including texture, structure and depth, moisture capacity and drainage, nutrient content, and topographic position. Biological factors include the plants that grow with the trees; the larger animals that use the forest as a source of food and shelter; the many small animals, insects, and insectlike animals; the fungi to which the trees are hosts; and the micro-organisms in the soil.

The most important environmental factor influencing tree growth and woodland species composition is soil. In addition to holding moisture for a tree, soil provides all the essential elements required in growth except those derived from the atmosphere: carbon, from carbon dioxide, and oxygen (*13*). Obviously, soil also is the medium in which a tree is anchored. The many characteristics of soil, such as chemical composition, texture, structure, depth, and position, affect tree growth to the extent that they affect the supply of moisture and nutrients. A number of studies have shown strong correlations between productivity of site, or growth of trees, and various soil characteristics, such as depth and position on the slope. The relationships are often indirect. The capacity of a soil to supply water and nutrients to trees is strongly related to its texture, structure, and depth. Sands contain only a small amount of plant nutrients and are low in available water capacity. Many fine textured soils are high in plant nutrients and have high available water capacity. Aeration is impeded in clays, however, particularly under wet conditions, so metabolic processes that require oxygen in the roots are inhibited.

The position on slope strongly influences species composition. Moisture-loving species such as sweetgum and yellow-poplar thrive on moderately moist, well drained, loose textured soils on the lower to middle parts of slopes, coves, and areas adjoining streams. Less demanding species such as oaks, hickories, and pines grow well on the middle parts of slopes and moderately well on the upper parts of slopes and on ridges.

Silvicultural practices that help to prevent the destruction of organic matter and the compaction of soil are important in maintaining suitable soil moisture and aeration. Such practices as sanitation cutting to remove trees killed or injured by fire, insects, and fungi; cutting to improve species composition and stand condition; and thinning to increase rate of growth, improve composition, and foster quality all result in long-term increases in total yield and income as well as benefiting woodland soils and environment.

Woodland management and productivity

Table 8 contains information useful to woodland owners or forest managers planning use of soils for wood crops. Mapping unit symbols for soils suitable for wood crops are listed, and the ordination (woodland suitability) symbol for each soil is given. All soils bearing the same ordination symbol require the same general kinds of woodland 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 *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates insignificant limitations or restrictions. If a soil has more than one limitation, priority in placing the soil into a limitation class is in the following order: x, w, t, d, c, s, f, and r. The third part of the symbol, a number, indicates the woodland suitability group. The soils in a woodland suitability group have the same potential productivity and the same major limitations, as indicated by the first and second parts of the symbol. Further, the soils are capable of producing similar kinds of wood crops and need similar management to produce these crops when the existing vegetation is similar.

In table 8 the soils are also rated for a number of factors to be considered in management. *Slight*, *moderate*, and *severe* are used to indicate the degree of major soil limitations.

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 some 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 equipment; *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 that the soil affects expected mortality of planted tree seedlings. Plant competition is not considered in the ratings. Seedlings from good planting stock that are properly planted during a period of sufficient rainfall are rated. A rating of *slight* indicates that the expected mortality of the planted seedlings 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 or grow if openings are made in the tree canopy. The invading plants compete with native plants or planted seedlings by impeding or preventing their growth. 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* means that plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed for the control of undesirable plants.

The *potential productivity* of merchantable or *important 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. The site index applies to fully stocked, even-aged, unmanaged stands. Important 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 suitable for commercial wood production and that are suited to the soils.

Engineering

BILLY P. HARTSELL, engineer, Soil Conservation Service, helped to prepare this section.

This section provides information about the use of soils for building sites, sanitary facilities, construction material, and water management. Among those who can benefit from this information are engineers, landowners, community planners, town and city managers, land developers, builders, contractors, and farmers and ranchers.

The ratings in the engineering tables are based on test data and estimated data in the "Soil properties" section. The ratings were determined jointly by soil scientists and engineers of the Soil Conservation Service using known relationships between the soil properties and the behavior of soils in various engineering uses.

Among the soil properties and site conditions identified by a soil survey and used in determining the ratings in this section were grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock that is within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure or aggregation, in-place soil density, and geologic origin of the soil material. Where pertinent, data about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of absorbed cations were also considered.

On the basis of information assembled about soil properties, ranges of values can be estimated for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, shear strength, compressibility, slope stability, and other factors of expected soil behavior in engineering uses. As appropriate, these values can be applied to each major horizon of each soil or to the entire profile.

These factors of soil behavior affect construction and maintenance of roads, airport runways, pipelines, foundations for small buildings, ponds and small dams, irrigation projects, drainage systems, sewage and refuse disposal systems, and other engineering works. The ranges of values can be used to (1) select potential residential, commercial, industrial, and recreational uses; (2) make preliminary estimates pertinent to construction in a particular area; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for location of sanitary landfills, onsite sewage disposal systems, and other waste disposal facilities; (5) plan detailed onsite investigations of soils and geology; (6) find sources of gravel, sand, clay, and topsoil; (7) plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; (8) relate performance of structures already built to the properties of the kinds of soil on which they are built so that performance of similar structures on the same or a similar soil in other locations can be predicted; and (9) predict the trafficability of soils for cross-country movement of vehicles and construction equipment.

Data presented in this section are useful for land-use planning and for choosing alternative practices or general designs that will overcome unfavorable soil properties and minimize soil-related failures. Limitations to the use of these data, however, should be well understood. First, the data are generally not presented for soil material below a depth of 5 or 6 feet. Also, because of the scale of the detailed map in this soil survey, small areas of soils that differ from the dominant soil may be included in mapping. Thus, these data do not eliminate the need for onsite investigations, testing, and analysis by personnel having expertise in the specific use contemplated.

The information is presented mainly in tables. Table 9 shows, for each kind of soil, the degree and kind of limitations for building site development; table 10, for sanitary facilities; and table 12, for water management. Table 11 shows the suitability of each kind of soil as a source of construction materials.

The information in the tables, along with the soil map, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations and to construct interpretive maps for specific uses of land.

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

Building site development

The degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets are indicated in table 9. A *slight* limitation indicates that soil properties generally are favorable for the specified use; any limitation is minor and easily overcome. A *moderate* limitation indicates that soil properties and site features are unfavorable for the specified use, but the limitations can be overcome or minimized by special planning and design. A *severe* limitation indicates that one or more soil properties or site features are so unfavorable or difficult to overcome that a major increase in construction effort, special design, or intensive maintenance is required. For some soils rated severe, such costly measures may not be feasible.

Shallow excavations are made for pipelines, sewerlines, communications and power transmission lines, basements, open ditches, and cemeteries. Such digging or trenching is influenced by soil wetness caused by a seasonal high water table; the texture and consistence of soils; the tendency of soils to cave in or slough; and the presence of very firm, dense soil layers, bedrock, or large stones. In addition, excavations are affected by slope of the soil and the probability of flooding. Ratings do not apply to soil horizons below a depth of 6 feet unless otherwise noted.

In the soil series descriptions, the consistence of each soil horizon is given, and the presence of very firm or extremely firm horizons, usually difficult to excavate, is indicated.

Dwellings and *small commercial buildings* referred to in table 9 are built on undisturbed soil and have foundation loads of a dwelling no more than three stories high. Separate ratings are made for small commercial buildings without basements and for dwellings with and without basements. For such structures, soils should be sufficiently stable that cracking or subsidence of the structure from settling or shear failure of the foundation does not occur. These ratings were determined from estimates of the shear strength, compressibility, and shrink-swell potential of the soil. Soil texture, plasticity and in-place density, potential frost action, soil wetness, and depth to a seasonal high water table were also considered. Soil wetness and depth to a seasonal high water table indicate potential difficulty in providing adequate drainage for basements, lawns, and gardens. Depth to bedrock, slope, and large stones in or on the soil are also important considerations in the choice of sites for these structures and were considered in determining the ratings. Susceptibility to flooding is a serious hazard.

Local roads and streets referred to in table 9 have an all-weather surface that can carry light to medium traffic all year. They consist of a subgrade of the underlying soil material; a base of gravel, crushed rock fragments, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. The roads are graded with soil material at hand, and most cuts and fills are less than 6 feet deep.

The load supporting capacity and the stability of the soil as well as the quantity and workability of fill material available are important in design and construction of roads and streets. The classifications of the soil and the soil texture, density, shrink-swell potential, and potential frost action are indicators of the traffic supporting capacity used in making the ratings. Soil wetness, flooding, slope, depth to hard rock or very compact layers, and content of large stones affect stability and ease of excavation.

Sanitary facilities

Favorable soil properties and site features are needed for proper functioning of septic tank absorption fields, sewage lagoons, and sanitary landfills. The nature of the soil is important in selecting sites for these facilities and in identifying limiting soil properties and site features to be considered in design and installation. Also, those soil properties that affect ease of excavation or installation of these facilities will be of interest to contractors and local officials. Table 10 shows the degree and kind of limitations of each soil for such uses and for use of the soil as daily cover for landfills. It is important to observe local ordinances and regulations.

If the degree of soil limitation is expressed as *slight*, soils are generally favorable for the specified use and limitations are minor and easily overcome; if *moderate*, soil properties or site features are unfavorable for the specified use, but limitations can be overcome by special planning and design; and if *severe*, soil properties or site features are so unfavorable or difficult to overcome that major soil reclamation, special designs, or intensive maintenance is required. Soil suitability is rated by the terms *good*, *fair*, or *poor*, which, respectively, mean about the same as the terms *slight*, *moderate*, and *severe*.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into the natural soil. Only the soil horizons between depths of 18 and 72 inches are evaluated for this use. The soil properties and site features considered are those that affect the absorption of the effluent and those that affect the construction of the system.

Properties and features that affect absorption of the effluent are permeability, depth to seasonal high water table, depth to bedrock, and susceptibility to flooding. Excessive slope can cause lateral seepage and surfacing of the effluent. Also, soil erosion and soil slippage are hazards if absorption fields are installed on sloping soils.

In some soils, loose sand is less than 4 feet below the tile lines. In these soils the absorption field does not adequately filter the effluent, and ground water in the area may be contaminated.

On many of the soils that have moderate or severe limitations for use as septic tank absorption fields, a system to lower the seasonal water table can be installed or the size of the absorption field can be increased so that performance is satisfactory.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons have a nearly level floor and cut slopes or embankments of compacted soil material. Aerobic lagoons generally are designed to hold 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. Unless the soil has very slow permeability, contamination of ground water is a hazard where the seasonal high water table is above the level of the lagoon floor. In soils where the water table is seasonally high, seepage of ground water into the lagoon can seriously reduce the lagoon's capacity for liquid waste. Slope, depth to bedrock, and susceptibility to flooding also affect the suitability of sites for sewage lagoons or the cost of construction. Shear strength and permeability of compacted soil material affect the performance of embankments.

Sanitary landfill is a method of disposing of solid waste by placing refuse in successive layers either in excavated trenches or on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil material. Landfill areas are subject to heavy vehicular traffic. Risk of polluting ground water and trafficability affect the suitability of a soil for this use. The best soils have a loamy or silty texture, have moderate to slow permeability, are deep to a seasonal water table, and are not subject to flooding. Clayey soils are likely to be sticky and difficult to spread. Sandy soils generally have rapid permeability, which might allow noxious liquids to contaminate ground water. Soil wetness can be a limitation, because operating heavy equipment on a wet soil is difficult. Seepage into the refuse increases the risk of pollution of ground water.

Ease of excavation affects the suitability of a soil for the trench type of landfill. A suitable soil is deep to bedrock and free of large stones and boulders. If the seasonal water table is high, water will seep into trenches.

Unless otherwise stated, the limitations in table 10 apply only to the soil material within a depth of about 6 feet. If the trench is deeper, a limitation of slight or moderate may not be valid. Site investigation is needed before a site is selected.

Daily cover for landfill should be soil that is easy to excavate and spread over the compacted fill in wet and dry periods. Soils that are loamy or silty and free of stones or boulders are better than other soils. Clayey soils may be sticky and difficult to spread; sandy soils may be subject to soil blowing.

The soils selected for final cover of landfills should be suitable for growing plants. Of all the horizons, the A horizon in most soils has the best workability, more organic matter, and the best potential for growing plants. Thus, for either the area- or trench-type landfill, stockpiling material from the A horizon for use as the surface layer of the final cover is desirable.

Where it is necessary to bring in soil material for daily or final cover, thickness of suitable soil material available and depth to a seasonal high water table in soils surrounding the sites should be evaluated. Other factors to be evaluated are those that affect reclamation of the borrow areas. These factors include slope, erodibility, and potential for plant growth.

Construction materials

The suitability of each soil as a source of roadfill, sand, gravel, and topsoil is indicated in table 11 by ratings of good, fair, or poor. The texture, thickness, and organic-matter content of each soil horizon are important factors in rating soils for use as construction materials. Each soil is evaluated to the depth observed, generally about 6 feet.

Roadfill is soil material used in embankments for roads. Soils are evaluated as a source of roadfill for low embankments, which generally are less than 6 feet high and less exacting in design than high embankments. The ratings reflect the ease of excavating and working the material and the expected performance of the material where it has been compacted and adequately drained. The performance of soil after it is stabilized with lime or cement is not considered in the ratings, but information about some of the soil properties that influence such performance is given in the descriptions of the soil series.

The ratings apply to the soil material between the A horizon and a depth of 5 to 6 feet. It is assumed that soil horizons will be mixed during excavation and spreading. Many soils have horizons of contrasting suitability within their profile. The estimated engineering properties in table 15 provide specific information about the nature of each horizon. This information can help determine the suitability of each horizon for roadfill.

Soils rated *good* are coarse grained. They have low shrink-swell potential, low potential frost action, and few cobbles and stones. They are at least moderately well drained and have slopes of 15 percent or less. Soils rated *fair* have a plasticity index of less than 15 and have other limiting features, such as moderate shrink-swell potential, moderately steep slopes, wetness, or many stones. If the thickness of suitable material is less than 3 feet, the entire soil is rated *poor.*

Sand and *gravel* are used in great quantities in many kinds of construction. The ratings in table 11 provide guidance as to where to look for probable sources and are based on the probability that soils in a given area contain sizable quantities of sand or gravel. A soil rated *good* or *fair* has a layer of suitable material at least 3 feet thick, the top of which is within a depth of 6 feet. Coarse fragments of soft bedrock material, such as shale and siltstone, are not considered to be sand and gravel. Fine-grained soils are not suitable sources of sand and gravel.

The ratings do not take into account depth to the water table or other factors that affect excavation of the material. Descriptions of grain size, kinds of minerals, reaction, and stratification are given in the soil series descriptions and in table 15.

Topsoil is used in areas where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material in preparing a seedbed and by the ability of the soil material to support plantlife. Also considered is the damage that can result at the area from which the topsoil is taken.

The ease of excavation is influenced by the thickness of suitable material, wetness, slope, and amount of stones. The ability of the soil to support plantlife is determined by texture, structure, and the amount of soluble salts or toxic substances. Organic matter in the A1 or Ap horizon greatly increases the absorption and retention of moisture and nutrients. Therefore, the soil material from these horizons should be carefully preserved for later use.

Soils rated *good* have at least 16 inches of friable loamy material at their surface. They are free of stones and cobbles, are low in content of gravel, and have gentle slopes. They are low in soluble salts that can limit or prevent plant growth. They are naturally fertile or respond well to fertilizer. They are not so wet that excavation is difficult during most of the year.

Soils rated *fair* are loose sandy soils or firm loamy or clayey soils in which the suitable material is only 8 to 16 inches thick or soils that have appreciable amounts of gravel, stones, or soluble salt.

Soils rated *poor* are very sandy soils and very firm clayey soils; soils with suitable layers less than 8 inches thick; soils having large amounts of gravel, stones, or soluble salt; steep soils; and poorly drained soils.

Although a rating of *good* is not based entirely on high content of organic matter, a surface horizon is generally preferred for topsoil because of its organic-matter content. This horizon is designated as A1 or Ap in the soil series descriptions. The absorption and retention of moisture and nutrients for plant growth are greatly increased by organic matter.

Water management

Many soil properties and site features that affect water management practices have been identified in this soil survey. In table 12 the degree of soil limitation and soil and site features that affect use are indicated for each kind of soil. This information is significant in planning, installing, and maintaining water control structures.

Soil and site limitations are expressed as slight, moderate, and severe. *Slight* means that the soil properties and site features are generally favorable for the specified use and that any limitation is minor and easily overcome. *Moderate* means that some soil properties or site features are unfavorable for the specified use but can be overcome or modified by special planning and design. *Severe* means that the soil properties and site features are so unfavorable and so difficult to correct or overcome that major soil reclamation, special design, or intensive maintenance is required.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have a low seepage potential, which is determined by permeability and the depth to fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material that is resistant to seepage, erosion, and piping and has favorable stability, shrink-swell potential, shear strength, and compaction characteristics. Organic matter in a soil downgrade the suitability of a soil for use in embankments, dikes, and levees.

Aquifer-fed excavated ponds are bodies of water made by excavating a pit or dugout into a ground-water aquifer. Excluded are ponds that are fed by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Ratings in table 12 are for ponds that are properly designed, located, and constructed. Soil properties and site features that affect aquifer-fed ponds are depth to a permanent water table, permeability of the aquifer, quality of the water, and ease of excavation.

Drainage of soil is affected by such soil properties as permeability; texture; depth to bedrock, hardpan, or other layers that affect the rate of water movement; depth to the water table; slope; stability of ditchbanks; susceptibility to flooding; and availability of outlets for drainage.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to intercept runoff. They allow water to soak into the soil or flow slowly to an outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock, hardpan, or other unfavorable material; large stones; permeability; ease of establishing vegetation; and resistance to water erosion, soil slipping, and piping.

Grassed waterways are constructed to channel runoff to outlets at a nonerosive velocity. Features that affect the use of soils for waterways are slope, permeability, erodibility, wetness, and suitability for permanent vegetation.

Recreation

George Yeates, soil conservationist, Soil Conservation Service, helped to prepare this section.

The soils of the survey area are rated in table 13 according to limitations that affect their suitability for recreation uses. The ratings are based on such restrictive soil features as flooding, wetness, slope, and texture of the surface layer. Not considered in these ratings, but important in evaluating a site, are location and accessibility of the area, size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites available, and either access to public sewerlines or capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degree, for recreation use by the duration and intensity of flooding and the season when flooding occurs. Onsite assessment of height, duration, intensity, and frequency of flooding is essential in planning recreation facilities.

The degree of the limitation of the soils is expressed as slight, moderate, or severe. *Slight* means that the soil properties are generally favorable and that the limitations are minor and easily overcome. *Moderate* means that the 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 13 can be supplemented by information in other parts of this survey. Especially helpful are interpretations for septic tank absorption fields, given in table 10, and interpretations for dwellings without basements and for local roads and streets, given in table 9.

Camp areas require such site preparation as shaping and leveling for 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 for this use have mild slopes and are not wet or subject to flooding during the period of use. The surface absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes can greatly increase the cost of constructing camping sites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for use as picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use.

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 firm after rains, and is not dusty when dry. If shaping is required to obtain a uniform grade, the depth of the soil over bedrock or hardpan should be enough to allow necessary grading.

Paths and trails for walking, horseback riding, bicycling, and other uses should require little or no cutting and filling. The best soils for this use are those that are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once during the annual period of use. They should have moderate slopes.

Wildlife habitat

Soils directly affect the kind and amount of vegetation that is available to wildlife as food and cover, and they affect the construction of water impoundments. The kind and abundance of wildlife that populate an area depend largely on the amount and distribution of food, cover, and water. If any one of these elements is missing, is inadequate, or is inaccessible, wildlife either are scarce or do not inhabit the area.

If the soils have the potential, wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by helping the natural establishment of desirable plants.

In table 14, the soils in the survey area are rated according to their potential to support the main kinds of wildlife habitat in the area. This information can be used in planning for parks, wildlife refuges, nature study areas, and other developments for wildlife; selecting areas that are suitable for wildlife; selecting soils that are suitable for creating, improving, or maintaining specific elements of wildlife habitat; and 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* means that the element of wildlife habitat or the kind of habitat is easily created, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected if the soil is used for the designated purpose. A rating of *fair* means that the element of wildlife habitat or kind of habitat can be created, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* means that limitations are severe for the designated element or kind of wildlife habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* means that restrictions for the element of wildlife habitat or kind of wildlife are very severe, and that unsatisfactory results can be expected. Wildlife habitat is impractical or even impossible to create, improve, or maintain on soils having such a rating.

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

Grain and seed crops are seed-producing annuals used by wildlife. The major soil properties that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, sorghum, wheat, oats, millet, buckwheat, cowpeas, soybeans, and sunflowers.

Grasses and legumes are domestic perennial grasses and herbaceous legumes that are planted for wildlife food and cover. Major soil properties that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bahiagrass, orchardgrass, clover, annual lespedeza, and vetch.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds, that provide food and cover for wildlife. Major soil properties that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, indiangrass, goldenrod, beggarweed, pokeweed, partridgepea, and fescue. wheatgrass, and grama.

Hardwood trees and the associated woody understory provide cover for wildlife and produce nuts or other fruit, buds, catkins, twigs, bark, or foliage that wildlife eat. Major soil properties that affect growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of native plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are commercially available and suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites, exclusive of submerged or floating aquatics. They produce food or cover for wildlife that use wetland as habitat. Major soil properties affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, rushes, sedges, reeds, wildrice, and cattail.

Shallow water areas are bodies of water that have an average depth of less than 5 feet and that are useful to wildlife. They can be naturally wet areas, or they can be created by dams or levees or by water-control structures in marshes or streams. Major soil properties affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. The availability of a dependable water supply is important if water areas are to be developed. Examples of shallow water areas are marshes, waterfowl feeding areas, wildlife watering developments, beaver ponds, and other wildlife ponds.

The kinds of wildlife habitat are briefly described in the following paragraphs.

Openland habitat 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 kinds of wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, killdeer, cottontail rabbit, red fox, and woodchuck.

Woodland habitat consists of areas of hardwoods or conifers, or a mixture of both, and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Wetland habitat consists of open, marshy or swampy, shallow water areas where water-tolerant plants grow. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, rails, kingfishers, muskrat, mink, and beaver.

Soil properties

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

In making soil borings during field mapping, soil scientists can identify several important soil properties. They note the seasonal soil moisture condition or the presence of free water and its depth. For each horizon in the profile, they note the thickness and color of the soil material; the texture, or amount of clay, silt, sand, and gravel or other coarse fragments; the structure, or the natural pattern of cracks and pores in the undisturbed soil; and the consistence of the soil material in place under the existing soil moisture conditions. They record the depth of plant roots, determine the pH or reaction of the soil, and identify any free carbonates.

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

The available field and laboratory data are summarized in tables. The tables give the estimated range of engineering properties, the engineering classifications, and the physical and chemical properties of each major horizon of each soil in the survey area. They also present data about pertinent soil and water features, engineering test data, and data obtained from physical and chemical laboratory analyses of soils.

Engineering properties

Table 15 gives estimates of engineering properties and classifications for the major horizons of each soil in the survey area.

Most soils have, within the upper 5 or 6 feet, horizons of contrasting properties. Table 15 gives information for each of these contrasting horizons in a typical profile. *Depth* to the upper and lower boundaries of each horizon is indicated. More information about the range in depth and about other properties in each horizon is given for each soil series in the section "Soil series and morphology."

Texture is described in table 15 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 soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains gravel or other particles coarser than sand, an appropriate modifier is added, for example, "gravelly loam." Other texture terms are defined in the Glossary.

The two systems commonly used in classifying soils for engineering use (*8*) are the Unified soil classification system (Unified) (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO) (*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, plasticity index, liquid limit, and organic-matter content. Soils are grouped into 15 classes—eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes have a dual classification symbol, for example, CL-ML.

The *AASHTO* system classifies soils according to those properties that affect their use in highway construction and maintenance. In this system a mineral soil is classified in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines. At the other extreme, in group A-7, are fine-grained soils. Highly organic soils are classified in group A-8 on the basis of visual inspection.

When laboratory data are available, the A-1, A-2, and A-7 groups are further classified as follows: A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, and A-7-6. As an additional refinement, the desirability of soils as subgrade material can be indicated by a group index number. These numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested in the survey area, with group index numbers in parentheses, is given in table 20. The estimated classification, without group index numbers, is given in table 15.

Also in table 15 the percentage, by weight, of rock fragments more than 3 inches in diameter is estimated for each major horizon. These estimates are determined mainly by observing volume percentage in the field and then converting that, by formula, to weight percentage.

Percentage of the soil material less than 3 inches in diameter that passes each of four sieves (U.S. standard) is estimated for each major horizon. The estimates are based on tests of soils that were sampled in the survey area and in nearby areas and on field estimates from many borings made during the survey.

Liquid limit and *plasticity index* indicate the effect of water on the strength and consistence of soil. These indexes are used in both the Unified and AASHTO soil classification systems. They are also used as indicators in making general predictions of soil behavior. Range in liquid limit and plasticity index are estimated on the basis of test data from the survey area or from nearby areas and on observations of the many soil borings made during the survey.

Physical and chemical properties

Table 16 shows estimated values for several soil characteristics and features that affect behavior of soils in engineering uses. These estimates are given for each major horizon, at the depths indicated, in the typical pedon of each soil. The estimates are based on field observations and on test data for these and similar soils.

Permeability is estimated on the basis of known relationships among the soil characteristics observed in the field—particularly soil structure, porosity, and gradation or texture—that influence the downward movement of water in the soil. The estimates are for vertical water movement when the soil is saturated. Not considered in the estimates is lateral seepage or such transient soil features as plowpans and surface crusts. Permeability of the soil is an important factor to be considered in planning and designing drainage systems, in evaluating the potential of soils for septic tank systems and other waste disposal systems, and in many other aspects of land use and management.

Available water capacity is rated on the basis of soil characteristics that influence the ability of the soil to hold water and make it available to plants. Important characteristics are content of organic matter, soil texture, and soil structure. Shallow-rooted plants are not likely to use the available water from the deeper soil horizons. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design of irrigation systems.

Soil reaction is expressed as a range in pH values. The range in pH of each major horizon is based on many field checks. For many soils, the values have been verified by laboratory analyses. Soil reaction is important in selecting the crops, ornamental plants, or other plants to be grown; in evaluating soil amendments for fertility and stabilization; and in evaluating the corrosivity of soils.

Shrink-swell potential depends mainly on the amount and kind of clay in the soil. Laboratory measurements of the swelling of undisturbed clods were made for many soils. For others the swelling was estimated on the basis of the kind and amount of clay in the soil and on measurements of similar soils. The size of the load and the magnitude of the change in soil moisture content also influence the swelling of soils. Shrinking and swelling of some soils can cause damage to building foundations, basement walls, roads, and other structures unless special designs are used. A high shrink-swell potential indicates that special design and added expense may be required if the planned use of the soil will not tolerate large volume changes.

Risk of corrosion pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to soil moisture, particle-size distribution, total acidity, and electrical conductivity of the soil material. The rate of corrosion of concrete is based mainly on the sulfate content, texture, and acidity of the soil. Protective measures for steel or more resistant concrete help to avoid or minimize damage resulting from the corrosion. Uncoated steel intersecting soil boundaries or soil horizons is more susceptible to corrosion than an installation that is entirely within one kind of soil or within one soil horizon.

Erosion factors are used to predict the erodibility of a soil and its tolerance to erosion in relation to specific kinds of land use and treatment. The soil erodibility factor (K) is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible. K values range from 0.10 to 0.64. To estimate annual soil loss per acre, the K value of a soil is modified by factors representing plant cover, grade and length of slope, management practices, and climate. The soil-loss tolerance factor (T) is the maximum rate of soil erosion, whether from rainfall or soil blowing, that can occur without reducing crop production or environmental quality. The rate is expressed in tons of soil loss per acre per year.

Soil and water features

Table 17 contains information helpful in planning land uses and engineering projects that are likely to be affected by soil and water features.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are placed in one of four groups on the basis of the intake of water after the soils have been wetted and have received 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 chiefly of deep, well drained to excessively drained sands or gravels. 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 that have a layer that impedes the downward movement of water or soils that have 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 clay soils 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 is the temporary covering of soil with water from overflowing streams, with runoff from adjacent slopes, and by tides. Water standing for short periods after rains or after snow melts is not considered flooding, nor is water in swamps and marshes. Flooding is rated in general terms that describe the frequency and duration of flooding and the time of year when flooding is most likely. The ratings are based on evidence in the soil profile of the effects of flooding, namely thin strata of gravel, sand, silt, or, in places, clay deposited by floodwater; irregular decrease in organic-matter content with increasing depth; and absence of distinctive soil horizons that form in soils of the area that are not subject to flooding. The ratings are also based on local information about floodwater levels in the area and the extent of flooding; and on information that relates the position of each soil on the landscape to historic floods.

The generalized description of flood hazards is of value in land-use planning and provides a valid basis for land-use restrictions. The soil data are less specific, however, than those provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table is the highest level of a saturated zone more than 6 inches thick for a continuous period of more than 2 weeks during most years. The depth to a seasonal high water table applies to undrained soils. Estimates are based mainly on the relationship between grayish colors or mottles in the soil and the depth to free water observed in many borings made during the course of the soil survey. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table, that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. Only saturated zones above a depth of 5 or 6 feet are indicated.

Information about the seasonal high water table helps in assessing the need for specially designed foundations, the need for specific kinds of drainage systems, and the need for footing drains to insure dry basements. Such information is also needed to decide whether or not construction of basements is feasible and to determine how septic tank absorption fields and other underground installations will function. Also, a seasonal high water table affects ease of excavation.

Depth to bedrock is shown for all soils that are underlain by bedrock at a depth of 5 to 6 feet or less. For many soils, the limited depth to bedrock is a part of the definition of the soil series. The depths shown are based on measurements made in many soil borings and on other observations during the mapping of the soils. The kind of bedrock and its hardness as related to ease of excavation is also shown. Rippable bedrock can be excavated with a single-tooth ripping attachment on a 200-horsepower tractor, but hard bedrock generally requires blasting.

Chemical properties

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The soil analyses reported in table 18 were made in the Soil Genesis and Morphology Laboratory of the Mississippi Agricultural and Forestry Experiment Station. The procedures used were essentially like those given in the Soil Survey Investigation Report No. 1 (*16*).

Soil samples were collected from open pits by the soil scientist. Preparation of the samples for analyses at the laboratory consisted of air-drying, grinding, and screening through a No. 10 sieve.

The exchangeable cations—calcium, magnesium, potassium, and sodium—were extracted by neutral, normal ammonium acetate (procedure 5A1 in Soil Survey Investigations Report No. 1). Calcium and magnesium in the extract were determined with a Perkin-Elmer atomic absorption apparatus using strontium chloride to suppress interference of aluminum, silicon, and phosphorus. Potassium and sodium were analyzed by flame photometry using a Beckman flame spectrophotometer. Extractable acidity (hydrogen plus aluminum) was extracted with barium chloride-triethanolamine buffered to pH 8.2.

The percentage base saturation was calculated by dividing the sum of the bases (calcium, magnesium, sodium, and potassium) by the sum of the cations and multiplying by 100. The sum of the cations include in addition to the bases the extractable acidity (hydrogen plus aluminum).

Soil reaction was determined potentiometrically with a Coleman pH meter using a 1:1 soil-to-water ratio.

Not only is cation exchange capacity a measure of the capacity of a soil to hold nutrient cations in an available form, but it also gives clues as to the type of clay present. For example, montmorillonite has a cation exchange capacity of 50 to 120 milliequivalents per 100 grams of soil and is the only mineral with high cation exchange capacity in several of the soils. It has high shrink-swell potential. If one assumes that most of the cation exchange capacity is in the clay fraction, it is apparent that the cation exchange capacity of the clay in the Wilcox soils is 60 to 70 milliequivalents per 100 grams of soil. This suggests that a considerable proportion of the clay fraction is montmorillonite. These soils formed in thick beds of acid, heavy clay materials over shale of the Coastal Plain. Similar soils in Oktibbeha County were shown by X-ray analyses to contain about 50 percent montmorillonite. The high shrink-swell potential of these soils also suggests the presence of montmorillonite. The other soils reported have low cation exchange capacity, as would be expected from the low percentage of clay. Also, similar soils in adjacent counties have been found to be low in montmorillonite.

Calcium is the dominant basic exchangeable cation in these soils, particularly in the deeper horizons of soils such as the Pooleville and Wilcox soils. Magnesium saturation of these soils is in the range of 5 to 10 percent, which is adequate for balanced plant nutrition. The parent material, particularly the Porters Creek Clay, releases magnesium to the exchange complex. Many soils of this area have a calcium/magnesium ratio of less than 1. In this highly leached, acid soil, the calcium minerals have been removed and magnesium is being released from the clay minerals. Exchangeable potassium is low, usually less than 0.2 milliequivalents per 100 grams of soil or 156 pounds per acre where no fertilizer has been applied.

The soils analyzed from Union County are acid, as shown by the low pH, high extractable acidity, and low base saturation. Liming has raised base saturation and pH in the surface layer of Talla and Wilcox soils. Pooleville, Talla, and Wilcox soils have base saturation of more than 35 percent in the subsoil. The high acidity of most of these soils is another indication of high weathering intensity.

The comprehensive soil classification systems adopted by the National Cooperative Soil Survey makes use of chemical soil properties as differentiating criteria in some categories of the system. Alfisols and Ultisols, for instance, are separated on the basis of percentage base saturation deep in the subsoil. The argillic horizon of Ultisols has a base saturation of less than 35 percent at a designated depth below 4 feet, whereas Alfisols have base saturation of more than 35 percent. In the soils reported in this county, none has base saturation low enough to be classed as an Ultisol. The Wilcox soils, which have base saturation of more than 40 percent, are Alfisols. The degree of weathering is inversely related to base saturation, since this is a measure of the extent of the replacement of bases by hydrogen during the leaching process.

Particle size analyses

The particle size analyses in table 19 were obtained using Day's hydrometer method (*5*). Forty grams of soil was dispersed in a 0.5 percent Calgon solution (sodium phosphate) by mixing for 5 minutes in a milkshaker. The dispersed soil was transferred to a sedimentation cylinder, made to 1,000 milliliters, and equilibrated overnight in a 30 degree C water bath. The suspension was then mixed and allowed to settle. Hydrometer readings were taken at predetermined times to determine the clay content. The sand was separated on a 325-mesh sieve, dried, and weighed. All results are expressed on the basis of 110 degrees C ovendry weight.

The physical properties of soils, such as water infiltration and conduction, shrink-swell potential, crusting, ease of tillage, consistence, and water holding capacity, are closely related to soil texture (the percentage of sand, silt, and clay).

Wilcox soils are high in the expansible montmorillonite clay. This causes shrinking and swelling during drying and wetting cycles, which makes these soils very unstable as foundations for buildings and roads. Cracks develop during dry weather, sometimes damaging plant roots. Water infiltration is rapid until the cracks swell closed, and then infiltration and hydraulic conductivity are very slow.

Cascilla, Pooleville, and Talla soils have a high silt content, which can result in adverse physical conditions. Often these soils pack excessively. A surface crust is formed by raindrops; this can result in poor seedling germination and emergence. A plowpan also develops easily during tillage.

The surface layer of the Wilcox soils that were analyzed is silty clay loam. These soils have a narrow range of moisture conditions in which they can be worked without clodding. Tillage operations require more power compared to the silty soils, and the moisture content at the time of tillage is more critical. These clayey soils have high water holding and nutrient holding capacities.

Engineering test data

Table 20 contains engineering test data for Cascilla, Talla, and Pooleville soils. These tests were made to help evaluate the soils for engineering purposes. The engineering classificatons given are based on data obtained by mechanical analyses and by tests to determine liquid limits and plastic limits. The mechanical analyses were made by combined sieve and hydrometer methods.

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

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

Classification of the soils

This section describes the soil series of the survey area, defines the current system of classifying soils, and classifies the soils of the area according to that system.

Soil series and morphology

In this section, each soil series recognized in the survey area is described in detail. The descriptions are arranged in alphabetic order by series name.

Characteristics of the soil and the material in which it formed are discussed for each series. The soil is then compared to similar soils and to nearby soils of other series. Then a pedon, a small three-dimensional area of soil that is typical of the soil series in the survey area, is described. The detailed descriptions of each soil horizon follow standards in the Soil Survey Manual (*10*). Unless otherwise noted, colors described are for moist soil.

Following the pedon description is the range of important characteristics of the soil series in this survey area. Phases, or map units, of each soil series are described in the section "Soil maps for detailed planning."

Arkabutla series

The Arkabutla series consists of somewhat poorly drained soils that formed in silty alluvium on broad flood plains. Slopes are 0 to 2 percent.

Typical pedon of Arkabutla silt loam, 1/4 mile east of Mill Creek canal, 1/2 mile west of Mud Creek canal, SW1/4NE1/4 sec. 13, T. 8 S., R. 1 E.:

Ap—0 to 7 inches; brown (10YR 5/3) silt loam; weak fine granular and subangular blocky structure; friable; few fine roots; strongly acid; abrupt smooth boundary.

B21—7 to 15 inches; mottled brown (10YR 5/3), gray (10YR 5/1), dark yellowish brown (10YR 4/4), and dark grayish brown (10YR 4/2) silt loam; weak medium subangular blocky structure; friable; common black concretions and stains; few fine roots; strongly acid; gradual smooth boundary.

B22g—15 to 28 inches; gray (10YR 5/1) silt loam; many medium distinct brown (10YR 5/3), dark yellowish brown (10YR 4/4), and very dark brown (10YR 2/2) mottles; weak medium subangular blocky structure; friable; many soft black concretions; few fine roots; strongly acid; gradual smooth boundary.

B23g—28 to 43 inches; gray (10YR 5/1) silt loam; many medium distinct brown (10YR 5/3), dark yellowish brown (10YR 4/4), and very dark brown (10YR 2/2) mottles; weak medium subangular blocky structure; friable, slightly plastic; common black concretions; strongly acid; gradual smooth boundary.

B24g—43 to 55 inches; gray (10YR 6/1) silt loam; many coarse distinct brown (10YR 5/3), dark yellowish brown (10YR 4/4), pale brown (10YR 6/3), and yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; friable, slightly plastic; common black concretions; strongly acid.

Soft black concretions range from few to many throughout the solum. Reaction is strongly acid or very strongly acid throughout the profile except for the surface layer in limed areas.

The Ap horizon is brown, dark brown, or dark yellowish brown silt loam or silty clay loam. The B horizon is mottled in shades of brown, yellow, and gray, or it has a brown or yellowish brown matrix and few to many grayish mottles. Texture is silt loam or silty clay loam. The Bg horizon has a gray or light brownish gray matrix mottled in shades of brown or yellow. Texture is silt loam, loam, and silty clay loam. Clay content of the 10-to-40-inch control section ranges from 20 to 35 percent.

Arkabutla soils are near Cascilla, Mantachie, and Urbo soils. They are not so well drained as Cascilla soils and have gray mottles nearer the surface. They contain more silt and less sand than Mantachie soils. They are lower in clay than Urbo soils.

Atwood series

The Atwood series consists of well drained soils that formed in a thin silty mantle and over the underlying loamy material. Slopes are 2 to 12 percent.

Typical pedon of Atwood silt loam, 2 to 5 percent slopes, eroded, 1/2 mile northwest of junction of Tallahatchie River and Jasper Creek, 3/4 mile northeast of junction of Highways 78 and 30, southeast corner of SE1/4NE1/4NE1/4 sec. 6, T. 7 S., R. 3 E.:

Ap—0 to 5 inches; brown (7.5YR 4/4) silt loam; weak fine granular structure; very friable; few fine roots; medium acid; abrupt smooth boundary.

B21t—5 to 20 inches; reddish brown (5YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few black stains; continuous clay films; medium acid; gradual smooth boundary.

B22t—20 to 37 inches; reddish brown (2.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable, slightly plastic; few fine roots; few black stains; nearly continuous clay films; strongly acid; gradual smooth boundary.

B23t—37 to 45 inches; reddish brown (2.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable, slightly plastic; few black stains; patchy clay films; strongly acid; gradual smooth boundary.

IIB24t—45 to 70 inches; reddish brown (2.5YR 4/4) clay loam; moderate medium subangular blocky structure; friable, slightly plastic; few black stains; patchy clay films; strongly acid; gradual smooth boundary.

IIB25t—70 to 87 inches; reddish brown (2.5YR 4/4) sandy clay loam; moderate medium subangular blocky structure; friable, slightly plastic; few black stains; patchy clay films; strongly acid.

Reaction is medium acid to strongly acid throughout the profile, except for the surface layer in limed areas.

The Ap horizon is brown or reddish brown silt loam or loam. The Bt horizon is reddish brown, yellowish red, and red silty clay loam. Clay content of the upper 20 inches of the Bt horizon ranges from 27 to 33 percent. The IIBt horizon is reddish brown or red clay loam, sandy clay loam, or silty clay loam. Brownish yellow, pale brown, and light yellowish brown mottles are in some profiles. Few to many black stains are in the Bt horizon and in the upper part of the IIBt horizon.

Atwood soils are near Providence and Smithdale soils. They do not have the fragipan of Providence soils and are better drained. They contain more silt and less sand than Smithdale soils.

Bude series

The Bude series consists of somewhat poorly drained soils that have a fragipan. These soils formed in beds of silty material on broad upland flats and stream terraces. Slopes are 0 to 2 percent.

Typical pedon of Bude silt loam in a large soybean field, 1.4 miles southwest of Pooleville and 25 feet east of dead-end road, NW1/4SW1/4NE1/4 sec. 30, T. 7 S., R. 2 E.:

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

B21—6 to 18 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct pale brown (10YR 6/3), yellowish brown (10YR 5/6), and light brownish gray (10YR 6/2) mottles; weak fine and medium subangular blocky structure; friable; common fine roots; many fine pores; few fine black and brown coatings; few worm casts; very strongly acid; gradual smooth boundary.

B22—18 to 28 inches; yellowish brown (10YR 5/4) silt loam; many distinct gray (10YR 6/1) mottles; weak fine and medium subangular blocky structure; friable; few fine roots; many fine pores; few fine black and brown coatings; few worm casts; very strongly acid; clear smooth boundary.

A&B—28 to 35 inches; mottled pale brown (10YR 6/3), gray (10YR 6/1), and reddish yellow (7.5YR 6/6) silt loam; weak fine and medium subangular blocky structure; friable, the reddish yellow part is firm, compact and brittle; few fine roots in gray part; few fine black and brown stains and soft concretions; common fine voids; gray silt coatings on peds; very strongly acid; clear smooth boundary.

IIBx1—35 to 40 inches; mottled strong brown (7.5YR 5/6), gray (10YR 6/1), and yellowish brown (10YR 5/4) silty clay loam containing noticeable sand; prismatic structure parting to moderate medium subangular blocky; firm, compact and brittle; few fine flattened roots in gray seams; common black and brown stains and soft concretions; common voids; thin tongues or gray silt coatings between prisms; patchy clay films on prisms; very strongly acid; clear smooth boundary.

IIBx2—40 to 60 inches; mottled gray (10YR 6/1), pale brown (10YR 6/3), strong brown (7.5YR 5/6), and yellowish brown (10YR 5/6) clay loam; prismatic structure parting to moderate medium subangular blocky structure; firm, compact and brittle; common fine and medium black and brown stains and soft concretions; common voids; thin tongues of gray silt coatings between prisms; patchy clay film on prisms; very strongly acid.

Depth to the fragipan ranges from 15 to 37 inches. Soil reaction is very strongly acid to medium acid throughout the soil, except for the surface layer in limed areas.

The Ap horizon is brown, dark brown, or yellowish brown. The B horizon is mottled gray, light brownish gray, olive yellow, pale brown, yellowish brown, dark yellowish brown, brown, or strong brown silt loam or silty clay loam. The B21 horizon in places has a yellowish brown matrix and few to many mottles in shades of gray, brown, or yellow. Clay content of the upper 20 inches of the B2 horizon ranges from 19 to 28 percent. The A&B horizon is mottled in shades of gray, brown, and yellow. The gray portion has less clay and interfingers into the IIBx1 horizon. The IIBx1 horizon is mottled in shades of brown and yellow with grayish silty material in the seams between prisms. Texture is silt loam or silty clay loam. The IIBx2 horizon is mottled in shades of brown and yellow with grayish material in the seams between prisms. Texture is silt loam, silty clay loam, or clay loam. The sand content of this horizon is more than 15 percent.

Bude soils are near Pooleville and Talla soils. They contain more silt and less sand than Talla soils. They have a fragipan, which Pooleville soils do not have.

Cascilla series

The Cascilla series consists of well drained soils that formed in silty alluvium on flood plains. Slopes are 0 to 2 percent.

Typical pedon of Cascilla silt loam in a large cotton field, 3,000 feet south of Tippah County line, 1,000 feet west of Hell Creek channel, NE1/4NW1/4SE1/4 sec. 2, T. 6 S., R. 2 E.:

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

B21—6 to 15 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; common fine roots; few worm casts; strongly acid; gradual smooth boundary.

B22—15 to 29 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; common fine roots; few worm casts; few patchy clay films in root channels; strongly acid; gradual smooth boundary.

IIB23—29 to 46 inches; dark brown (10YR 4/3) silt loam; common fine distinct light brownish gray and brown mottles; weak medium subangular blocky structure; friable; few fine roots; few fine and medium black and brown stains; strongly acid; gradual smooth boundary.

IIB3—46 to 72 inches; mottled light brownish gray (2.5Y 6/2) and brown (10YR 4/3) silt loam; few fine distinct strong brown mottles; weak medium subangular blocky structure; friable; few fine roots; few fine black and brown stains; few bedding planes; very strongly acid.

Reaction is strongly acid to very strongly acid, except in the surface layer in limed areas.

The Ap horizon is brown, dark brown, or dark yellowish brown silt loam. The B2 horizon is brown, dark brown, yellowish brown, and dark yellowish brown silt loam or silty clay loam. The lower part of the B2 horizon and the B3 horizon contain few to many light brownish gray mottles. The texture of the B3 horizon is silt loam, fine sandy loam, or loam. Clay content of the 10-to-40-inch control section ranges from 18 to 30 percent.

Cascilla soils are near Arkabutla, Jena, and Urbo soils. Cascilla soils are better drained than Arkabutla and Urbo soils and contain less clay than Urbo soils. Cascilla soils are similar to Jena soils in drainage but contain less sand in the B horizon.

Falkner series

The Falkner series consists of somewhat poorly drained soils on broad upland flats. These soils formed in a thin, silty mantle and the underlying clayey material. Slopes are 0 to 5 percent.

Typical pedon of Falkner silt loam, 0 to 2 percent slopes, 1 mile southwest of Cotton Plant, Mississippi, 150 feet north of local road in cultivated field, SE1/4SE1/4NE1/4 sec. 6, T. 6 S., R. 3 E.:

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

B21t—6 to 11 inches; light yellowish brown (10YR 6/4) silt loam; moderate fine and medium subangular blocky structure; friable; few fine roots; few patchy clay films; strongly acid; gradual smooth boundary.

B22t—11 to 21 inches; light yellowish brown (10YR 6/4) silt loam; common medium distinct gray (10YR 6/1) and strong brown (7.5YR 5/6) mottles; moderate medium and fine subangular blocky structure; friable; few fine roots; few patchy clay films; very strongly acid; clear smooth boundary.

IIB23tg—21 to 27 inches; gray (10YR 6/1) silty clay; many medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm, plastic; few fine roots; common patchy clay films; very strongly acid; gradual smooth boundary.

IIB24tg—27 to 36 inches; gray (10YR 6/1) silty clay; many medium and coarse distinct yellowish brown (10YR 5/6), strong brown (7.5YR 5/6), and pale brown (10YR 6/3) and prominent yellowish red (5YR 5/6) mottles; strong medium subangular blocky structure; firm, plastic; few fine roots; patchy clay films on peds; few slickensides that intersect; very strongly acid; gradual smooth boundary.

IIB25tg—36 to 65 inches; gray (10YR 6/1) silty clay loam; many fine distinct yellowish brown and pale brown mottles; moderate fine and coarse subangular blocky structure; firm; patchy clay films; few slickensides that do not intersect; very strongly acid.

Reaction is strongly acid and very strongly acid throughout the soil, except in the surface layer in limed areas.

The A horizon is brown, grayish brown, yellowish brown, pale brown, or dark grayish brown silt loam, or it is mottled in shades of brown and gray. The Bt horizon is mottled in shades of brown, yellow, red, and gray, or the B21t horizon is light yellowish brown and yellowish brown with few to many gray mottles. Texture is silt loam or silty clay loam. The IIBtg horizon is gray mottled in shades of brown, yellow, and red. Texture is silty clay loam or silty clay. Clay content of the upper 20 inches of the B horizon ranges from 25 to 32 percent.

Falkner soils are near Pooleville, Tippah, and Wilcox soils. Falkner soils contain more clay than Pooleville soils. Falkner soils are more poorly drained than Tippah soils and have gray mottles nearer the surface. They are not so clayey in the upper part as Wilcox soils.

Jena series

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

Typical pedon of Jena silt loam, 50 yards southwest of middle radio transmission tower, SW1/4SW1/4 sec. 5, T. 7 S., R. 3 E.:

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

B1—6 to 13 inches; brown (7.5YR 5/4) silt loam; weak fine and medium subangular blocky structure; very friable; few fine roots; few fine soft black concretions; strongly acid; gradual smooth boundary.

B21—13 to 21 inches; yellowish brown (10YR 5/6) silt loam; weak fine and medium subangular blocky structure; very friable; strongly acid; gradual smooth boundary.

B22—21 to 33 inches; yellowish brown (10YR 5/6) fine sandy loam; weak fine and medium subangular blocky structure; very friable; strongly acid; gradual smooth boundary.

C—33 to 66 inches; yellowish brown (10YR 5/6) sandy loam; few medium distinct light brownish gray (10YR 6/2) mottles; weak fine subangular blocky structure; few bedding planes; very friable; strongly acid.

Reaction is strongly acid or very strongly acid throughout, except for the surface layer in limed areas.

The Ap horizon is brown and yellowish brown silt loam or fine sandy loam. The B horizon is brown, dark brown, yellowish brown, or dark yellowish brown. Subhorizons of the B horizon are fine sandy loam, silt loam, or very fine sandy loam. Clay content of the control section ranges from 12 to 17 percent. In some profiles few to many grayish mottles are in the lower part of the B horizon. The C horizon is brown, dark brown, strong brown, yellowish brown, or brownish yellow and contains few to many grayish mottles in places. Textures are sandy loam, fine sandy loam, or loamy fine sand.

Jena soils are near Cascilla, Mantachie, and Marietta soils. Jena soils contain less clay than either Cascilla, Mantachie, or Marietta soils and more sand than Cascilla soils. They are better drained than either Mantachie or Marietta soils. They have lower pH than Marietta soils.

Mantachie series

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

Typical pedon of Mantachie silt loam, about 3 miles southwest of Martintown, SE1/4SE1/4SW1/4 sec. 32, T. 7 S., R. 2 E.:

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

A1—5 to 10 inches; mottled brown (10YR 5/3), grayish brown (10YR 5/2), very dark grayish brown (10YR 3/2), and dark brown (10YR 4/3) silt loam; weak fine and medium subangular blocky structure; friable; common fine roots; common fine and medium black stains and soft concretions; strongly acid; clear smooth boundary.

B21—10 to 17 inches; mottled grayish brown (10YR 5/2), dark brown (10YR 4/3), and strong brown (7.5YR 5/6) loam; weak medium subangular blocky structure; friable; few fine roots; common fine and medium black and brown stains and soft concretions; strongly acid; clear smooth boundary.

B22g—17 to 43 inches; light brownish gray (10YR 6/2) loam; common medium distinct strong brown (7.5YR 5/6) and very dark grayish brown (10YR 3/2) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine black and brown stains and soft concretions; strongly acid; gradual smooth boundary.

B23g—43 to 60 inches; gray (10YR 6/1) loam; many coarse prominent strong brown mottles; weak medium subangular blocky structure; few fine and medium black and brown stains; strongly acid.

Reaction is strongly acid or very strongly acid throughout the profile, except for the surface layer in limed areas.

The Ap horizon is brown, dark brown, or dark yellowish brown silt loam, sandy loam, or fine sandy loam. The upper part of the B horizon is mottled in shades of gray, brown, and yellow or has a brown matrix and grayish mottles. Textures are loam, sandy clay loam, or clay loam. The Bg horizon is gray, light brownish gray, or grayish brown sandy clay loam, loam, or clay loam. Clay content of the 10-to-40-inch control section ranges from 18 to 30 percent. Content of sand coarser than very fine ranges from 16 to about 50 percent.

Mantachie soils are near Arkabutla, Jena, and Marietta soils. Mantachie soils contain more sand than Arkabutla soils. They are not so well drained as Jena soils, and they contain more clay. They have lower pH than Marietta soils.

Marietta series

The Marietta series consists of moderately well drained, nonacid soils on flood plains. Slopes are 0 to 2 percent.

Typical pedon of Marietta loam in a large cultivated field, 3 miles northeast of Sherman, SW1/4NW1/4NW1/4 NE1/4 sec. 7, T. 8 S., R. 5 E.:

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

B21—6 to 13 inches; brown (10YR 5/3) loam; common medium faint pale brown (10YR 6/3) and few fine distinct light brownish gray and yellowish brown mottles; weak fine and medium subangular blocky structure; friable; common fine roots; medium acid; gradual smooth boundary.

B22—13 to 21 inches; mottled light brownish gray (2.5Y 6/2), strong brown (7.5YR 5/6), and dark yellowish brown (10YR 4/4) loam; weak medium subangular blocky structure; friable; few fine roots; few fine black and brown stains and concretions; medium acid; gradual smooth boundary.

B23—21 to 28 inches; mottled grayish brown (2.5Y 5/2), brown (7.5Y 5/4), strong brown (7.5YR 5/6), and yellowish brown (10YR 5/6) loam; weak medium subangular blocky structure; friable; few fine roots; few fine black and brown stains; few fine voids; medium acid; gradual smooth boundary.

B24g—28 to 46 inches; grayish brown (2.5Y 5/2) loam; moderate medium distinct brown (7.5YR 4/4), strong brown (7.5YR 5/6), and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable to firm; few fine roots; few fine voids and pores; few fine black and brown stains; slightly acid; gradual smooth boundary.

B25g—46 to 54 inches; grayish brown (2.5Y 5/2) loam; moderate medium distinct dark yellowish brown (10YR 4/4), yellowish brown (10YR 5/6), brown (7.5YR 4/4), and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine black and brown stains; few bedding planes; slightly acid; gradual smooth boundary.

Cg—54 to 70 inches; light brownish gray (2.5Y 6/2) loam; common medium distinct brown (7.5YR 5/4) and strong brown (7.5YR 5/6) mottles; massive; friable, sticky; few fine roots; black and brown stains; slightly acid.

Reaction ranges from medium acid to slightly acid throughout the profile.

The Ap horizon is brown, dark brown, dark grayish brown, or yellowish brown fine sandy loam or loam. The B2 horizon is brown, yellowish brown, or dark yellowish brown and has few to many grayish mottles, or it is mottled in shades of gray, brown, and yellow. Textures are sandy clay loam, loam, or silty clay loam. The Bg horizon is gray or grayish brown loam, sandy clay loam, or silty clay loam. Clay content of the 10-to-40-inch control section ranges from 20 to 30 percent. Sand coarser than very fine ranges from 20 to more than 40 percent.

Marietta soils are near Jena, Mantachie, and Talla soils. Marietta soils are not so well drained as Jena soils, contain more clay, and have gray mottles nearer the surface. They are not so acid as Mantachie soils. They do not have the thick A horizon of Talla soils and are not so acid.

Oktibbeha series

The Oktibbeha series consists of well drained soils that formed in acid clays over calcareous material. Slopes are 2 to 12 percent.

Typical pedon of Oktibbeha silt loam, 2 to 5 percent slopes, eroded, 100 feet east of road intersection and 1/4 mile north of Jericho Church, NE1/4SE1/4 sec. 34, T. 6 S., R. 5 E.:

A1—0 to 2 inches; brown (10YR 5/3) silt loam; weak fine granular structure; friable; many fine roots; strongly acid; abrupt smooth boundary.

A2—2 to 6 inches; yellowish brown (10YR 5/4) silt loam; weak fine granular structure; friable; common fine roots; strongly acid; clear smooth boundary.

B21t—6 to 17 inches; yellowish red (5YR 5/6) clay; strong medium angular and subangular blocky structure; firm, very hard, plastic; few fine roots; nearly continuous clay films; strongly acid; gradual smooth boundary.

B22t—17 to 25 inches; mottled yellowish red (5YR 5/6) and light yellowish brown (2.5Y 6/4) clay; few medium distinct red (2.5YR 4/6) and olive yellow (2.5Y 6/6) mottles; strong medium subangular blocky structure; firm, very hard, plastic; few fine roots; patchy clay films; slickensides that do not intersect; strongly acid; gradual smooth boundary.

B23t—25 to 37 inches; mottled yellowish brown (10YR 5/6) and light yellowish brown (2.5Y 6/4) clay; common medium distinct light brownish gray (2.5Y 6/2) and few fine distinct strong brown mottles; strong medium subangular blocky structure; firm, very hard, plastic; few fine roots; patchy clay films; slickensides; strongly acid; clear smooth boundary.

IIC—37 to 60 inches; light brownish gray (2.5Y 6/2) clay; common medium faint light yellowish brown (2.5Y 6/4) and few fine distinct brownish yellow mottles; massive breaking to angular fragments; firm, very hard, plastic; content of chalk fragments increase with depth; moderately alkaline.

Depth to marly clay ranges from 27 to 54 inches. This soil cracks to depths of more than 20 inches during dry periods. Reaction is strongly acid or very strongly acid in the solum and neutral to moderately alkaline in the C horizon.

The A horizon is very dark grayish brown, grayish brown, brown, or yellowish brown silt loam, loam, or fine sandy loam. The upper part of the B horizon is yellowish red, red, strong brown, or reddish brown. The lower part is yellowish red, red, strong brown, or yellowish brown and has few to many grayish mottles, or it is mottled in shades of brown, yellow, gray, or red. The B horizon is clay. Clay content in the upper 20 inches of the B horizon ranges from 60 to 73 percent. The C horizon is yellowish brown, light olive brown, light yellowish brown, light brownish gray, or gray mottled in shades of gray or is mottled in shades of gray, brown, and yellow. The C horizon is clay, marly clay, or silty clay. Lime nodules in the C horizon range from few to many, and black and brown concretions are in some profiles.

Oktibbeha soils are near Ora, Smithdale, and Sweatman soils. They contain more clay and less sand in the B horizon than Ora, Smithdale, or Sweatman soils and contain calcareous material in the lower part. They do not have a fragipan, which Ora soils have.

Ora series

The Ora series consists of moderately well drained soils that have a fragipan. They formed in loamy material on uplands. Slopes are 8 to 12 percent.

Typical pedon of Ora fine sandy loam, 8 to 12 percent slopes, severely eroded, in a pasture about 1 mile northeast of Ellistown, SE1/4SW1/4NE1/4 sec. 24, T. 7 S., R. 4 E.:

Ap—0 to 2 inches; brown (10YR 5/3) fine sandy loam; weak fine granular structure; very friable; many fine roots; strongly acid; abrupt smooth boundary.

B21t—2 to 14 inches; yellowish red (5YR 4/6) loam; moderate fine and medium subangular blocky structure; friable, slightly hard; few fine roots; patchy clay films; strongly acid; gradual smooth boundary.

B22t—14 to 22 inches; yellowish red (5YR 4/6) sandy clay loam; moderate fine and medium subangular blocky structure; friable, slightly hard; few fine roots; patchy clay films; strongly acid; clear smooth boundary.

Bx1—22 to 28 inches; yellowish red (5YR 5/6) sandy clay loam; common medium faint yellowish red (5YR 4/6) and few medium to coarse distinct light brownish gray (2.5Y 6/2) and light yellowish brown (2.5Y 6/4) mottles; prismatic structure parting to moderate medium subangular blocky; firm, compact and brittle in about 85 percent of the volume; few fine roots in cracks; silt coatings between peds; clay films on faces of peds; few fine pores and voids; strongly acid; gradual smooth boundary.

Bx2—28 to 38 inches; yellowish red (5YR 5/6) sandy clay loam; many medium distinct light brownish gray (2.5Y 6/2) and pale brown (10YR 6/3) mottles; prismatic structure parting to weak fine and medium subangular blocky; firm, hard, brittle and compact in about 85 percent of the volume; grayish fine sandy loam between prisms; silt coats on peds; clay films on ped faces; common fine pores and voids; strongly acid; gradual smooth boundary.

Bx3—38 to 52 inches; yellowish red (5YR 4/6) sandy clay loam; common medium distinct light brownish gray (2.5Y 6/2), pale brown (10YR 6/3), and light yellowish brown (2.5Y 6/4) mottles; prismatic structure parting to weak fine and medium subangular blocky; firm, hard, brittle and compact in about 85 percent of the volume; grayish fine sandy loam between prisms; silt coats on peds; clay films on ped faces; common fine pores and voids; strongly acid; gradual smooth boundary.

C—52 to 64 inches; strong brown (7.5YR 5/6) sandy loam; few medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; strongly acid.

Reaction is strongly acid or very strongly acid throughout the profile, except for the surface layer in limed areas. Depth to the fragipan ranges from 20 to 25 inches.

The Ap horizon is brown or yellowish brown fine sandy loam, sandy loam, or loam. The Bt horizon is yellowish red loam, clay loam, or sandy clay loam. Clay content of the Bt horizon ranges from 18 to 30 percent. The Bx horizon is yellowish red or strong brown and has few to many light brownish gray, gray, yellowish brown, and brown mottles, or it is mottled in shades of brown, gray, red, and yellow. Textures are sandy clay loam, loam, and sandy loam. A few soft brown concretions are in some pedons. The C horizon is strong brown or yellowish red and has grayish mottles. Texture is sandy clay loam, loam, or sandy loam.

Ora soils are near Providence, Smithdale, and Oktibbeha soils. Ora soils contain more sand than Providence soils. They have a fragipan, which Smithdale and Oktibbeha soils do not have. Ora soils also contain less clay than Oktibbeha soils.

Pooleville series

The Pooleville series consists of somewhat poorly drained soils that formed in silty material on broad upland flats and stream terraces. Slopes are 0 to 2 percent.

Typical pedon of Pooleville silt loam, 0.7 mile south of Martintown Church, 300 feet west of blacktop road, SE1/4NE1/4 sec. 26, T. 7 S., R. 2 E.:

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

B&A21—4 to 14 inches; yellowish brown (10YR 5/6) silt loam; common fine and medium distinct and faint light brownish gray (10YR 6/2), light yellowish brown (10YR 6/4), and yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; common fine roots; few fine voids and pores; tongues of light brownish gray (10YR 6/2) silt 2 to 3 inches in diameter make up about 30 percent of the horizon; very strongly acid; irregular boundary.

B&A22—14 to 26 inches; yellowish brown (10YR 5/6) silt loam; common fine and medium distinct and faint light brownish gray (10YR 6/2), light yellowish brown (10YR 6/4), and brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine pores; few fine black and brown stains and concretions; tongues of light brownish gray (10YR 6/2) silt 2 to 3 inches in diameter make up about 30 percent of the horizon; very strongly acid; gradual irregular boundary.

B21t—26 to 42 inches; mottled yellowish brown (10YR 5/8), light gray (10YR 7/2), and pale brown (10YR 6/3) silt loam; weak medium subangular blocky structure; friable; few fine roots; few fine voids and pores; few fine black and brown stains and concretions; tongues of light brownish gray (10YR 6/2) silt 2 to 4 inches in diameter make up about 30 percent of the horizon; patchy clay films on faces of peds; very strongly acid; diffuse irregular boundary.

B22t—42 to 64 inches; mottled light yellowish brown (2.5Y 6/4), light brownish gray (2.5Y 6/2), and yellowish brown (10YR 5/8) silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; few fine pores; few fine black and brown stains and concretions; few charcoal fragments; tongues of light brownish gray (10YR 6/2) silt 2.5 to 5 inches in diameter make up 30 percent of the horizon; patchy clay films on faces of peds; very strongly acid; diffuse wavy boundary.

B23t—64 to 74 inches; mottled light brownish gray (2.5Y 6/2), light yellowish brown (2.5Y 6/4), and yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; slightly firm and brittle; few fine roots; few fine black and brown concretions; patchy clay films on faces of peds; very strongly acid.

Reaction is strongly acid or very strongly acid, except for the surface layer in limed areas.

The Ap horizon is dark brown, yellowish brown, brown, grayish brown, dark grayish brown, or light yellowish brown. A thin A1 horizon, where present, is dark grayish brown or dark brown. Texture is silt loam or loam. The B horizon part of the B&A horizon is yellowish brown, strong brown, dark yellowish brown, brown, light yellowish brown, and brownish yellow. The A horizon part of the B&A horizon consists of pockets and tongues of gray and light brownish gray silt or silt loam that has less clay than the B part. The Bt horizon is mottled in shades of brown, yellow, and gray. Textures are silt loam or silty clay loam but range to loam or clay loam in the lower part in places. Grayish tongues of A horizon material extend deep into the Bt horizon. These range from 1 to 5 inches in diameter horizontally and make up 15 to 40 percent of the volume.

Pooleville soils are near Bude, Falkner, and Talla soils. They do not have a fragipan, which Bude soils have. They contain less clay than Falkner soils, and they are not so sandy as Talla soils.

Providence series

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

Typical pedon of Providence silt loam, 2 to 5 percent slopes, eroded, 1/2 mile southeast of junction of Highways 78 and 15, 1/4 mile south (across SLSF Railroad) of TVA substation, NE1/4NW1/4 sec. 16, T. 7 S., R. 3 E.:

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

B21t—4 to 11 inches; yellowish red (5YR 4/6) silt loam; moderate medium subangular blocky structure; friable, slightly sticky; few fine roots; patchy clay films; strongly acid; gradual smooth boundary.

B22t—11 to 18 inches; yellowish red (5YR 4/6) silt loam; moderate medium subangular blocky structure; friable, slightly sticky; few fine roots; few soft black and brown concretions; patchy clay films; strongly acid; gradual smooth boundary.

Bx1—18 to 21 inches; strong brown (7.5YR 5/6) silt loam; common medium distinct pale brown (10YR 6/3) and yellowish red (5YR 4/6) mottles; prismatic structure parting to moderate medium subangular blocky; firm, compact and brittle in about 70 percent of the volume; few fine voids; few soft black concretions; patchy clay films; strongly acid; clear smooth boundary.

Bx2—21 to 26 inches; mottled yellowish red (5YR 4/6), yellowish brown (10YR 5/6), and pale brown (10YR 6/3) silt loam; few fine faint gray mottles; prismatic structure parting to moderate medium subangular blocky; firm, compact and brittle in about 70 percent of the volume; few fine voids; few soft black concretions; patchy clay films; strongly acid; gradual smooth boundary.

Bx3—26 to 37 inches; mottled yellowish red (5YR 4/6), dark brown (7.5YR 4/4), and pale brown (10YR 6/3) silt loam with high sand content; common medium faint gray (10YR 6/1) mottles; prismatic structure parting to moderate medium subangular blocky; firm, compact and brittle in 70 percent of the volume; few fine voids; few soft black concretions; patchy clay films; strongly acid; gradual smooth boundary.

IIBx4—37 to 44 inches; mottled red (2.5YR 4/6), yellowish red (5YR 4/6), and dark brown (7.5YR 4/4) loam; common fine faint gray (10YR 6/1) mottles; prismatic structure parting to moderate medium subangular blocky; firm, compact and brittle in 70 percent of the volume; few fine voids; patchy clay films; strongly acid; gradual smooth boundary.

IIBx5—44 to 52 inches; mottled red (2.5YR 4/6), yellowish red (5YR 4/6), and yellowish brown (10YR 5/6) loam; common fine distinct gray (10YR 6/1) mottles; prismatic structure parting to moderate medium subangular blocky; firm, compact and brittle in 70 percent of the volume; few fine voids; patchy clay films; strongly acid; gradual smooth boundary.

IIBx6—52 to 62 inches; mottled red (2.5YR 4/6), yellowish red (5YR 4/6), and yellowish brown (10YR 5/6) sandy clay loam; common medium distinct gray (10YR 6/1) mottles; prismatic structure parting to moderate medium subangular blocky; firm, compact and brittle in 70 percent of the volume; few fine voids; patchy clay films; strongly acid.

Depth to the fragipan ranges from 18 to 31 inches. Depth to the IIBx horizon ranges from 20 to 43 inches. Reaction is medium acid to very strongly acid throughout the profile, except for the surface layer in limed areas.

The Ap horizon is brown, dark brown, or yellowish brown silt loam. The Bt horizon is strong brown, yellowish brown, or yellowish red silt loam or silty clay loam. Clay content of the Bt horizon ranges from 20 to 30 percent. The Bx horizon is brown, strong brown, or yellowish brown with few to many gray, light brownish gray, and dark yellowish brown mottles, or it is mottled in shades of brown, gray, red, and yellow. Texture is silt loam or silty clay loam. The IIBx horizon is mottled in shades of brown, gray, red, and yellow. Textures are loam, clay loam, sandy clay loam, and sandy loam. There are few to many soft black and brown concretions.

Providence soils are near Atwood, Ora, Sweatman, and Tippah soils. Providence soils are not so well drained as Atwood and Sweatman soils, and they have a fragipan, which those soils do not have. They do not have a clayey substratum, which Tippah soils have. They have more silt in the upper part of the profile than Ora soils.

Smithdale series

The Smithdale series consists of well drained soils that formed in loamy material on uplands. Slopes are 12 to 45 percent.

Typical pedon of Smithdale sandy loam that has slopes of 18 percent, 0.8 mile northeast of Highway 15 and 150 yards north of Highway 30, NE1/4NW1/4NE1/4 sec. 9, T. 7 S., R. 3 E.:

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

B1—4 to 8 inches; yellowish red (5YR 4/6) loam; weak medium subangular blocky structure; very friable; common fine roots; very strongly acid; clear smooth boundary.

B21t—8 to 25 inches; yellowish red (5YR 5/6) sandy clay loam with few fine pockets of yellowish brown (10YR 5/6) sand; moderate medium subangular blocky structure; slightly brittle; patchy clay films; few fine roots; very strongly acid; gradual smooth boundary.

B22t—25 to 41 inches; yellowish red (5YR 5/6) sandy loam with few fine pockets of stripped sand; weak medium subangular blocky structure; slightly brittle; patchy clay films on peds and in root channels; oxide coatings on sand grains; very strongly acid; gradual smooth boundary.

B23t—41 to 55 inches; yellowish red (5YR 5/6) sandy loam with few fine pockets of stripped sand; weak medium subangular blocky structure; friable; clay films in root channels and clay bridging sand grains; oxide coatings on peds; very strongly acid; few fine mica flakes; gradual smooth boundary.

B24t—55 to 76 inches; yellowish red (5YR 5/6) sandy loam with few fine pockets of stripped sand; weak fine and medium subangular blocky structure; friable; sand grains bridged and coated with clay and oxides; very strongly acid.

Soil reaction is strongly acid or very strongly acid throughout, except for the surface layer in limed areas.

The Ap and A2 horizons are brown, dark brown, yellowish brown, or dark yellowish brown. In undisturbed areas the A1 horizon is grayish brown, dark grayish brown, very dark grayish brown, and dark brown. Texture of the A horizon is sandy loam or fine sandy loam. The upper part of the B2t horizon is red or yellowish red loam, clay loam, or sandy clay loam. Clay content of the upper 20 inches of the B2t horizon ranges from 20 to 32 percent. The lower part of the Bt horizon is similar in color to the upper part of the Bt horizon except for fine pockets of stripped sand grains. Textures are sandy loam or loam.

Smithdale soils are near Atwood, Ora, Providence, and Sweatman soils. Smithdale soils contain less silt in the upper part than Atwood and Providence soils. They do not have a fragipan, which Ora and Providence soils have. They contain less clay than Sweatman soils.

Sweatman series

The Sweatman series consists of well drained soils that formed in clayey material on uplands. Slopes are 3 to 30 percent.

Typical pedon of Sweatman fine sandy loam that has slopes of 6 percent, 2 miles northeast of Ellistown, 200 feet north of road intersection, NW1/4NW1/4SW1/4 sec. 18, T. 7 S., R. 5 E.:

O2—1 inch to 0; very dark grayish brown (10YR 3/2) partially decayed organic matter.

A1—0 to 3 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; many fine roots; strongly acid; clear smooth boundary.

A2—3 to 7 inches; grayish brown (10YR 5/2) fine sandy loam; weak fine granular structure; very friable; many fine roots; strongly acid.

B21t—7 to 22 inches; red (2.5YR 4/6) clay; strong medium angular and subangular blocky structure; firm, plastic; few fine roots; patchy clay films on ped faces; very strongly acid; gradual smooth boundary.

B22t—22 to 32 inches; red (2.5YR 4/6) clay; many medium and large light yellowish brown (2.5YR 6/4) and yellowish red (5YR 5/6) mottles; moderate medium angular blocky structure; firm, plastic; few fine roots; common fine mica flakes; patchy clay films on ped faces; very strongly acid; gradual smooth boundary.

B3—32 to 45 inches; mottled pale brown (10YR 6/3) and red (2.5YR 5/6 and 4/6) clay loam; moderate medium subangular blocky to weak medium subangular blocky structure; slightly plastic; few fine roots; common fine mica flakes; pressure faces or patchy clay films on peds; strongly acid; gradual smooth boundary.

C—45 to 57 inches; stratified reddish yellow (5YR 6/6), red (2.5YR 5/8), and light brownish gray (2.5YR 6/2) fine sandy loam and sandy clay loam; massive; firm; common fine mica flakes; few fragments of partially weathered shale; very strongly acid.

Partially weathered shale and mica flakes are in most profiles. Reaction is strongly acid or very strongly acid throughout.

The A horizon is brown, grayish brown, dark grayish brown, very dark grayish brown, and yellowish brown silt loam, loam, or fine sandy loam. The B2t horizon is red or yellowish red silty clay, clay, or silty clay loam. Clay content in the upper 20 inches of the B2t horizon ranges from 35 to 50 percent. The B3 horizon is strong brown or yellowish red or is mottled in shades of red, brown, yellow, and gray. Textures are loam or clay loam. The C horizon is stratified in most places and is mottled in shades of red, brown, yellow, and gray. Textures are stratified sandy loam, fine sandy loam, sandy clay loam, or silty clay loam.

Sweatman soils are near Oktibbeha, Providence, and Smithdale soils. They contain less clay than Oktibbeha soils and are not underlain by calcareous material. They contain more clay than Providence soils and do not have a fragipan. They contain more clay but less sand than Smithdale soils.

Talla series

The Talla series consists of somewhat poorly drained soils that formed in loamy material on old stream terraces and broad upland flats. Slopes are 0 to 2 percent.

Typical pedon of Talla silt loam, about 2 1/2 miles southwest of Fredonia church, 2,000 feet south of blacktop road, center of E1/2SW1/4/NW1/4 sec. 15, T. 8 S., R. 2 E.:

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

A21—6 to 13 inches; mottled strong brown (7.5YR 5/6), yellowish brown (10YR 5/6), gray (10YR 6/1), and light yellowish brown (10YR 6/4) silt loam; weak fine and medium subangular blocky structure; very friable, firm in place; few fine roots; common fine pores; few fine black and brown stains and soft bodies; strongly acid; gradual wavy boundary.

A22—13 to 24 inches; mottled light yellowish brown (10YR 6/4), gray (10YR 6/1), and yellowish brown (10YR 5/6) silt loam; weak fine and medium subangular blocky structure; friable; few fine roots; common fine pores; few fine black and brown stains and soft bodies; strongly acid; gradual wavy boundary.

B21t—24 to 38 inches; mottled pale brown (10YR 6/3), gray (10YR 6/1), yellowish brown (10YR 5/6), and strong brown (7.5YR 5/6) loam; weak medium prismatic structure parting to weak medium subangular blocky; firm; common fine pores; few fine roots; common fine black and brown stains and soft bodies; gray silt coatings on peds and in seams; patchy clay films; strongly acid; gradual wavy boundary.

IIB22t&A'2—38 to 61 inches; mottled light yellowish brown (10YR 6/4), gray (10YR 6/1), yellowish brown (10YR 5/6), and strong brown (7.5YR 5/6) loam; weak medium prismatic structure parting to weak medium subangular blocky; firm; few fine roots; common fine pores; common fine black and brown stains and concretions; gray silt coatings on peds and in seams; patchy clay films; very strongly acid.

IIB23t—61 to 79 inches; mottled strong brown (7.5YR 5/6), gray (10YR 6/1), and yellowish brown (10YR 5/4) loam; weak medium prismatic structure parting to weak medium subangular blocky; firm; common fine pores; common fine black and brown stains and concretions; gray silt coatings on peds and in seams; patchy clay films; strongly acid.

Solum thickness ranges from 60 to 80 inches or more. Reaction is strongly acid or very strongly acid, except for the surface layer in limed areas. Depth to the horizon that is high in sodium ranges from 28 to 40 inches.

The Ap horizon is brown, pale brown, dark brown, or dark yellowish brown. The A2 horizon is similar to the Ap horizon in color, except that it is not dark brown and dark yellowish brown and it contains few to many grayish mottles, or it is mottled in shades of gray and brown. The A horizon is fine sandy loam, loam, or silt loam. The upper part of the Bt horizon is pale brown and has many grayish mottles, or it is mottled gray, grayish brown, pale brown, yellowish brown, strong brown, dark brown, or brownish yellow. It is loam, silt loam, or sandy clay loam. A discontinuous gray or light brownish gray A' horizon extends to the Bt horizon. The lower part of the Bt horizon is yellowish brown or strong brown and has many grayish mottles, or it is mottled gray, light brownish gray, brown, dark brown, yellowish brown, or strong brown. Textures are loam, clay loam, or sandy clay loam. Weighted average clay content of the upper 20 inches of the Bt horizon ranges from 18 to 27 percent.

Talla soils are near Bude, Marietta, and Pooleville soils. They contain more sand than Bude and Pooleville soils. They do not have a fragipan, which Bude soils have. They are more acid than Marietta soils and have more structural development.

Tippah series

The Tippah series consists of moderately well drained soils that formed in a thin mantle of silt and the underlying clayey material on uplands. Slopes are 2 to 12 percent.

Typical pedon of Tippah silt loam, 5 to 8 percent slopes, eroded, 2 3/4 miles north of Pumpkin Center, NE1/4NW1/4SE1/4 sec. 16, T. 6 S., R. 2 E.:

Ap1—0 to 3 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many fine roots; few worm casts; strongly acid; abrupt smooth boundary.

Ap2—3 to 6 inches; yellowish brown (10YR 5/4) silt loam; weak fine granular structure; friable; many fine roots; few worm casts; strongly acid; clear smooth boundary.

B21t—6 to 22 inches; yellowish red (5YR 4/6) silt loam; moderate medium subangular blocky structure; firm; common fine roots; patchy clay films on peds; very strongly acid; clear smooth boundary.

B22t—22 to 32 inches; strong brown (7.5YR 5/6) silt loam; common fine and distinct pale brown (10YR 6/3) and light brownish gray (2.5Y 6/2) mottles; moderate medium subangular blocky structure; firm; few fine roots; patchy clay films on peds; few fine black stains and soft concretions; very strongly acid; gradual smooth boundary.

IIB23t—32 to 44 inches; mottled grayish brown (2.5Y 5/2), yellowish red (5YR 4/6), and strong brown (7.5YR 5/6) silty clay; moderate medium subangular blocky structure; plastic; few fine roots; thin continuous clay films or pressure faces on peds; very strongly acid; gradual smooth boundary.

IIB24t—44 to 60 inches; yellowish red (5YR 4/6) clay; many medium distinct light brownish gray (2.5Y 6/2) and strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; plastic; few fine roots; thin continuous clay films or pressure faces; very strongly acid.

Depth to the IIBt horizon ranges from 22 to 42 inches. Reaction is medium acid to very strongly acid throughout, except for the surface layer in limed areas.

The Ap horizon is dark grayish brown, brown, or yellowish brown. The upper part of the Bt horizon is strong brown or yellowish red silt loam or silty clay loam. The lower part of the Bt horizon is strong brown and has common grayish mottles, or it is mottled in shades of red, yellow, brown, and gray. Textures are silt loam or silty clay loam. Clay content of the family control section ranges from 26 to 35 percent. The IIBt horizon is mottled in shades of brown, yellow, red, and gray, or it is yellowish red in the lower part and has many grayish mottles. Texture is silty clay loam, silty clay, or clay.

Some pedons of these soils have a thin A' horizon just above the clayey layer. These soils are outside the series range, but are considered as parallel families and are included with the soils identified with the reference term Tippah in naming the mapping unit. Use, management, and behavior are the same as for Tippah soils.

Tippah soils are near Falkner, Providence, and Wilcox soils. They are better drained than Falkner soils, are redder, and do not have gray mottles in the upper part. They do not have a fragipan, which Providence soils have, and they have more clay in the lower horizons than Providence soils. They contain more silt in the upper part of the B horizon than Wilcox soils, are better drained, and do not have gray mottles near the surface.

Urbo series

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

Typical pedon of Urbo silty clay, 1 mile southeast of Etta and 1/2 mile south of Tallahatchie River, NE1/4NE1/4 sec. 20, T. 7 S., R. 1 E.:

Ap—0 to 7 inches; brown (10YR 4/3) silty clay; few medium distinct light olive gray (5Y 6/2) mottles; weak fine granular structure; friable; common fine soft black concretions; common fine roots; strongly acid; abrupt smooth boundary.

B21—7 to 12 inches; mottled dark yellowish brown (10YR 4/4) and light olive gray (5Y 6/2) silty clay; weak medium subangular blocky structure; plastic; many fine soft black and dark brown concretions; common black and dark brown stains; few fine pores; few fine roots; strongly acid; gradual smooth boundary.

B22—12 to 16 inches; mottled dark yellowish brown (10YR 4/4), dark brown (10YR 3/3), and light olive gray (5Y 6/2) silty clay; weak medium subangular blocky structure; firm, plastic; many fine soft black and brown concretions; many black and very dark grayish brown stains; few fine pores; few fine roots; strongly acid; gradual smooth boundary.

B23g—16 to 35 inches; olive gray (5Y 5/2) silty clay; many medium distinct dark yellowish brown (10YR 4/4) and brown (10YR 4/3) mottles; weak medium subangular blocky structure; firm, plastic; common soft black and brown concretions and stains; few fine pores; few fine roots; strongly acid; gradual smooth boundary.

B24g—35 to 50 inches; olive gray (5Y 5/2) silty clay; many medium distinct dark yellowish brown (10YR 4/4), yellowish brown (10YR 5/4), and brown (10YR 4/3) mottles; weak medium subangular blocky structure; firm, plastic; common soft black and dark brown concretions and stains; few fine pores; strongly acid.

Reaction is strongly acid or very strongly acid throughout the soil, except in the surface layer in limed areas.

The Ap horizon is brown or grayish brown silty clay loam or silty clay. The upper part of the B2 horizon is mottled in shades of gray, brown, and yellow, or the horizon is brown to grayish brown with mottles in shades of gray. Textures are silty clay loam and silty clay. The lower part of the B2 horizon is grayish and has mottles in shades of brown and yellow.

Urbo soils are near Arkabutla and Cascilla soils. They contains more clay than any of those soils. They are similar in drainage to Arkabutla soils. They are not so well drained as Cascilla soils.

Wilcox series

The Wilcox series consists of somewhat poorly drained soils on uplands. These soils formed in beds of clayey material over shale. Slopes are 2 to 8 percent.

Typical pedon of Wilcox silty clay loam, 2 to 5 percent slopes, eroded, in a large pasture, 1,000 feet northeast of intersection of Myrtle Road and Highway 30 at Pooleville, NW1/4SW1/4SW1/4 sec. 17, T. 7 S., R. 2 E.:

Ap—0 to 6 inches; dark brown (10YR 4/3) silty clay loam; weak fine granular structure; friable; many fine roots; many root and worm channels; strongly acid; abrupt smooth boundary.

B21t—6 to 10 inches; reddish brown (2.5YR 4/4) silty clay; common medium prominent light brownish gray (2.5Y 6/2) and light yellowish brown (2.5Y 6/4) mottles; moderate medium subangular blocky structure; firm, slightly plastic; common fine roots; shiny pressure faces or clay films on faces of peds; clay films in some pores; very strongly acid; clear smooth boundary.

B22t—10 to 21 inches; mottled light brownish gray (2.5Y 6/2) and red (2.5YR 4/6) clay; few fine distinct yellowish red and brown mottles; strong medium subangular blocky structure; extremely firm, plastic; common fine roots; pressure faces or clay films on faces of peds; clay films in some pores; very strongly acid; clear smooth boundary.

B23t—21 to 40 inches; mottled light brownish gray (2.5Y 6/2) and light olive brown (2.5Y 5/6) silty clay; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; extremely firm, plastic; few fine roots; slickensides that do not intersect; clay films or pressure faces on peds; clay films in some pores; very strongly acid; gradual smooth boundary.

C1—40 to 58 inches; mottled light brownish gray (2.5Y 6/2), strong brown (7.5YR 5/6), and brown (10YR 5/4) clay; massive; extremely firm, plastic; few fine roots; few fine black and brown stains and soft concretions; slickensides that intersect; few weathered shale fragments; very strongly acid; gradual smooth boundary.

C2—58 to 72 inches; mottled strong brown (7.5YR 5/6), light brownish gray (2.5Y 6/2), and yellowish brown (10YR 5/6) clay; massive; extremely firm, plastic; many black and brown stains and soft concretions; 60 percent partially weathered shale; very strongly acid.

Reaction is strongly acid to extremely acid, except for the surface layer in limed areas.

The Ap horizon is dark brown, dark grayish brown, or very dark grayish brown. The surface texture is silt loam or silty clay loam. The B21t horizon is red, yellowish red, reddish brown, or strong brown and has grayish mottles, or it is mottled in shades of red, brown, and gray. Texture is clay, silty clay, or silty clay loam. The lower part of the B2t horizon is mottled in shades of red, brown, and gray. Textures are silty clay, clay, or silty clay loam. Clay content of the upper 20 inches of the Bt horizon ranges from 38 to 55 percent. The B3 horizon, where present, is gray, light brownish gray, or light olive gray or is mottled in shades of brown, yellow, red, and gray, and it contains fragments of partially weathered shale. Textures are clay or silty clay. The C horizon is gray or is mottled in shades of gray, brown, and yellow, and it contains shale fragments.

Wilcox soils are near Falkner and Tippah soils. They contain more clay in the upper horizons than either Falkner or Tippah soils. They are not so well drained as Tippah soils and have gray mottles nearer the surface.

Classification

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965. Readers interested in further details about the system should refer to "Soil taxonomy" (*17*).

The system of classification has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. In this system the classification is based on the different soil properties that can be observed in the field or those that can be inferred either from other properties that are observable in the field or from the combined data of soil science and other disciplines. The properties selected for the higher categories are the result of soil genesis or of factors that affect soil genesis. In table 21, the soils of the survey area are classified according to the system. Categories of the system are discussed in the following paragraphs.

ORDER. Ten soil orders are recognized as classes in the system. The properties used to differentiate among orders are those that reflect the kind and degree of dominant soil-forming processes that have taken place. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders based primarily on properties that influence soil genesis and are important to plant growth or that are selected to 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 expression of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and a prefix that suggests something about the properties of the soil. An example is Haplaquents (*Hapl*, meaning simple horizons, plus *aquent*, the suborder of Entisols that have an aquic moisture regime).

SUBGROUP. Each great group may be divided into three subgroups: the central (typic) concept of the great groups, which is not necessarily the most extensive subgroup; the intergrades, or transitional forms to other orders, suborders, or great groups; and the extragrades, which have some properties that are representative of the great groups but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceeding the name of the great group. The adjective *Typic* identifies the subgroup that is thought to typify the great group. An example is Typic Haplaquents.

FAMILY. Families are established within a subgroup on the basis of similar physical and chemical properties that affect management. Among the properties considered in horizons of major biological activity below plow depth are particle-size distribution, mineral content, temperature regime, thickness of the soil penetrable by roots, consistence, moisture equivalent, soil slope, and permanent cracks. A family name consists of the name of a subgroup and a series of adjectives. The adjectives are the class names for the soil properties used as family differentiae. An example is fine-loamy, mixed, nonacid, mesic, Typic Haplaquents.

SERIES. The series consists of soils that formed in a particular kind of material and have horizons that, except for texture of the surface soil or of the underlying substratum, are similar in differentiating characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineral and chemical composition.

Formation of the soils

This section tells how the major factors of soil formation have affected the soils in Union County and describes how soil horizons have developed.

Factors of soil formation

In this section, the five main factors of soil formation are discussed. These factors are parent material, climate, living organisms, relief, and time (*9*).

Parent material

Parent material, the unconsolidated mass in which a soil forms, largely determines the chemical and mineral composition of a soil. The parent material of the soils in Union County consists of loess, marine deposits, and alluvium.

Loess is largely glacial rock flour. This material was carried southward and deposited on flood plains by streams from melting glaciers and later redeposited by wind on the older formations.

Many of the soils in Union County formed in more than one kind of parent material. Where the overlying layer of loess is thin, the upper soil horizons formed in weathered loess and the lower soil horizons formed in acid marine deposits. Atwood, Providence, Falkner, and Tippah soils formed in this combination of parent materials.

The parent materials in the steeper areas of the county are of marine origin. The particles of these sediments are mixtures of sand, silt, and clay. Smithdale soils formed in this kind of parent material.

Some of the soils in the eastern part of the county formed in calcareous marine deposits. The clayey Oktibbeha soils are an example.

The soils along the streams in the county formed in alluvium washed from the surrounding uplands and redeposited by the streams on the flood plains. The alluvial particles are dominantly silt mixed with sand and clay. Cascilla, Marietta, and Jena soils formed in this kind of parent material.

Climate

Climate as a genetic factor affects the physical, chemical, and biological relationships in the soil primarily through the influence of precipitation and temperature. Water dissolves minerals, supports biological activity, and transports mineral and organic residue through the soil profile. The amount of water that percolates through the soil over a broad area depends mainly on rainfall, relative humidity, and length of the frost-free period. At a given point, the amount of downward percolation is also affected by physiographic position and soil permeability. In Union County rainfall is abundant, is slightly greater in spring and summer than in fall and winter, and averages about 53 inches per year.

The warm temperature influences the kinds and growth of organisms and also affects the speed of physical and chemical reactions in the soils. The climate of Union County is warm and moist and presumedly is similar to that which existed as the soils formed. Freezing and thawing in this county have very little effect on weathering and soil-forming processes.

Living organisms

Micro-organisms, plants, earthworms, and all other organisms that live on and in the soil have an important effect on its formation. Bacteria, fungi, and other micro-organisms aid in weathering rock and in decomposing organic matter. Larger plants alter the soil climate in small areas (soil microclimate). They also supply organic matter to the soil and transfer elements from the subsoil to the surface layer.

The kinds and numbers of plants and animals that live on and in the soil are determined mainly by climate and, to a varying degree, by parent material, relief, and age of the soil.

Not much is known of the fungi and micro-organisms in the soils of Union County except that they are confined mostly to the top few inches. Earthworms and other small invertebrates are more active in the surface layer, where they continually mix the soil, than in other layers. Mixing of the soil materials by rodents does not appear to be of much consequence in this county.

Except on bottom lands the native vegetation in Union County was chiefly oak, hickory, and pine. In the better drained areas on bottom lands the trees were lowland hardwoods, chiefly yellow-poplar, sweetgum, ash, and oak. Cypress, birch, blackgum, beech, and water-tolerant oak grew mainly in wetter areas on bottom lands.

Relief

The relief in Union County ranges from nearly level on flood plains to steep on the uplands. The relief, or lay of the land, affects the drainage and rate of runoff. Thus, relief influences the moisture conditions in soils and the erosion on the land surface. The rate of runoff is greater on steep slopes than it is on gentle slopes and level areas. This means that the amount of water that moves through the soil during development depends partly on relief. In level areas and depressions, the soils are likely to be grayish and wet.

Fragipan formation is associated with relief and drainage. This compact, brittle horizon is most strongly expressed in level to gently sloping soils. Bude, Ora, and Providence soils have a fragipan. A fragipan governs the depth that roots, air, and water can penetrate the soil; it also determines permeability and wetness.

In comparison with other factors of soil development, relief and drainage are more local, and their influence on the soil can be observed on a single small farm. Relief determines in many places use to which the land is put as well as its productivity.

Time

Generally, a long time is required for formation of a soil that has distinct horizons. The differences in length of time that parent materials have been in place, therefore, are commonly reflected in the degree of development of the soil profiles.

The soils in Union County range from young to old. Young soils have very little profile development, and old soils have well expressed soil horizons. Arkabutla soils, for example, are young soils that lack development; these soils formed in recent alluvium on flood plains. Examples of older soils that formed in alluvium are Jena soils, which have a weakly developed soil profile. Examples of older soils that formed on uplands are Atwood and Providence soils, which have a strongly developed profile with distinct horizons.

Processes of soil horizon differentiation

Several processes were involved in the formation of horizons in the soils of Union County. These processes are the accumulation of organic matter, the leaching of calcium carbonates and bases, the reduction and transfer of iron, and the formation and translocation of silicate clay minerals. In all of the soils, one or more of these processes have been active to some extent.

The accumulation of organic matter in the upper part of the profile is important because this accumulation results in the formation of an A1 horizon. The soils of this county are low in content of organic matter.

Carbonates and bases have been leached from most of the soils in the county. This leaching has contributed to the development of horizons. Leaching of bases from the upper horizons of a soil commonly precedes the translocation of silicate clay minerals. Most of the soils in this county are moderately to strongly leached.

The reduction and transfer of iron, a process called gleying, is evident in the somewhat poorly drained soils of the county. This gleying is indicated by grayish mottles in the upper horizons and grayish colors in the lower. Segregation of iron is indicated in some horizons by reddish brown mottles and concretions.

In many soils of Union County, the translocation of clay minerals has contributed to horizon development. The eluviated A2 horizon has a lower content of clay than the B horizon and generally is lighter in color. The B horizon commonly has accumulations of translocated clay in pores and on ped surfaces. Soils of this kind were probably leached of carbonates and soluble salts to a considerable extent before translocation of silicate clays took place.

The leaching of bases and the subsequent translocation of silicate clay are among the more important processes of horizon differentiation that have taken place in the soils of Union County. In Atwood, Providence, Tippah, Falkner, and Oktibbeha soils, translocated silicate clays have accumulated in the B horizon.

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Glossary

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

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

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

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

Base saturation. The degree to which material having base exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Calcareous soil. A soil containing enough calcium carbonate (commonly with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid. A soil having measurable amounts of calcium carbonate or magnesium carbonate.

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.

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

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

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures is difficult.

Complex, soil. A mapping unit of two or more kinds of soil occurring in such an intricate pattern that they cannot be shown separately on a soil map at the selected scale of mapping and publication.

Compressible. Excessive decrease in volume of soft soil under load.

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.

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.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

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

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 for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients, as for example in "hillpeats" and "climatic moors."

Erosion. The wearing away of the land surface by running 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 a bare surface.

Excess fines. Excess silt and clay. The soil does not provide a source of gravel or sand for construction purposes.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Flooding. The temporary covering of soil with water from overflowing streams, runoff from adjacent slopes, and tides. Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather 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, and *long* if more than 7 days. Probable dates are expressed in months; *November-May*, for example, means that flooding can occur during the period November through May. Water standing for short periods after rainfall or commonly covering swamps and marshes is not considered 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.

Gleyed soil. A soil having one or more neutral gray horizons as a result of waterlogging and lack of oxygen. The term "gleyed" also designates gray horizons and horizons having yellow and gray mottles as a result of intermittent waterlogging.

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. The major horizons of mineral soil are as follows:

O horizon.—An organic layer, fresh and decaying plant residue, at the surface of a mineral soil.

A horizon.—The mineral horizon, formed or forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon most of which was originally part of a B horizon.

A2 horizon.—A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

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

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

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. Inadequate strength for supporting loads.

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.

Parent material. The great variety of unconsolidated organic and mineral material in which soil forms. Consolidated bedrock is not yet parent material by this concept.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percs slowly. The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are *very slow* (less than 0.06 inch), *slow* (0.06 to 0.20 inch), *moderately slow* (0.2 to 0.6 inch), *moderate* (0.6 to 2.0 inches), *moderately rapid* (2.0 to 6.0 inches), *rapid* (6.0 to 20 inches), and *very rapid* (more than 20 inches).

pH value. (See Reaction, soil). A numerical designation of acidity and alkalinity in soil.

Piping. Moving water forms subsurface tunnels or pipelike cavities in the soil.

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 a semisolid to a plastic state.

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

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

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
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

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.

Rooting depth. Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

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. The rapid movement of water through the soil. Seepage adversely affects the specified use.

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.

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.

Slow intake. The slow movement of water into the soil.

Soil. A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows: *very coarse sand* (2.0 millimeters to 1.0 millimeter); *coarse sand* (1.0 to 0.5 millimeter); *medium sand* (0.5 to 0.25 millimeter); *fine sand* (0.25 to 0.10 millimeter); *very fine sand* (0.10 to 0.05 millimeter); *silt* (0.05 to 0.002 millimeter); and *clay* (less than 0.002 millimeter).

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

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

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer. Otherwise suitable soil material too thin for the specified use.

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

Unstable fill. Risk of caving or sloughing in banks of fill material.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but the limited geographic soil area does not justify creation of a new series.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.

Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Water table, perched. A water table standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Illustrations

Figure 1.—Making silage in an area of the Mantachie-Marietta-Jena association.

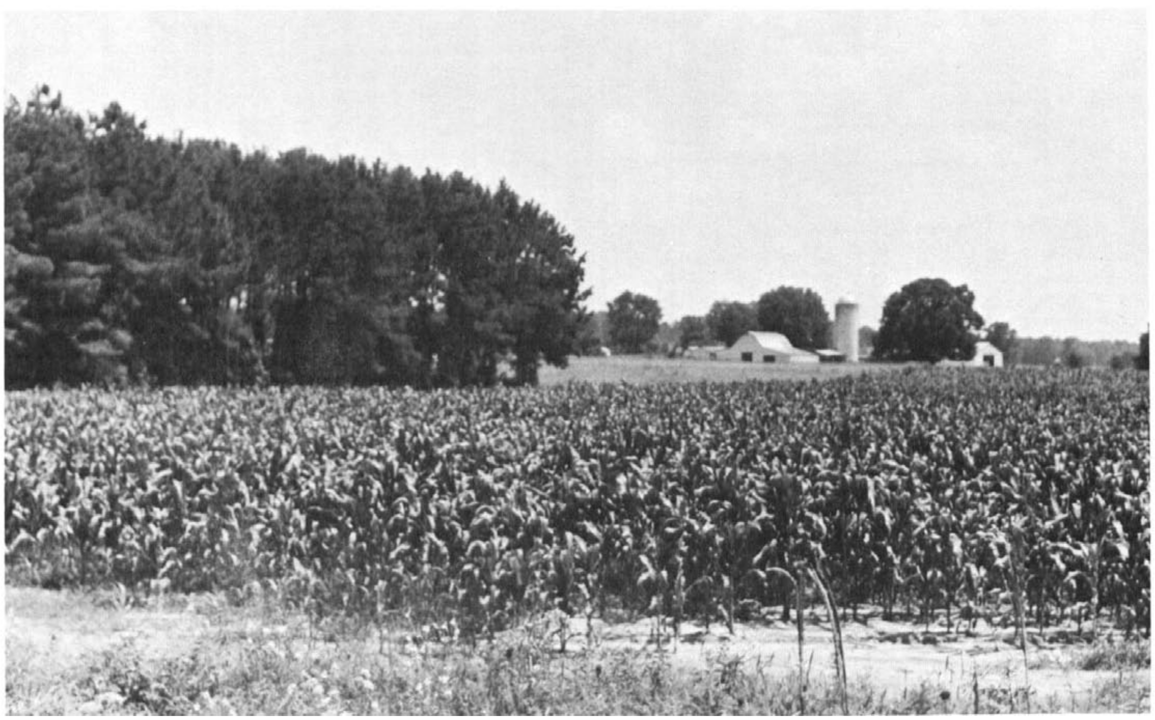

Figure 2.—Corn in an area of Bude silt loam.

Figure 3.—Coastal bermudagrass hay in an area of Mantachie silt loam.

Figure 4.—Cattle grazing fescue pasture in an area of Smithdale sandy loam, 17 to 35 percent slopes.

Figure 5.—These pine trees in an area of Smithdale-Udorthents complex, gullied, reduce erosion and sedimentation.

Figure 6.—This kudzu protects a steep roadbank through an area of Smithdale-Sweatman association, hilly.

Tables

TABLE 1.—TEMPERATURE AND PRECIPITATION DATA

[Recorded in the period 1931-52, at Tupelo, Miss.]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have[1]— Maximum temperature higher than—	2 years in 10 will have[1]— Minimum temperature lower than—	Average number of growing degree days[2]	Average	2 years in 10 will have[1]— Less than—	2 years in 10 will have[1]— More than—	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January	53.8	34.4	44.1	74	0	0	5.87	3.10	7.96	7	1.4
February	56.2	36.6	46.4	79	12	0	5.50	3.04	7.97	7	.4
March	64.5	42.7	53.6	86	17	112	6.95	4.05	8.01	7	.1
April	73.7	51.3	62.5	90	32	375	3.89	3.28	6.22	7	0
May	82.8	59.9	71.3	95	38	660	3.82	2.36	5.47	7	0
June	90.8	68.1	79.5	100	55	885	3.87	2.03	5.51	5	0
July	92.2	71.0	81.6	99	56	980	4.51	2.58	5.29	8	0
August	92.5	70.1	81.3	101	55	970	2.88	1.38	4.40	6	0
September	86.9	63.2	75.0	96	43	750	3.02	1.40	4.25	5	0
October	77.8	51.2	64.5	91	32	450	2.84	.98	3.73	3	0
November	63.2	40.9	52.0	82	17	60	4.50	2.13	6.48	6	.1
December	55.1	36.0	45.6	65	5	0	5.36	2.61	6.60	7	.2
Year	74.1	52.1	63.1	101	0	5,242	53.01	43.46	58.88	75	2.2

[1]Based on data for the 10-year period 1960-69.

[2]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 in the period 1931-52, at Tupelo, Miss.]

Probability	Minimum 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 8	March 28	April 17
2 years in 10 later than	March 1	March 21	April 10
5 years in 10 later than	February 15	March 7	March 27
First freezing temperature in fall:			
1 year in 10 earlier than	November 13	October 26	October 18
2 years in 10 earlier than	November 19	November 1	October 24
5 years in 10 earlier than	December 1	November 12	November 4

TABLE 3.—GROWING SEASON LENGTH

[Recorded in the period 1931-52, at Tupelo, Miss.]

Probability	Minimum temperature		
	24° F or higher	28° F or higher	32° F or higher
	Days	Days	Days
9 years in 10	250	222	194
8 years in 10	261	223	197
5 years in 10	289	250	222
2 years in 10[1]	306	274	235
1 year in 10[1]	312	305	263

[1]Determined in the period 1960-69.

TABLE 4.--SOIL ASSOCIATIONS AND THEIR POTENTIAL

Soil association	Percentage of area	Cultivated crops	Pasture and hay	Woodland	Urban uses	Intensive recreation	Extensive recreation
1. Arkabutla-Mantachie-Jena	15	High	High	Very high	Low: floods.	Low: floods.	Medium: floods.
2. Jena-Mantachie	5	High	High	Very high	Low: floods.	Low: floods.	Medium: floods.
3. Mantachie-Marietta-Jena	4	High	High	Very High	Low: floods.	Low: floods.	Medium: floods.
4. Providence-Smithdale-Sweatman	25	Medium: erosion.	High	Moderately high.	Low: slope, shrink-swell.	Low: slope.	Medium: slope.
5. Tippah-Falkner-Wilcox	13	Medium	High	Moderately high.	Low: shrink-swell.	Medium: wetness, shrink-swell.	High.
6. Atwood-Smithdale	13	High	High	Moderately high.	High	High	High.
7. Smithdale-Sweatman	16	Low: erosion.	Low: slope.	Moderately high.	Low: slope.	Low: slope.	Medium: slope.
8. Providence-Oktibbeha-Tippah	9	Medium: erosion.	High	Moderately high.	Low: shrink-swell.	Medium: shrink-swell.	Medium: shrink-swell.

TABLE 5.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
Ar	Arkabutla silt loam	20,970	7.8
AtB2	Atwood silt loam, 2 to 5 percent slopes, eroded	6,105	2.3
AtC2	Atwood silt loam, 5 to 8 percent slopes, eroded	5,829	2.2
AtD3	Atwood silt loam, 8 to 12 percent slopes, severely eroded	3,257	1.2
Bu	Bude silt loam	5,773	2.1
Ca	Cascilla silt loam	2,674	1.0
FaA	Falkner silt loam, 0 to 2 percent slopes	3,288	1.2
FaB	Falkner silt loam, 2 to 5 percent slopes	3,953	1.5
Je	Jena silt loam	19,278	7.1
Ma	Mantachie silt loam	25,695	9.5
Mr	Marietta loam	2,168	0.8
OkB2	Oktibbeha silt loam, 2 to 5 percent slopes, eroded	1,278	0.5
OkC2	Oktibbeha silt loam, 5 to 8 percent slopes, eroded	787	0.3
OkD2	Oktibbeha silt loam, 8 to 12 percent slopes, eroded	1,110	0.4
OmE2	Oktibbeha-Sweatman-Smithdale complex, 12 to 20 percent slopes, eroded	6,839	2.5
OrD3	Ora fine sandy loam, 8 to 12 percent slopes, severely eroded	1,549	0.6
Po	Pooleville silt loam	2,132	0.8
PrB2	Providence silt loam, 2 to 5 percent slopes, eroded	9,986	3.7
PrC2	Providence silt loam, 5 to 8 percent slopes, eroded	12,922	4.8
PrD3	Providence silt loam, 8 to 12 percent slopes, severely eroded	4,786	1.8
SdF	Smithdale sandy loam, 17 to 35 percent slopes	2,500	0.9
SgF	Smithdale-Udorthents complex, gullied	3,007	1.1
SHF	Smithdale association, hilly	45,387	16.8
STF	Smithdale-Sweatman association, hilly	18,151	6.7
SWF	Smithdale-Sweatman-Providence association, hilly	26,758	9.9
SyE	Sweatman-Providence-Smithdale complex, 12 to 17 percent slopes	5,712	2.1
Ta	Talla silt loam	4,255	1.6
TpB2	Tippah silt loam, 2 to 5 percent slopes, eroded	4,040	1.5
TpC2	Tippah silt loam, 5 to 8 percent slopes, eroded	7,629	2.8
TpD2	Tippah silt loam, 8 to 12 percent slopes, eroded	6,003	2.2
Ur	Urbo silty clay	2,091	0.8
WaB2	Wilcox silty clay loam, 2 to 5 percent slopes, eroded	2,010	0.7
WaC2	Wilcox silty clay loam, 5 to 8 percent slopes, eroded	1,728	0.6
	Water	430	0.2
	Total	270,080	100.0

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE

[All yields were estimated for a high level of management in 1974. Absence of a yield figure indicates the crop is seldom grown or is not suited]

Soil name and map symbol	Cotton	Corn	Soybeans	Improved bermudagrass	Common bermudagrass	Tall fescue	Bahiagrass
	Lb	Bu	Bu	AUM[1]	AUM[1]	AUM[1]	AUM[1]
Arkabutla:							
Ar	700	95	35	11.0	7.0	10.0	10.0
Atwood:							
AtB2	700	90	35	10.0	7.0	9.0	10.0
AtC2	650	80	30	9.5	6.5	8.5	9.5
AtD3	550	70	25	9.5	5.5	---	9.0
Bude:							
Bu	625	80	25	9.0	6.0	8.0	---
Cascilla:							
Ca	850	110	40	12.0	9.0	11.0	11.0
Falkner:							
FaA	625	75	35	9.5	6.5	8.0	9.0
FaB	600	70	30	9.0	6.0	7.5	8.5
Jena:							
Je	700	85	40	12.0	9.0	10.5	10.5
Mantachie:							
Ma	650	90	35	10.0	7.0	10.0	10.0
Marietta:							
Mr	750	100	40	12.0	8.0	12.0	10.5
Oktibbeha:							
OkB2	550	55	35	9.0	6.0	8.5	---
OkC2	500	50	30	8.5	5.5	8.0	---
OkD2	---	---	---	7.5	4.5	7.0	---
[2]OmE2	---	---	---	---	---	---	---
Ora:							
OrD3	---	---	---	7.0	4.0	7.0	8.0
Pooleville:							
Po	625	80	30	9.0	6.0	8.0	---
Providence:							
PrB2	700	80	35	9.5	6.5	8.5	8.5
PrC2	650	70	30	9.0	6.0	7.5	8.0
PrD3	---	---	---	8.5	5.5	---	8.0
Smithdale:							
SdF, [2]SgF, SHF	---	---	---	---	---	---	---
[2]STF:							
Smithdale part	---	---	---	---	---	---	---
Sweatman part	---	---	---	---	---	---	---
[2]SWF:							
Smithdale part	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 6.—YIELDS PER ACRE OF CROPS AND PASTURE—Continued

Soil name and map symbol	Cotton	Corn	Soybeans	Improved bermuda-grass	Common bermuda-grass	Tall fescue	Bahia-grass
	Lb	Bu	Bu	AUM[1]	AUM[1]	AUM[1]	AUM[1]
Smithdale:							
Sweatman part	—	—	—	—	—	—	—
Providence part	—	—	—	—	—	—	—
Sweatman:							
[2]SyE	—	—	—	—	3.5	—	—
Talla:							
Ta	625	70	25	9.0	6.0	8.0	—
Tippah:							
TpB2	650	80	35	10.0	6.5	8.5	9.0
TpC2	600	70	30	9.0	6.0	7.5	8.5
TpD2	500	60	25	8.5	5.5	7.0	8.0
Urbo:							
Ur	700	95	35	12.0	8.0	11.0	—
Wilcox:							
WaB2	—	40	25	8.5	6.5	7.5	8.0
WaC2	—	—	20	8.0	6.0	7.0	7.0

[1]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 a period of 30 days.

[2]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 7.—CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas excluded. Absence of an entry means no acreage]

Class	Total acreage	Major management concerns (subclass)	
		Erosion (e)	Wetness (w)
		Acres	Acres
II	113,455	34,996	78,459
III	33,621	33,621	—
IV	8,518	8,518	—
VI	10,702	10,702	—
VII	108,354	108,354	—

TABLE 8.—WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed in this table. Absence of an entry in a column means the information was not available]

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Important trees	Site index	
Arkabutla:								
Ar	1w8	Slight	Moderate	Slight	Moderate	Cherrybark oak Eastern cottonwood Green ash Loblolly pine Nuttall oak Sweetgum Water oak Willow oak	105 110 95 100 110 100 100 100	Cherrybark oak, eastern cottonwood, green ash, loblolly pine, sweetgum, American sycamore.
Atwood:								
AtB2, AtC2, AtD3	2o7	Slight	Slight	Slight	Slight	Cherrybark oak White oak Loblolly pine Sweetgum	90 — 90 85	Cherrybark oak, Shumard oak, loblolly pine, sweetgum, yellow-poplar.
Bude:								
Bu	2w8	Slight	Moderate	Slight	Moderate	Cherrybark oak Loblolly pine Sweetgum	90 90 90	Cherrybark oak, Shumard oak, loblolly pine, sweetgum, yellow-poplar.
Cascilla:								
Ca	1o7	Slight	Slight	Slight	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.
Falkner:								
FaA, FaB	2w8	Slight	Moderate	Slight	Moderate	Loblolly pine Shortleaf pine Sweetgum	85 75 90	Cherrybark oak, loblolly pine, shortleaf pine, sweetgum.
Jena:								
Je	1o7	Slight	Slight	Slight	Moderate	Loblolly pine Sweetgum Water oak	100 90 80	Loblolly pine, sweetgum, American sycamore, eastern cottonwood.
Mantachie:								
Ma	1w9	Slight	Severe	Moderate	Severe	Green ash Eastern cottonwood Cherrybark oak Loblolly pine Sweetgum Yellow-poplar	80 90 100 98 95 95	Green ash, eastern cottonwood, cherrybark oak, loblolly pine, sweetgum, yellow-poplar.
Marietta:								
Mr	1w5	Slight	Moderate	Moderate	Slight	Eastern cottonwood Green ash Sweetgum American sycamore Yellow-poplar	105 90 100 105 100	Eastern cottonwood, sweetgum, yellow-poplar, green ash, American sycamore.

See footnote at end of table.

TABLE 8.—WOODLAND MANAGEMENT AND PRODUCTIVITY—Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Important trees	Site index	
Oktibbeha:								
OkB2, OkC2, OkD2	3c8	Slight	Moderate	Moderate	Moderate	Loblolly pine Shortleaf pine Eastern redcedar Southern red oak	80 70 50 70	Loblolly pine, eastern redcedar.
[1]OmE2:								
Oktibbeha part	3c8	Slight	Moderate	Moderate	Moderate	Loblolly pine Shortleaf pine Eastern redcedar Southern red oak	80 70 50 70	Loblolly pine, eastern redcedar.
Sweatman part	3c2	Slight	Moderate	Slight	Slight	Loblolly pine Shortleaf pine	83 73	Loblolly pine, shortleaf pine.
Smithdale part	3o1	Slight	Slight	Slight	Moderate	Loblolly pine Shortleaf pine	80 69	Loblolly pine.
Ora:								
OrD3	3o7	Slight	Slight	Slight	Moderate	Loblolly pine Shortleaf pine Sweetgum	83 69 80	Loblolly pine.
Pooleville:								
Po	2w8	Slight	Moderate	Slight	Moderate	Loblolly pine	85	Cherrybark oak, Shumard oak, loblolly pine, sweetgum, yellow-poplar.
Providence:								
PrB2, PrC2, PrD3	3o7	Slight	Slight	Slight	Slight	Loblolly pine Shortleaf pine Sweetgum	84 64 90	Loblolly pine, Shumard oak, sweetgum, yellow-poplar.
Smithdale:								
SdF, [1]SgF, SHF	3o1	Slight	Slight	Slight	Moderate	Loblolly pine Shortleaf pine	80 69	Loblolly pine.
[1]STF:								
Smithdale part	3o1	Slight	Slight	Slight	Moderate	Loblolly pine Shortleaf pine	80 69	Loblolly pine.
Sweatman part	3c2	Slight	Moderate	Slight	Slight	Loblolly pine Shortleaf pine	83 73	Loblolly pine, shortleaf pine.
[1]SWF:								
Smithdale part	3o1	Slight	Slight	Slight	Moderate	Loblolly pine Shortleaf pine	80 69	Loblolly pine.
Sweatman part	3c2	Slight	Moderate	Slight	Slight	Loblolly pine Shortleaf pine	83 73	Loblolly pine, shortleaf pine.
Providence part	3o7	Slight	Slight	Slight	Slight	Loblolly pine Shortleaf pine Sweetgum	84 64 90	Loblolly pine, Shumard oak, sweetgum, yellow-poplar.
Sweatman:								
[1]SyE:								
Sweatman part	3c2	Slight	Moderate	Slight	Slight	Loblolly pine Shortleaf pine	83 73	Loblolly pine, shortleaf pine.

See footnote at end of table.

TABLE 8.—WOODLAND MANAGEMENT AND PRODUCTIVITY—Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Important trees	Site index	
Sweatman:								
Providence part	3o7	Slight	Slight	Slight	Slight	Loblolly pine	84	Loblolly pine, Shumard oak, sweetgum, yellow-poplar.
						Shortleaf pine	64	
						Sweetgum	90	
Smithdale part	3o1	Slight	Slight	Slight	Moderate	Loblolly pine	80	Loblolly pine.
						Shortleaf pine	69	
Talla:								
Ta	2w8	Slight	Moderate	Slight	Moderate	Cherrybark oak	90	Cherrybark oak, loblolly pine, sweetgum, water oak, yellow-poplar.
						Loblolly pine	90	
						Shortleaf pine	80	
						Sweetgum	90	
Tippah:								
TpB2, TpC2, TpD2	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	
Urbo:								
Ur	1w8	Slight	Moderate	Slight	Moderate	Green ash	93	Eastern cottonwood, loblolly pine, sweetgum, American sycamore, yellow-poplar.
						Eastern cottonwood	108	
						Cherrybark oak	99	
						Sweetgum	98	
Wilcox:								
WaB2, WaC2	3c2	Slight	Moderate	Moderate	Slight	Loblolly pine	81	Loblolly pine.
						Shortleaf pine	68	
						Slash pine	85	

[1]This map unit is made up of two or more dominant kinds of soil. See map unit description for the composition and behavior of the whole map unit.

TABLE 9.--BUILDING SITE DEVELOPMENT

["Shrink-swell" and some of the other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe"]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
Arkabutla:					
Ar	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness, corrosive.	Severe: floods, low strength.
Atwood:					
AtB2	Slight	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.
AtC2	Slight	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell, slope.	Moderate: low strength, shrink-swell.
AtD3	Moderate: slope.	Moderate: slope, shrink-swell, low strength.	Moderate: slope, shrink-swell, low strength.	Severe: slope.	Moderate: slope, shrink-swell, low strength.
Bude:					
Bu	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness.	Severe: wetness, corrosive.	Moderate: wetness, low strength.
Cascilla:					
Ca	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
Falkner:					
FaA, FaB	Severe: wetness.	Severe: wetness, low strength, shrink-swell.	Severe: low strength, shrink-swell, wetness.	Severe: low strength, shrink-swell, wetness.	Severe: low strength, shrink-swell, wetness.
Jena:					
Je	Severe: floods, too sandy, cutbanks cave.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
Mantachie:					
Ma	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods.
Marietta:					
Mr	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, low strength.
Oktibbeha:					
OkB2, OkC2	Severe: too clayey.	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell.
OkD2	Severe: too clayey.	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell, slope.	Severe: low strength, shrink-swell.

TABLE 9.—BUILDING SITE DEVELOPMENT—Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
Oktibbeha:					
[1]OmE2:					
Oktibbeha part	Severe: too clayey.	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell, slope.	Severe: low strength, shrink-swell.
Sweatman part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Smithdale part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ora:					
OrD3	Moderate: slope.	Moderate: low strength.	Moderate: low strength.	Severe: slope.	Moderate: low strength.
Pooleville:					
Po	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, low strength.	Moderate: wetness, low strength.
Providence:					
PrB2, PrC2	Moderate: wetness.	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Moderate: low strength.
PrD3	Moderate: wetness.	Moderate: low strength.	Moderate: low strength.	Severe: slope.	Moderate: low strength.
Smithdale:					
SdF, [1]SgF, SHF	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
[1]STF:					
Smithdale part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Sweatman part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
[1]SWF:					
Smithdale part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Sweatman part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Providence part	Moderate: wetness.	Moderate: low strength.	Moderate: low strength.	Severe: slope.	Moderate: low strength.
Sweatman:					
[1]SyE:					
Sweatman part	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Moderate: shrink-swell, slope.
Providence part	Moderate: wetness.	Moderate: low strength.	Moderate: low strength.	Severe: slope.	Moderate: low strength.
Smithdale part	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
Talla:					
Ta	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength, corrosive.	Moderate: wetness, low strength.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
Tippah:					
TpB2, TpC2, TpD2	Severe: too clayey.	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell, corrosive.	Severe: low strength, shrink-swell.
Urbo:					
Ur	Severe: floods, wetness, too clayey.	Severe: floods, wetness, shrink-swell.	Severe: floods, wetness, shrink-swell.	Severe: floods, corrosive, wetness.	Severe: floods, shrink-swell.
Wilcox:					
WaB2, WaC2	Severe: wetness, too clayey.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength, wetness.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.

[1]This map unit is made up of two or more dominant kinds of soil. See map unit description for the composition and behavior of the whole map unit.

TABLE 10.--SANITARY FACILITIES

["Percs slowly" and some of the other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms used to rate soils]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Arkabutla:					
Ar	Severe: floods, wetness.	Moderate: seepage, floods.	Severe: floods.	Severe: floods.	Fair: too clayey.
Atwood:					
AtB2, AtC2	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
AtD3	Moderate: percs slowly, slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey.
Bude:					
Bu	Severe: percs slowly, wetness.	Slight	Moderate: wetness, percs slowly.	Moderate: wetness.	Fair: too clayey.
Cascilla:					
Ca	Severe: floods.	Moderate: seepage.	Severe: floods.	Severe: floods.	Good.
Falkner:					
FaA	Severe: percs slowly, wetness.	Slight	Severe: too clayey, wetness.	Moderate: wetness.	Fair: thin layer.
FaB	Severe: percs slowly, wetness.	Moderate: slope.	Severe: too clayey, wetness.	Moderate: wetness.	Fair: thin layer.
Jena:					
Je	Severe: floods.	Severe: floods, seepage.	Severe: floods, too sandy, seepage.	Severe: floods, seepage.	Good.
Mantachie:					
Ma	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Good.
Marietta:					
Mr	Severe: floods, wetness.	Moderate: seepage, floods.	Severe: floods, wetness.	Severe: floods, wetness.	Good.
Oktibbeha:					
OkB2, OkC2	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey.
OkD2	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
[1]OmE2:					
Oktibbeha part	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
Sweatman part	Severe: slope, percs slowly.	Severe: slope.	Moderate: too clayey.	Severe: slope.	Poor: slope, thin layer.
Smithdale part	Severe: slope.	Severe: seepage, slope.	Moderate: slope.	Severe: slope.	Poor: slope.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ora:					
OrD3	Severe: percs slowly.	Severe: slope.	Slight	Moderate: slope.	Good.
Pooleville:					
Po	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Good.
Providence:					
PrB2, PrC2	Severe: percs slowly.	Moderate: slope.	Moderate: too clayey.	Slight	Fair: too clayey.
PrD3	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey.
Smithdale:					
SdF, [1]SgF, SHF	Severe: slope.	Severe: seepage, slope.	Severe: slope.	Severe: slope.	Poor: slope.
[1]STF:					
Smithdale part	Severe: slope.	Severe: seepage, slope.	Severe: slope.	Severe: slope.	Poor: slope.
Sweatman part	Severe: slope, percs slowly.	Severe: slope.	Moderate: too clayey.	Severe: slope.	Poor: slope, thin layer.
[1]SWF:					
Smithdale part	Severe: slope.	Severe: seepage, slope.	Severe: slope.	Severe: slope.	Poor: slope.
Sweatman part	Severe: slope, percs slowly.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope, thin layer.
Providence part	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey.
Sweatman:					
[1]SyE:					
Sweatman part	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Poor: thin layer.
Providence part	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey.
Smithdale part	Moderate: slope.	Severe: seepage, slope.	Slight	Moderate: slope.	Fair: slope.
Talla:					
Ta	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Good.
Tippah:					
TpB2, TpC2	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Moderate: wetness.	Fair: too clayey, thin layer.
TpD2	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: wetness.	Fair: too clayey, thin layer.

TABLE 10.—SANITARY FACILITIES—Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Urbo: Ur	Severe: percs slowly, floods, wetness.	Slight	Severe: too clayey, wetness, floods.	Severe: floods, wetness.	Poor: too clayey, wetness, thin layer.
Wilcox: WaB2, WaC2	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Moderate: wetness, slope.	Poor: too clayey.

[1]This map unit is made up of two or more dominant kinds of soil. See map unit description for the composition and behavior of the whole map unit.

TABLE 11.--CONSTRUCTION MATERIALS

["Shrink-swell" and some of the other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," and "unsuited"]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Arkabutla:				
Ar	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
Atwood:				
AtB2, AtC2	Fair: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
AtD3	Fair: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey, slope.
Bude:				
Bu	Fair: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
Cascilla:				
Ca	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Falkner:				
FaA, FaB	Poor: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
Jena:				
Je	Fair: low strength.	Poor: excess fines.	Unsuited: excess fines.	Good.
Mantachie:				
Ma	Fair: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Marietta:				
Mr	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey, thin layer.
Oktibbeha:				
OkB2, OkC2, OkD2	Poor: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey.
[1]OmE2:				
Oktibbeha part	Poor: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey.
Sweatman part	Fair: shrink-swell, slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.
Smithdale part	Fair: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Ora:				
OrD3	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.

TABLE 11.—CONSTRUCTION MATERIALS—Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Pooleville:				
Po	Fair: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Providence:				
PrB2, PrC2, PrD3	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
Smithdale:				
SdF, [1]SgF, SHF	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
[1]STF:				
Smithdale part	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Sweatman part	Fair: shrink-swell, slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.
[1]SWF:				
Smithdale part	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Sweatman part	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.
Providence part	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
Sweatman:				
[1]SyE:				
Sweatman part	Fair: shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.
Providence part	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
Smithdale part	Good	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope.
Talla:				
Ta	Fair: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Tippah:				
TpB2, TpC2, TpD2	Poor: shrink-swell, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
Urbo:				
Ur	Poor: shrink-swell, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: wetness, too clayey.
Wilcox:				
WaB2, WaC2	Poor: shrink-swell, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey.

[1]This map unit is made up of two or more dominant kinds of soil. See map unit description for the composition and behavior of the whole map unit.

TABLE 12.--WATER MANAGEMENT

["Seepage" and some of the other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe"]

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
Arkabutla:						
Ar	Moderate: seepage.	Moderate: piping, low strength.	Severe: no water.	Cutbanks cave, floods.	Erodes easily, piping.	Erodes easily.
Atwood:						
AtB2, AtC2	Moderate: seepage.	Moderate: unstable fill, compressible, piping.	Severe: deep to water.	Not needed	Favorable	Favorable.
AtD3	Moderate: seepage.	Moderate: unstable fill, compressible, piping.	Severe: deep to water.	Not needed	Slope, erodes easily.	Slope, erodes easily.
Bude:						
Bu	Slight	Moderate: low strength, piping.	Severe: no water.	Cutbanks cave, percs slowly, wetness.	Erodes easily, wetness.	Erodes easily, wetness.
Cascilla:						
Ca	Moderate: seepage.	Moderate: piping, low strength.	Severe: no water.	Cutbanks cave	Erodes easily, piping.	Erodes easily.
Falkner:						
FaA	Slight	Moderate: compressible, erodes easily.	Severe: no water.	Favorable	Erodes easily, percs slowly.	Erodes easily, percs slowly.
FaB	Slight	Moderate: compressible, erodes easily.	Severe: no water.	Slope	Erodes easily, percs slowly.	Erodes easily, percs slowly.
Jena:						
Je	Severe: seepage.	Moderate: low strength, seepage, piping.	Severe: no water.	Not needed	Not needed	Not needed.
Mantachie:						
Ma	Moderate: seepage.	Moderate: piping.	Severe: no water.	Wetness, floods.	Wetness	Wetness.
Marietta:						
Mr	Moderate: seepage.	Moderate: compressible, piping.	Moderate: deep to water.	Floods, wetness.	Wetness	Wetness.
Oktibbeha:						
OkB2, OkC2, OkD2	Slight	Moderate: low strength, shrink-swell, unstable fill.	Severe: no water.	Not needed	Percs slowly, slope, erodes easily.	Percs slowly, slope, erodes easily.
[1]OmE2:						
Oktibbeha part	Slight	Moderate: low strength, shrink-swell, unstable fill.	Severe: no water.	Not needed	Percs slowly, slope, erodes easily.	Percs slowly, slope, erodes easily.
Sweatman part	Moderate: seepage.	Moderate: low strength.	Severe: no water.	Complex slope	Slope, erodes easily.	Slope, erodes easily.

See footnote at end of table.

TABLE 12.—WATER MANAGEMENT—Continued

Soil name and map symbol	Limitations for— Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting— Drainage	Terraces and diversions	Grassed waterways
Oktibbeha:						
Smithdale part	Severe: seepage.	Moderate: piping, unstable fill.	Severe: no water.	Not needed, slope.	Slope, erodes easily.	Slope, erodes easily.
Ora: OrD3	Moderate: seepage.	Moderate: piping.	Severe: no water.	Percs slowly	Favorable	Rooting depth.
Pooleville: Po	Slight	Moderate: low strength.	Severe: no water.	Percs slowly, wetness.	Not needed	Percs slowly, wetness.
Providence: PrB2, PrC2, PrD3	Slight	Moderate: piping, unstable fill.	Severe: no water.	Cutbanks cave, percs slowly, slope.	Erodes easily, percs slowly, piping.	Erodes easily, percs slowly, slope.
Smithdale: SdF, [1]SgF, SHF	Severe: seepage.	Moderate: piping, unstable fill.	Severe: no water.	Not needed, slope.	Slope, erodes easily.	Slope, erodes easily.
[1]STF:						
Smithdale part	Severe: seepage.	Moderate: piping, unstable fill.	Severe: no water.	Not needed, slope.	Slope, erodes easily.	Slope, erodes easily.
Sweatman part	Moderate: seepage.	Moderate: low strength.	Severe: no water.	Complex slope	Slope, erodes easily.	Slope, erodes easily.
[1]SWF:						
Smithdale part	Severe: seepage.	Moderate: piping, unstable fill.	Severe: no water.	Not needed, slope.	Slope, erodes easily.	Slope, erodes easily.
Sweatman part	Moderate: seepage.	Moderate: low strength.	Severe: no water.	Complex slope	Slope, erodes easily.	Slope, erodes easily.
Providence part	Slight	Moderate: piping, unstable fill.	Severe: no water.	Cutbanks cave, percs slowly, slope.	Erodes easily, percs slowly, piping.	Erodes easily, percs slowly, slope.
Sweatman:						
[1]SyE:						
Sweatman part	Moderate: seepage.	Moderate: low strength.	Severe: no water.	Complex slope	Slope, erodes easily.	Slope, erodes easily.
Providence part	Slight	Moderate: piping, unstable fill.	Severe: no water.	Cutbanks cave, percs slowly, slope.	Erodes easily, percs slowly, piping.	Erodes easily, percs slowly, slope.
Smithdale part	Severe: seepage.	Moderate: piping, unstable fill.	Severe: no water.	Not needed, slope.	Slope, erodes easily.	Slope, erodes easily.
Talla: Ta	Slight	Moderate: low strength.	Severe: no water.	Wetness, slope.	Not needed	Wetness, erodes easily.
Tippah: TpB2, TpC2, TpD2	Slight	Moderate: shrink-swell, piping.	Severe: no water.	Cutbanks cave, percs slowly, slope.	Erodes easily, percs slowly, slope.	Erodes easily, percs slowly, slope.
Urbo: Ur	Slight	Moderate: compressible, low strength.	Severe: no water.	Floods, percs slowly, wetness.	Wetness	Wetness, percs slowly.

See footnote at end of table.

TABLE 12.—WATER MANAGEMENT—Continued

Soil name and map symbol	Limitations for— Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting— Drainage	Terraces and diversions	Grassed waterways
Wilcox:						
WaB2, WaC2	Slight	Moderate: low strength, shrink-swell.	Severe: no water.	Percs slowly, slope.	Percs slowly, slope.	Percs slowly, slope.

[1]This map unit is made up of two or more dominant kinds of soil. See map unit description for the composition and behavior of the whole map unit.

TABLE 13.--RECREATIONAL DEVELOPMENT

["Percs slowly" and some of the other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe"]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Arkabutla:				
Ar	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods.	Severe: floods, wetness.
Atwood:				
AtB2	Slight	Slight	Moderate: slope.	Slight.
AtC2	Slight	Slight	Severe: slope.	Slight.
AtD3	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Bude:				
Bu	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, percs slowly.	Moderate: wetness.
Cascilla:				
Ca	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
Falkner:				
FaA, FaB	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, percs slowly.	Moderate: wetness.
Jena:				
Je	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
Mantachie:				
Ma	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
Marietta:				
Mr	Severe: floods.	Moderate: floods.	Severe: floods.	Moderate: floods.
Oktibbeha:				
OkB2	Severe: too clayey, percs slowly.	Severe: too clayey.	Severe: too clayey, percs slowly.	Severe: too clayey.
OkC2, OkD2	Severe: too clayey, percs slowly.	Severe: too clayey.	Severe: too clayey, percs slowly, slope.	Severe: too clayey.
[1]OmE2:				
Oktibbeha part	Severe: too clayey, percs slowly.	Severe: too clayey.	Severe: too clayey, percs slowly, slope.	Severe: too clayey.
Sweatman part	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Smithdale part	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Ora:				
OrD3	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Pooleville:				
Po	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, percs slowly.	Moderate: wetness.
Providence:				
PrB2	Slight	Slight	Moderate: slope.	Slight.
PrC2	Slight	Slight	Severe: slope.	Slight.
PrD3	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Smithdale:				
SdF, [1]SgF, SHF	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
[1]STF:				
Smithdale part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Sweatman part	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
[1]SWF:				
Smithdale part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Sweatman part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Providence part	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Sweatman:				
[1]SyE:				
Sweatman part	Moderate: percs slowly, slope.	Moderate: slope.	Severe: slope.	Slight.
Providence part	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Smithdale part	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Talla:				
Ta	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, percs slowly.	Moderate: wetness.
Tippah:				
TpB2	Moderate: percs slowly.	Slight	Moderate: percs slowly, slope.	Slight.
TpC2	Moderate: percs slowly.	Slight	Severe: slope.	Slight.
TpD2	Moderate: percs slowly.	Moderate: slope.	Severe: slope.	Slight.
Urbo:				
Ur	Severe: floods, wetness, percs slowly.	Severe: wetness, floods, too clayey.	Severe: floods, percs slowly, wetness.	Severe: wetness, floods, too clayey.

See footnote at end of table.

TABLE 13.—RECREATIONAL DEVELOPMENT—Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Wilcox:				
WaB2, WaC2	Severe: percs slowly.	Moderate: wetness, slope, too clayey.	Severe: percs slowly.	Moderate: wetness, too clayey.

[1]This map unit is made up of two or more dominant kinds of soil. See map unit description for the comp_sition and behavior of the whole map unit.

TABLE 14.—WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor"]

Soil name and map symbol	Potential for habitat elements						Potential as habitat for—		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Arkabutla:									
Ar	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Atwood:									
AtB2	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AtC2, AtD3	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Bude:									
Bu	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Cascilla:									
Ca	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Falkner:									
FaA	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
FaB	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Jena:									
Je	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Mantachie:									
Ma	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Marietta:									
Mr	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Oktibbeha:									
OkB2	Fair	Fair	Fair	Good	Poor	Very poor.	Fair	Good	Poor.
OkC2, OkD2	Fair	Fair	Fair	Good	Very poor.	Very poor.	Fair	Good	Very poor.
[1]OmE2:									
Oktibbeha part	Fair	Fair	Fair	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Sweatman part	Poor	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Smithdale part	Poor	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Ora:									
OrD3	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Pooleville:									
Po	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Providence:									
PrB2	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
PrC2, PrD3	Fair	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 14.—WILDLIFE HABITAT POTENTIALS—Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for—		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Smithdale:									
SdF, [1]SgF, SHF	Very poor.	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
[1]STF:									
Smithdale part	Very poor.	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Sweatman part	Poor	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
[1]SWF:									
Smithdale part	Very poor.	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Sweatman part	Very poor.	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Providence part	Fair	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Sweatman:									
[1]SyE:									
Sweatman part	Fair	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Providence part	Fair	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Smithdale part	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Talla:									
Ta	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Tippah:									
TpB2	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
TpC2, TpD2	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Urbo:									
Ur	Fair	Good	Fair	Good	Good	Good	Fair	Good	Good.
Wilcox:									
WaB2	Fair	Good	Good	Good	Fair	Poor	Good	Good	Poor.
WaC2	Poor	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

[1]This map unit is made up of two or more dominant kinds of soil. See map unit description for the composition and behavior of the whole map unit.

TABLE 15.—ENGINEERING PROPERTIES AND CLASSIFICATIONS

[The symbol < means less than; > means greater than. Absence of an entry means data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Arkabutla:											
Ar	0-7	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	100	100	85-100	60-95	25-35	7-15
	7-55	Silty clay loam, loam, silt loam.	CL	A-6, A-7	0	100	100	85-100	70-90	30-45	12-25
Atwood:											
AtB2, AtC2, AtD3	0-5	Silt loam, loam	CL, CL-ML	A-4	0	100	100	100	85-100	20-30	4-10
	5-37	Silty clay loam	CL, CH	A-7, A-6	0	100	100	100	85-95	35-55	15-32
	37-87	Clay loam, sandy clay loam, silty clay loam.	CL, SC	A-6, A-7	0	100	90-100	80-100	45-85	30-49	11-30
Bude:											
Bu	0-6	Silt loam	CL	A-6	0	100	100	95-100	85-96	30-40	11-25
	6-28	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	95-100	84-98	35-50	15-30
	28-60	Silt loam, clay loam, silty clay loam.	CL, CH	A-7, A-6	0	100	100	95-100	75-90	35-65	15-40
Cascilla:											
Ca	0-29	Silt loam, silty clay loam.	CL	A-4, A-6	0	100	100	95-100	85-98	28-39	9-18
	29-72	Fine sandy loam, loam, silt loam.	SM, ML, CL-ML, SM-SC	A-4	0	100	100	80-100	45-86	<32	NP-10
Falkner:											
FaA, FaB	0-6	Silt loam	ML, CL-ML	A-4	0	100	100	95-100	90-100	20-30	5-10
	6-21	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	95-100	85-95	30-45	15-30
	21-65	Silty clay, silty clay loam.	CH	A-7	0	100	100	90-100	85-95	51-75	30-50
Jena:											
Je	0-6	Silt loam, fine sandy loam.	SM, ML, CL-ML, SM-SC	A-4, A-2-4	0	100	100	60-95	30-75	<22	NP-4
	6-21	Silt loam, very fine sandy loam, fine sandy loam.	SM, ML, CL-ML, SM-SC	A-4, A-2-4	0	100	100	55-90	25-70	<22	NP-4
	21-60	Fine sandy loam, sandy loam, loamy fine sand.	SM	A-2-4, A-4	0	100	100	50-80	20-50	---	NP
Mantachie:											
Ma	0-10	Silt loam, sandy loam, fine sandy loam.	ML, CL-ML, SM	A-4	0	100	100	90-100	70-85	<30	NP-10
	10-60	Loam, clay loam, sandy clay loam.	ML, CL, SC, SM	A-4, A-6	0-5	95-100	90-100	80-95	45-80	20-40	5-15

See footnote at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Marietta:											
Mr	0-6	Loam, fine sandy loam.	ML, CL, SM	A-4	0	100	100	80-95	40-75	20-30	5-10
	6-54	Silty clay loam, sandy clay loam, loam.	CL, SC	A-6, A-4	0	100	100	80-100	45-90	25-40	8-20
	54-70	Silty clay loam, sandy clay loam, loam.	CL, CH, SC	A-7, A-6	0	100	100	85-100	45-90	35-55	15-30
Oktibbeha:											
OkB2, OkC2, OkD2	0-6	Silt loam, loam, fine sandy loam.	ML, SM, CL-ML, SM-SC	A-4	0	100	100	70-100	40-90	<30	NP-6
	6-37	Clay	CH	A-7	0	100	95-100	95-100	95-100	55-65	30-40
	37-60	Clay, silty clay	CL	A-7	0	100	95-100	95-100	90-100	41-49	25-30
[1]OmE2:											
Oktibbeha part	0-6	Silt loam, loam, fine sandy loam.	ML, SM, CL-ML, SM-SC	A-4	0	100	100	70-100	40-90	<30	NP-6
	6-37	Clay	CH	A-7	0	100	95-100	95-100	95-100	55-65	30-40
	37-60	Clay, silty clay	CL	A-7	0	100	95-100	95-100	90-100	41-49	25-30
Sweatman part	0-7	Fine sandy loam, silt loam, loam.	CL-ML, CL, ML	A-4	0	100	100	90-100	55-90	<35	NP-10
	7-32	Clay, silty clay, silty clay loam.	MH	A-7	0	95-100	95-100	95-100	90-95	60-80	25-40
	32-45	Loam, clay loam	CL, ML	A-6, A-7	0	100	98-100	90-100	80-90	30-45	12-30
	45-57	Stratified weathered bedrock to fine sandy loam.	ML, MH	A-7	0	95-100	75-100	60-95	55-95	41-65	12-30
Smithdale part	0-4	Sandy loam, fine sandy loam.	SM, SM-SC	A-4	0	100	85-100	60-80	36-49	<20	NP-5
	4-25	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
	25-76	Loam, sandy loam	SM, ML, CL, SC	A-4	0	100	85-100	65-80	36-70	<30	NP-10
Ora:											
OrD3	0-2	Fine sandy loam, sandy loam, loam.	SM-SC, SM, ML, CL-ML	A-4, A-2	0	100	95-100	65-85	30-65	<30	NP-5
	2-22	Clay loam, sandy clay loam, loam.	CL, ML	A-6, A-4, A-7	0	100	95-100	80-100	50-80	25-48	8-22
	22-52	Sandy clay loam, loam, sandy loam.	CL, ML	A-6, A-7, A-4	0	100	95-100	80-100	50-75	25-43	8-25
	52-64	Sandy clay loam, loam, sandy loam.	CL, ML	A-4, A-6, A-7	0	100	95-100	80-98	50-60	30-49	11-30
Pooleville:											
Po	0-26	Silt loam, loam	CL-ML, CL, ML	A-4, A-6	0	100	100	90-100	80-95	<30	4-12
	26-42	Silt loam, silty clay loam.	CL	A-6, A-4	0	100	100	90-100	85-95	25-35	10-20
	42-74	Silt loam, silty clay loam, clay loam.	CL	A-6, A-7	0	100	100	90-100	70-95	30-45	12-25

See footnote at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Providence:											
PrB2, PrC2, PrD3	0-4	Silt loam	ML, CL	A-4	0	100	100	100	85-100	<30	NP-10
	4-18	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	85-100	30-45	11-20
	18-37	Silt loam, silty clay loam.	CL	A-6	0	100	100	90-100	70-90	25-40	11-20
	37-52	Loam, clay loam, sandy clay loam.	CL, SM, SC	A-6, A-4	0	100	95-100	70-95	40-80	<35	8-18
	52-62	Sandy loam, sandy clay loam, loam.	SM, SC, CL, ML	A-2, A-4, A-6	0	100	95-100	60-85	30-80	<30	NP-10
Smithdale:											
SdF, [1]SgF, SHF	0-4	Sandy loam, fine sandy loam.	SM, SM-SC	A-4	0	100	85-100	60-80	36-49	<20	NP-5
	4-25	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
	25-76	Loam, sandy loam	SM, ML, CL, SC	A-4	0	100	85-100	65-80	36-70	<30	NP-10
[1]STF:											
Smithdale part	0-4	Sandy loam, fine sandy loam.	SM, SM-SC	A-4	0	100	85-100	60-80	36-49	<20	NP-5
	4-25	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
	25-76	Loam, sandy loam	SM, ML, CL, SC	A-4	0	100	85-100	65-80	36-70	<30	NP-10
Sweatman part	0-7	Fine sandy loam, silt loam, loam.	CL-ML, CL, ML	A-4	0	100	100	90-100	55-90	<35	NP-10
	7-32	Clay, silty clay, silty clay loam.	MH	A-7	0	95-100	95-100	95-100	90-95	60-80	25-40
	32-45	Loam, clay loam	CL, ML	A-6, A-7	0	100	98-100	90-100	80-90	30-45	12-30
	45-57	Stratified weathered bedrock to fine sandy loam.	ML, MH	A-7	0	95-100	75-100	60-95	55-95	41-65	12-30
[1]SWF:											
Smithdale part	0-4	Sandy loam, fine sandy loam.	SM, SM-SC	A-4	0	100	85-100	60-80	36-49	<20	NP-5
	4-25	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
	25-76	Loam, sandy loam	SM, ML, CL, SC	A-4	0	100	85-100	65-80	36-70	<30	NP-10
Sweatman part	0-7	Fine sandy loam, silt loam, loam.	CL-ML, CL, ML	A-4	0	100	100	90-100	55-90	<35	NP-10
	7-32	Clay, silty clay, silty clay loam.	MH	A-7	0	95-100	95-100	95-100	90-95	60-80	25-40
	32-45	Loam, clay loam	CL, ML	A-6, A-7	0	100	98-100	90-100	80-90	30-45	12-30
	45-57	Stratified weathered bedrock to fine sandy loam.	ML, MH	A-7	0	95-100	75-100	60-95	55-95	41-65	12-30

See footnote at end of table.

TABLE 15.—ENGINEERING PROPERTIES AND CLASSIFICATIONS—Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Smithdale:											
Providence part—	0-4	Silt loam, fine sandy loam.	ML, CL	A-4	0	100	100	100	85-100	<30	NP-10
	4-18	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	85-100	30-45	11-20
	18-37	Silt loam, silty clay loam.	CL	A-6	0	100	100	90-100	70-90	25-40	11-20
	37-52	Loam, clay loam, sandy clay loam.	CL, SM, SC	A-6, A-4	0	100	95-100	70-95	40-80	<35	8-18
	52-62	Sandy loam, sandy clay loam, loam.	SM, SC, CL, ML	A-2, A-4, A-6	0	100	95-100	60-85	30-80	<30	NP-10
Sweatman:											
[1]SyE:											
Sweatman part—	0-7	Fine sandy loam, silt loam, loam.	CL-ML, CL, ML	A-4	0	100	100	90-100	55-90	<35	NP-10
	7-32	Clay, silty clay, silty clay loam.	MH	A-7	0	95-100	95-100	95-100	90-95	60-80	25-40
	32-45	Loam, clay loam	CL, ML	A-6, A-7	0	100	98-100	90-100	80-90	30-45	12-30
	45-57	Stratified weathered bedrock to fine sandy loam.	ML, MH	A-7	0	95-100	75-100	60-95	55-95	41-65	12-30
Providence part—	0-4	Silt loam—	ML, CL	A-4	0	100	100	100	85-100	<30	NP-10
	4-18	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	85-100	30-45	11-20
	18-37	Silt loam, silty clay loam.	CL	A-6	0	100	100	90-100	70-90	25-40	11-20
	37-52	Loam, clay loam, sandy clay loam.	CL, SM, SC	A-6, A-4	0	100	95-100	70-95	40-80	<35	8-18
	52-62	Sandy loam, sandy clay loam, loam.	SM, SC, CL, ML	A-2, A-4, A-6	0	100	95-100	60-85	30-80	<30	NP-10
Smithdale part—	0-4	Sandy loam, fine sandy loam.	SM, SM-SC	A-4	0	100	85-100	60-80	36-49	<20	NP-5
	4-25	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
	25-76	Loam, sandy loam	SM, ML, CL, SC	A-4	0	100	85-100	65-80	36-70	<30	NP-10
Talla:											
Ta—	0-6	Silt loam, fine sandy loam, loam.	ML, CL-ML	A-4	0	100	100	80-100	60-80	<30	NP-7
	6-24	Silt loam, loam, sandy clay loam.	ML, CL, CL-ML	A-4	0	100	90-100	85-100	55-85	20-40	2-10
	24-79	Loam, sandy clay loam, clay loam.	CL	A-4, A-6, A-7	0	100	90-100	80-100	50-80	25-45	10-25
Tippah:											
TpB2, TpC2, TpD2—	0-6	Silt loam—	CL, CL-ML	A-4	0	100	100	90-100	70-90	20-30	4-10
	6-32	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	98-100	90-100	85-95	30-45	11-22
	32-60	Silty clay loam, silty clay, clay.	CH, MH	A-7	0	100	99-100	80-100	60-95	50-65	25-40

See footnote at end of table.

TABLE 15.—ENGINEERING PROPERTIES AND CLASSIFICATIONS—Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Urbo:											
Ur	0-50	Silty clay, silty clay loam.	CL, CH	A-7	0	100	100	95-100	80-98	44-62	20-36
Wilcox:											
WaB2, WaC2	0-6	Silty clay loam, silt loam.	CL, CH	A-7	0	100	100	95-100	80-95	41-51	19-25
	6-40	Clay, silty clay, silty clay loam.	CH, MH	A-7	0	100	100	95-100	80-95	50-72	22-40
	40-58	Clay	CH, MH	A-7	0	100	100	90-100	75-95	60-135	39-80
	58-72	Clay and weathered bedrock.	---	---	---	---	---	---	---	---	---

[1]This map unit is made up of two or more dominant kinds of soil. See map unit description for the composition and behavior of the whole map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[Dashes indicate data were not available. The symbol < means less than. The erosion tolerance factor (T) is for the entire profile. Absence of an entry means data were not estimated]

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete	Erosion factors: K	Erosion factors: T
	In	In/hr	In/in	pH					
Arkabutla:									
Ar	0-7	0.6-2.0	0.20-0.22	4.5-5.5	Low	High	High	---	---
	7-55	0.6-2.0	0.18-0.21	4.5-5.5	Low	High	High	---	
Atwood:									
AtB2, AtC2, AtD3	0-5	0.6-2.0	0.20-0.22	5.1-6.0	Low	Low	Moderate	0.37	5
	5-37	0.6-2.0	0.20-0.22	5.1-6.0	Moderate	Low	Moderate	0.37	
	37-87	0.6-2.0	0.14-0.20	5.1-6.0	Moderate	Low	Moderate	0.37	
Bude:									
Bu	0-6	0.6-2.0	0.18-0.23	4.5-6.0	Low	High	High	0.43	3
	6-28	0.6-2.0	0.10-0.12	4.5-6.0	Low	High	High	0.43	
	28-60	0.06-0.2	0.10-0.12	4.5-6.0	Moderate	High	High	0.43	
Cascilla:									
Ca	0-29	0.6-2.0	0.18-0.22	4.5-5.5	Low	Low	Moderate	---	---
	29-72	0.6-2.0	0.16-0.20	4.5-5.5	Low	Low	Moderate	---	
Falkner:									
FaA, FaB	0-6	0.2-0.6	0.20-0.22	4.5-5.5	Low	High	Moderate	0.43	4
	6-21	0.2-0.6	0.19-0.22	4.5-5.5	Moderate	High	Moderate	---	
	21-65	0.06-0.2	0.16-0.18	4.5-5.5	High	High	Moderate	---	
Jena:									
Je	0-6	0.6-2.0	0.12-0.20	4.5-5.5	Low	Low	High	---	---
	6-21	0.6-2.0	0.10-0.20	4.5-5.5	Low	Low	High	---	
	21-60	2.0-6.0	0.08-0.14	4.5-5.5	Low	Low	High	---	
Mantachie:									
Ma	0-10	0.6-2.0	0.16-0.20	4.5-5.5	Low	High	High	---	---
	10-60	0.6-2.0	0.14-0.20	4.5-5.5	Low	High	High	---	
Marietta:									
Mr	0-6	0.6-2.0	0.14-0.18	5.6-6.5	Low	Moderate	Low	---	---
	6-54	0.6-2.0	0.14-0.20	5.6-6.5	Low	Moderate	Low	---	
	54-70	0.6-2.0	0.14-0.20	5.6-6.5	Moderate	Moderate	Low	---	
Oktibbeha:									
OkB2, OkC2, OkD2	0-6	0.6-2.0	0.14-0.18	4.5-5.5	Low	High	High	0.32	3
	6-37	<0.06	0.12-0.16	4.5-5.5	High	High	High	0.32	
	37-60	<0.06	0.10-0.14	6.6-8.4	High	High	Low	0.32	
[1]OmE2:									
Oktibbeha part	0-6	0.6-2.0	0.14-0.18	4.5-6.5	Low	High	High	0.32	3
	6-37	<0.06	0.12-0.16	4.5-6.5	High	High	High	0.32	
	37-60	<0.06	0.10-0.14	6.6-8.4	High	High	Low	0.32	
Sweatman part	0-7	0.6-2.0	0.20-0.22	4.5-5.5	Low	High	High	0.37	3
	7-32	0.2-0.6	0.16-0.20	4.5-5.5	Moderate	High	High	0.28	
	32-45	0.2-0.6	0.16-0.20	4.5-5.5	Moderate	High	High	---	
	45-57	0.2-0.6	0.10-0.18	4.5-5.5	Moderate	High	High	---	
Smithdale part	0-4	2.0-6.0	0.14-0.16	4.5-5.5	Low	Low	Moderate	0.28	5
	4-25	0.6-2.0	0.15-0.17	4.5-5.5	Low	Low	Moderate	0.24	
	25-76	2.0-6.0	0.14-0.16	4.5-5.5	Low	Low	Moderate	0.28	
Ora:									
OrD3	0-2	2.0-6.0	0.10-0.13	4.5-5.5	Low	Moderate	High	0.32	3
	2-22	0.6-2.0	0.12-0.18	4.5-5.5	Low	Moderate	High	0.32	
	22-52	0.2-0.6	0.05-0.10	4.5-5.5	Low	Moderate	High	0.37	
	52-64	0.6-2.0	0.10-0.15	4.5-5.5	Low	Moderate	High	0.37	

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Risk of corrosion		Erosion factors	
						Uncoated steel	Concrete	K	T
	In	In/hr	In/in	pH					
Pooleville:									
Po	0-26	0.2-0.6	0.18-0.20	4.5-5.5	Low	High	High	0.43	5
	26-42	0.2-0.6	0.18-0.20	4.5-5.5	Low	High	High	0.43	
	42-74	0.2-0.6	0.18-0.20	4.5-5.5	Moderate	High	High	0.37	
Providence:									
PrB2, PrC2, PrD3	0-4	0.6-2.0	0.20-0.22	4.5-6.0	Low	Moderate	Moderate	0.37	4
	4-18	0.6-2.0	0.20-0.22	4.5-6.0	Low	Moderate	Moderate	0.37	
	18-37	0.2-0.6	0.08-0.10	4.5-6.0	Moderate	Moderate	Moderate	0.37	
	37-52	0.2-0.6	0.08-0.10	4.5-6.0	Low	Moderate	Moderate	0.32	
	52-62	0.6-2.0	0.10-0.15	4.5-6.0	Low	Moderate	Moderate	0.32	
Smithdale:									
SdF, [1]SgF, SHF	0-4	2.0-6.0	0.14-0.16	4.5-5.5	Low	Low	Moderate	0.28	5
	4-25	0.6-2.0	0.15-0.17	4.5-5.5	Low	Low	Moderate	0.24	
	25-76	2.0-6.0	0.14-0.16	4.5-5.5	Low	Low	Moderate	0.28	
[1]STF:									
Smithdale part	0-4	2.0-6.0	0.14-0.16	4.5-5.5	Low	Low	Moderate	0.28	5
	4-25	0.6-2.0	0.15-0.17	4.5-5.5	Low	Low	Moderate	0.24	
	25-76	2.0-6.0	0.14-0.16	4.5-5.5	Low	Low	Moderate	0.28	
Sweatman part	0-7	0.6-2.0	0.20-0.22	4.5-5.5	Low	High	High	0.37	3
	7-32	0.2-0.6	0.16-0.20	4.5-5.5	Moderate	High	High	0.28	
	32-45	0.2-0.6	0.16-0.20	4.5-5.5	Moderate	High	High	---	
	45-57	0.2-0.6	0.10-0.18	4.5-5.5	Moderate	High	High	---	
[1]SWF:									
Smithdale part	0-4	2.0-6.0	0.14-0.16	4.5-5.5	Low	Low	Moderate	0.28	5
	4-25	0.6-2.0	0.15-0.17	4.5-5.5	Low	Low	Moderate	0.24	
	25-76	2.0-6.0	0.14-0.16	4.5-5.5	Low	Low	Moderate	0.28	
Sweatman part	0-7	0.6-2.0	0.20-0.22	4.5-5.5	Low	High	High	0.37	3
	7-32	0.2-0.6	0.16-0.20	4.5-5.5	Moderate	High	High	0.28	
	32-45	0.2-0.6	0.16-0.20	4.5-5.5	Moderate	High	High	---	
	45-57	0.2-0.6	0.10-0.18	4.5-5.5	Moderate	High	High	---	
Providence part	0-4	0.6-2.0	0.20-0.22	4.5-6.0	Low	Moderate	Moderate	0.37	4
	4-18	0.6-2.0	0.20-0.22	4.5-6.0	Low	Moderate	Moderate	0.37	
	18-37	0.2-0.6	0.08-0.10	4.5-6.0	Moderate	Moderate	Moderate	0.37	
	37-52	0.2-0.6	0.08-0.10	4.5-6.0	Low	Moderate	Moderate	0.32	
	52-62	0.6-2.0	0.10-0.15	4.5-6.0	Low	Moderate	Moderate	0.32	
Sweatman:									
[1]SyE:									
Sweatman part	0-7	0.6-2.0	0.20-0.22	4.5-5.5	Low	High	High	0.37	3
	7-32	0.2-0.6	0.16-0.20	4.5-5.5	Moderate	High	High	0.28	
	32-45	0.2-0.6	0.16-0.20	4.5-5.5	Moderate	High	High	---	
	45-57	0.2-0.6	0.10-0.18	4.5-5.5	Moderate	High	High	---	
Providence part	0-4	0.6-2.0	0.20-0.22	4.5-6.0	Low	Moderate	Moderate	0.37	4
	4-18	0.6-2.0	0.20-0.22	4.5-6.0	Low	Moderate	Moderate	0.37	
	18-37	0.2-0.6	0.08-0.10	4.5-6.0	Moderate	Moderate	Moderate	0.37	
	37-52	0.2-0.6	0.08-0.10	4.5-6.0	Low	Moderate	Moderate	0.32	
	52-62	0.6-2.0	0.10-0.15	4.5-6.0	Low	Moderate	Moderate	0.32	
Smithdale part	0-4	2.0-6.0	0.14-0.16	4.5-5.5	Low	Low	Moderate	0.28	5
	4-25	0.6-2.0	0.15-0.17	4.5-5.5	Low	Low	Moderate	0.24	
	25-76	2.0-6.0	0.14-0.16	4.5-5.5	Low	Low	Moderate	0.28	
Talla:									
Ta	0-6	0.6-2.0	0.14-0.18	4.5-5.5	Low	High	High	0.43	4
	6-24	0.2-0.6	0.12-0.16	4.5-5.5	Low	High	High	0.37	
	24-79	0.2-0.6	0.12-0.16	4.5-5.5	Moderate	High	High	0.37	
Tippah:									
TpB2, TpC2, TpD2	0-6	0.6-2.0	0.20-0.22	4.5-6.0	Low	High	High	0.43	4
	6-32	0.06-0.2	0.19-0.21	4.5-6.0	Moderate	High	High	---	
	32-60	0.06-0.2	0.16-0.18	4.5-6.0	High	High	High	---	

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permea- bility	Available water capacity	Soil reaction	Shrink- swell potential	Risk of corrosion		Erosion factors	
						Uncoated steel	Concrete	K	T
	In	In/hr	In/in	pH					
Urbo:									
Ur	0-50	<0.06	0.18-0.20	4.5-5.5	Moderate	High	High	---	---
Wilcox:									
WaB2, WaC2	0-6	0.06-0.2	0.19-0.21	4.0-5.5	High	High	High	0.32	4
	6-40	<0.06	0.18-0.20	4.0-5.5	High	High	High	0.32	
	40-58	<0.06	0.15-0.18	4.0-5.5	High	High	High	0.28	
	58-72	---	---	---	---	---	---	---	

[1]This map unit is made up of two or more dominant kinds of soil. See map unit description for the composition and behavior of the whole map unit.

TABLE 17.--SOIL AND WATER FEATURES

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

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness
					Ft			In	
Arkabutla:									
Ar	C	Common	Brief	Jan-Apr	1.5-2.5	Apparent	Jan-Apr	>60	---
Atwood:									
AtB2, AtC2, AtD3	B	None	---	---	>6.0	---	---	>60	---
Bude:									
Bu	C	None	---	---	0.5-1.5	Perched	Jan-Apr	>60	---
Cascilla:									
Ca	B	Rare to common.	Brief	Jan-Apr	>6.0	---	---	>60	---
Falkner:									
FaA, FaB	C	None	---	---	1.5-2.5	Perched	Jan-Mar	>60	---
Jena:									
Je	B	Rare to common.	Brief	Dec-Apr	>6.0	---	---	>60	---
Mantachie:									
Ma	C	Common	Brief	Jan-Apr	1.0-1.5	Apparent	Dec-Mar	>60	---
Marietta:									
Mr	C	Common	Brief	Jan-Apr	2.0	Apparent	Jan-Mar	>60	---
Oktibbeha:									
OkB2, OkC2, OkD2	D	None	---	---	>6.0	---	---	20-50	Rippable
[1]OmE2:									
Oktibbeha part	D	None	---	---	>6.0	---	---	20-50	Rippable
Sweatman part	C	None	---	---	>6.0	---	---	>60	---
Smithdale part	B	None	---	---	>6.0	---	---	>60	---
Ora:									
OrD3	C	None	---	---	2.0-3.5	Perched	Feb-Apr	>60	---
Pooleville:									
Po	C	None	---	---	1.5-2.5	Perched	Dec-Apr	>60	---
Providence:									
PrB2, PrC2, PrD3	C	None	---	---	1.5-3.0	Perched	Jan-Mar	>60	---
Smithdale:									
SdF, [1]SgF, SHF	B	None	---	---	>6.0	---	---	>60	---
[1]STF:									
Smithdale part	B	None	---	---	>6.0	---	---	>60	---
Sweatman part	C	None	---	---	>6.0	---	---	>60	---
[1]SWF:									
Smithdale part	B	None	---	---	>6.0	---	---	>60	---
Sweatman part	C	None	---	---	>6.0	---	---	>60	---
Providence part	C	None	---	---	1.5-3.0	Perched	Jan-Mar	>60	---
Sweatman:									
[1]SyE:									
Sweatman part	C	None	---	---	>6.0	---	---	>60	---
Providence part	C	None	---	---	1.5-3.0	Perched	Jan-Mar	>60	---

See footnote at end of table.

TABLE 17.—SOIL AND WATER FEATURES—Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness
					Ft			In	
Sweatman: Smithdale part	B	None	—	—	>6.0	—	—	>60	—
Talla: Ta	C	None	—	—	1.0-3.0	Perched	Dec-Apr	>60	—
Tippah: TpB2, TpC2, TpD2	C	None	—	—	2.5	Perched	Dec-Apr	>60	—
Urbo: Ur	D	Common	Brief	Jan-Apr	1.0-2.0	Apparent	Jan-Mar	>60	—
Wilcox: WaB2, WaC2	D	None	—	—	1.5-3.0	Perched	Jan-Apr	40-80	Rippable

[1]This map unit is made up of two or more dominant kinds of soil. See map unit description for the composition and behavior of the whole map unit.

TABLE 18.—CHEMICAL ANALYSES OF SELECTED SOILS

[Analyzed by the Soil Genesis and Morphology Laboratory of the Mississippi Agricultural and Forestry Experiment Station]

Series	Laboratory number	Horizon	Depth from surface	Reaction 1:1 H_2O	Exchangeable cations (meq/100 g): Ca^{++}	Mg^{++}	H^{+}	K^{+}	Na^{+}	Sum of cations	Base saturation by sum of cations
			In	pH						Meq/100 g	Pct
Cascilla	86	Ap	0-6	4.7	3.6	1.3	8.8	0.3	0.3	14.3	38.4
	87	B21	6-15	4.5	2.6	2.3	7.0	0	0.3	12.3	42.6
	88	B22	15-29	4.7	1.8	2.3	10.3	0	0.3	14.7	29.9
	89	IIB23	29-46	4.8	1.3	1.7	8.3	0.1	0.2	11.6	28.4
	90	IIB3	46-72	4.9	1.3	1.9	4.4	0	0.2	7.8	43.6
Pooleville	153	Ap	0-4	4.9	1.5	0.5	5.9	0.2	0.2	8.3	29.1
	154	B&A21	4-14	4.9	0.8	0.3	6.3	0.1	0.1	7.6	17.2
	155	B&A22	14-26	4.8	0.9	0.6	7.7	0.1	0.2	9.5	18.7
	156	B21t	26-42	4.9	2.1	1.4	9.2	0.1	0.4	13.2	30.0
	157	B22t	42-64	4.8	3.5	1.6	8.6	0.2	0.4	14.3	39.6
	158	B23t	64-74	4.8	11.4	2.8	6.1	0.2	0.6	21.1	71.1
Talla	136	Ap	0-6	5.8	2.6	0.3	2.5	0.1	0.2	5.7	55.9
	137	A21	6-13	5.0	2.7	0.3	3.8	0	0.3	7.1	46.7
	138	A22	13-24	5.1	0.4	0.3	5.6	0.1	0.6	7.0	19.7
	139	B21t	24-38	5.2	2.3	1.4	9.8	0.1	.2.1	15.7	37.6
	140	IIB22t &A'2	38-61	5.2	0.5	1.4	6.3	0.1	2.1	10.4	38.9
	141	IIB23t	61-79	5.1	1.0	1.6	6.5	0.1	3.4	12.6	48.2
Wilcox	80	Ap	0-6	5.0	7.0	5.5	9.2	0.3	0.2	22.2	58.6
	81	B21t	6-10	4.8	3.7	4.9	16.9	0.2	0.3	26.0	35.0
	82	B22t	10-21	4.7	3.7	5.9	20.5	0.2	0.4	30.7	24.4
	83	B23t	21-40	4.6	5.0	6.1	15.9	0.2	0.9	28.1	43.4
	84	C1	40-58	4.6	7.0	11.6	10.2	0.2	0.9	30.5	66.5
	85	C2	58-72	4.6	10.3	16.3	10.4	0.2	0.4	37.6	72.3

TABLE 19.—PARTICLE SIZE DISTRIBUTION

[Analyzed by the Soil Genesis and Morphology Laboratory of the Mississippi Agricultural and Forestry Experiment Station]

Series	Laboratory number	Horizon	Depth from surface	Particle size distribution			Sand fraction		
				Total clay 0.002 mm	Total silt 0.05-0.002 mm	Total sand 2.0-0.05 mm	0.25-2.0 mm	0.1-0.25 mm	0.05-0.1 mm
			In	Pct	Pct	Pct	Pct	Pct	Pct
Cascilla	86	Ap	0-6	27.4	68.1	4.5	—	—	—
	87	B21	6-15	30.2	67.5	2.3	—	—	—
	88	B22	15-29	27.4	68.3	4.3	—	—	—
	89	IIB23	29-46	18.8	51.8	29.4	—	—	—
	90	IIB3	46-72	20.1	61.1	18.8	—	—	—
Pooleville	153	Ap	0-4	11.5	67.2	21.3	11.9	5.0	4.4
	154	B&A21	4-14	15.5	67.4	17.1	10.2	3.3	3.7
	155	B&A22	14-26	19.3	66.5	14.2	8.1	2.7	3.4
	156	B21t	26-42	24.9	63.1	12.0	7.0	2.3	2.8
	157	B22t	42-64	26.5	60.4	13.1	7.6	2.7	2.8
	158	B23t	64-74	27.2	57.6	15.2	8.7	3.3	3.3
Talla	136	Ap	0-6	5.8	66.9	27.3	—	—	—
	137	A21	6-13	11.4	55.9	32.7	—	—	—
	138	A22	13-24	10.9	57.0	32.1	—	—	—
	139	B21t	24-38	23.2	50.5	26.3	—	—	—
	140	IIB22t &A'2	38-61	15.3	42.9	41.8	—	—	—
	141	IIB23t	61-79	21.8	29.0	49.2	—	—	—
Wilcox	80	Ap	0-6	34.1	52.0	13.9	—	—	—
	81	B21t	6-10	50.3	44.0	5.7	—	—	—
	82	B22t	10-21	55.2	40.6	4.2	—	—	—
	83	B23t	21-40	45.5	50.5	4.0	—	—	—
	84	C1	40-58	48.0	47.9	4.1	—	—	—
	85	C2	58-72	65.5	30.4	4.1	—	—	—

TABLE 20.—ENGINEERING TEST DATA

[Tests performed by the Mississippi State Highway Department in accordance with standard procedures of the American Association of State Highway and Transportation Officials (1)]

Soil name and location	Report number	Depth from surface	Moisture-density[1]		Mechanical analysis[2]								Liquid limit	Plasticity index	Classification	
			Maximum dry density	Optimum moisture	Percentage passing sieve no.--			Percentage smaller than--							AASHTO	Unified
					10	40	60	0.074 mm	0.05 mm	0.02 mm	0.005 mm	0.002 mm				
		In	Lbs/ft3	Pct									Pct			
Cascilla silt loam: 300 feet south of Tippah County, 1,000 feet west of Hell Creek, NE1/4NW1/4 SE1/4 sec. 2, T. 6 S., R. 2 E.	S-1 S73Miss-73-2-2	6-15	100.8	19.6	100	100	100	98	93	66	32	25	37	13	A-6(13)	CL
	S-1 S73Miss-73-2-4	29-46	105.9	18.2	100	100	99	78	71	48	24	15	32	9	A-4(7)	CL
	S-1 S73Miss-73-2-5	46-72	105.8	17.2	100	100	100	86	80	53	25	20	31	9	A-4(8)	CL
Pooleville silt loam: 0.6 mile south of Martintown Church, 300 feet west of road, NE1/4SE1/4 NE1/4 sec. 26, T. 7 S., R. 2 E.	S-8 S73Miss-73-5-2	4-14	110.4	15.0	100	95	91	87	81	54	24	19	30	9	A-4(8)	CL
	S-9 S73Miss-73-5-4	26-42	108.6	15.9	100	96	93	88	83	56	24	19	30	10	A-4(8)	Cl
	S-10S73Miss-73-5-5	42-64	103.2	17.0	100	96	93	88	84	60	32	27	42	23	A-7(20)	CL
	S-11S73Miss-73-5-6	64-74	104.2	17.8	100	96	93	88	83	59	31	24	36	17	A-6(16)	CL
Talla silt loam: 1 1/4 miles northeast of Dowdy Store, E1/2SW1/4 NW1/4 sec. 15, T. 8 S., R. 2 E.	No. 1 S74MS-5-2-2	6-13	113.8	13.4	100	97	92	70	62	42	17	12	21	2	A-4(4)	ML
	No. 2 S74MS-5-2-4	24-38	107.7	17.0	100	98	94	77	69	51	32	17	41	23	A-7(18)	CL
	No. 3 S74MS-5-2-5	38-61	111.7	14.8	100	98	92	70	62	43	25	20	28	11	A-6(6)	CL

[1]Based on AASHTO Designation: T 99-57, Method A(1).

[2]Mechanical analysis according to AASHTO Designation: T 88-57 (1). Results by this procedure may differ somewhat from results obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHTO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method, and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analysis data used in this table are not suitable for naming textural classes for soils.

TABLE 21.—CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Arkabutla	Fine-silty, mixed, acid, thermic Aeric Fluvaquents
Atwood	Fine-silty, mixed, thermic Typic Paleudalfs
Bude	Fine-silty, mixed, thermic Glossaquic Fragiudalfs
Cascilla	Fine-silty, mixed, thermic Fluventic Dystrochrepts
Falkner	Fine-silty, siliceous, thermic Aquic Paleudalfs
Jena	Coarse-loamy, siliceous, thermic Fluventic Dystrochrepts
Mantachie	Fine-loamy, siliceous, acid, thermic Aeric Fluvaquents
Marietta	Fine-loamy, siliceous, thermic Fluvaquentic Eutrochrepts
Oktibbeha	Very-fine, montmorillonitic, thermic Vertic Hapludalfs
Ora	Fine-loamy, siliceous, thermic Typic Fragiudults
Pooleville	Fine-silty, siliceous, thermic Aquic Glossudalfs
Providence	Fine-silty, mixed, thermic Typic Fragiudalfs
Smithdale	Fine-loamy, siliceous, thermic Typic Paleudults
Sweatman	Clayey, mixed, thermic Typic Hapludults
Talla	Fine-loamy, siliceous, thermic Glossic Natrudalfs
Tippah	Fine-silty, mixed, thermic Aquic Paleudalfs
Urbo	Fine, mixed, acid, thermic Aeric Haplaquepts
Wilcox	Fine, montmorillonitic, thermic Vertic Hapludalfs

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