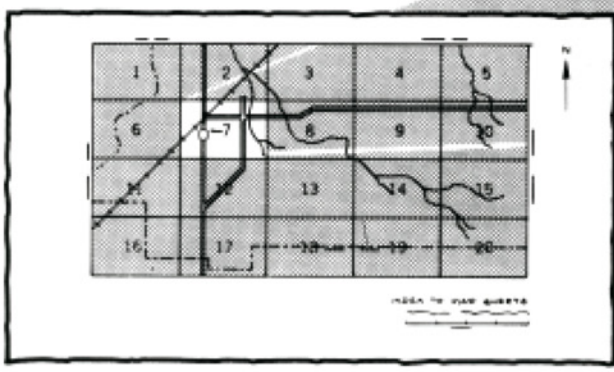
SOIL SURVEY OF

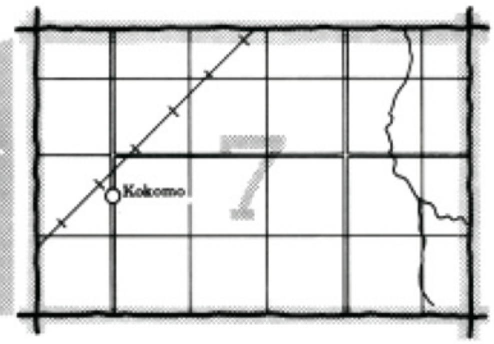
Clay County, Arkansas

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

HOW TO USE

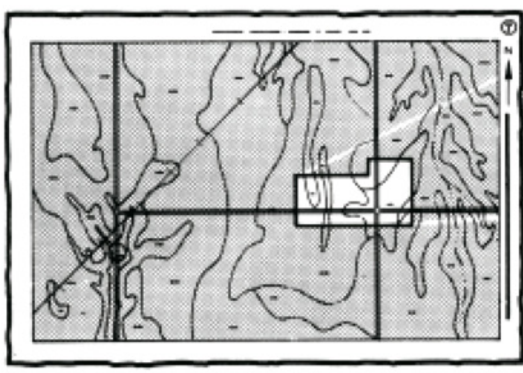
1. Locate your area of interest on the "Index to Map Sheets"

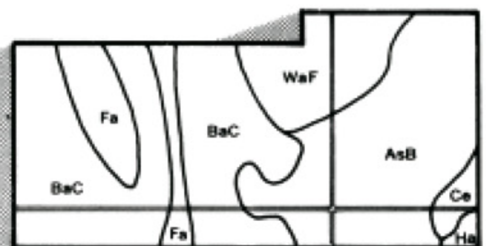




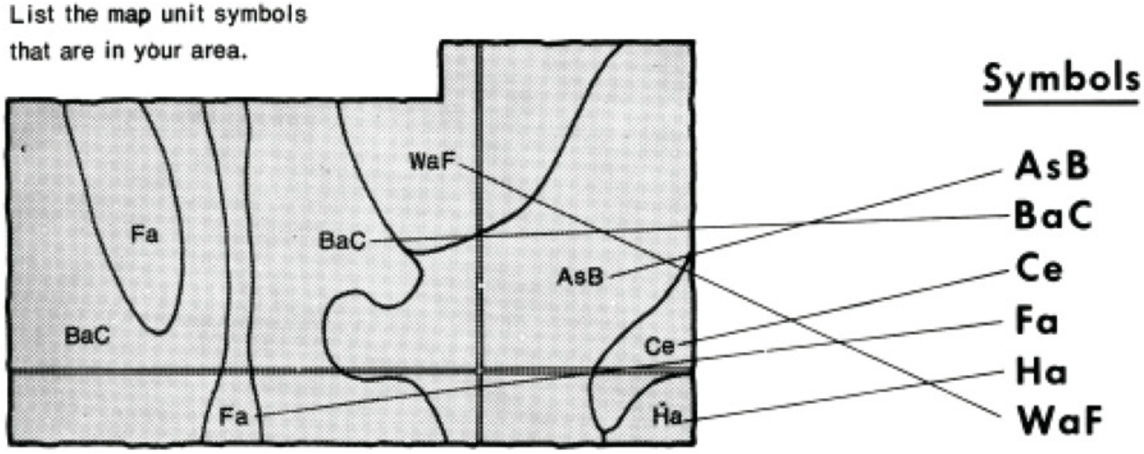
2. Note the number of the map sheet and turn to that sheet.

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



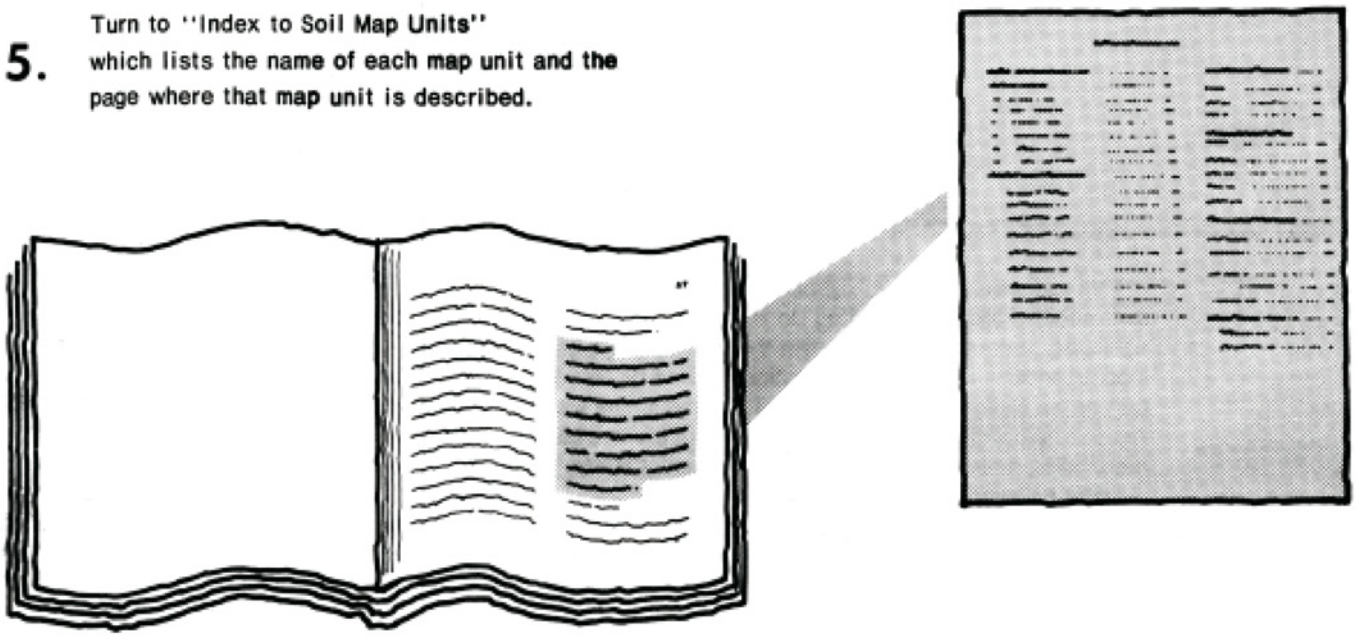


4. List the map unit symbols that are in your area.

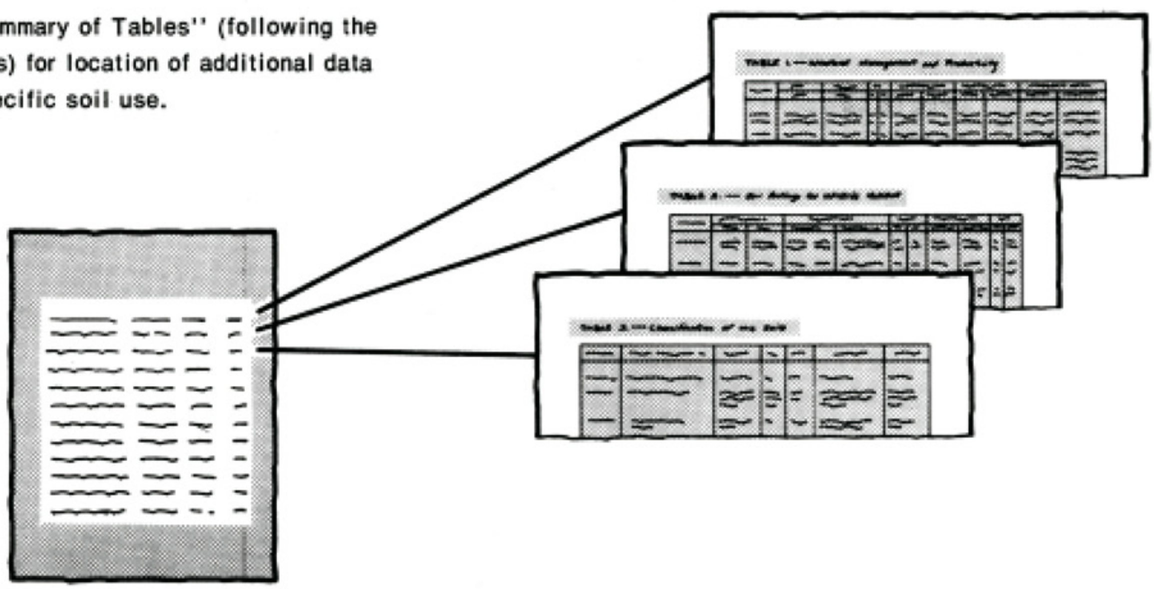


THIS SOIL SURVEY

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 1971-74. 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 and the Arkansas Agricultural Experiment Station. It is part of the technical assistance furnished to the Clay 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.

Cover: Cotton on Beulah fine sandy loam, gently undulating. Stripcropping reduces soil blowing.

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Issued July 1978

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Foreword

The Soil Survey of Clay County, Arkansas, 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.

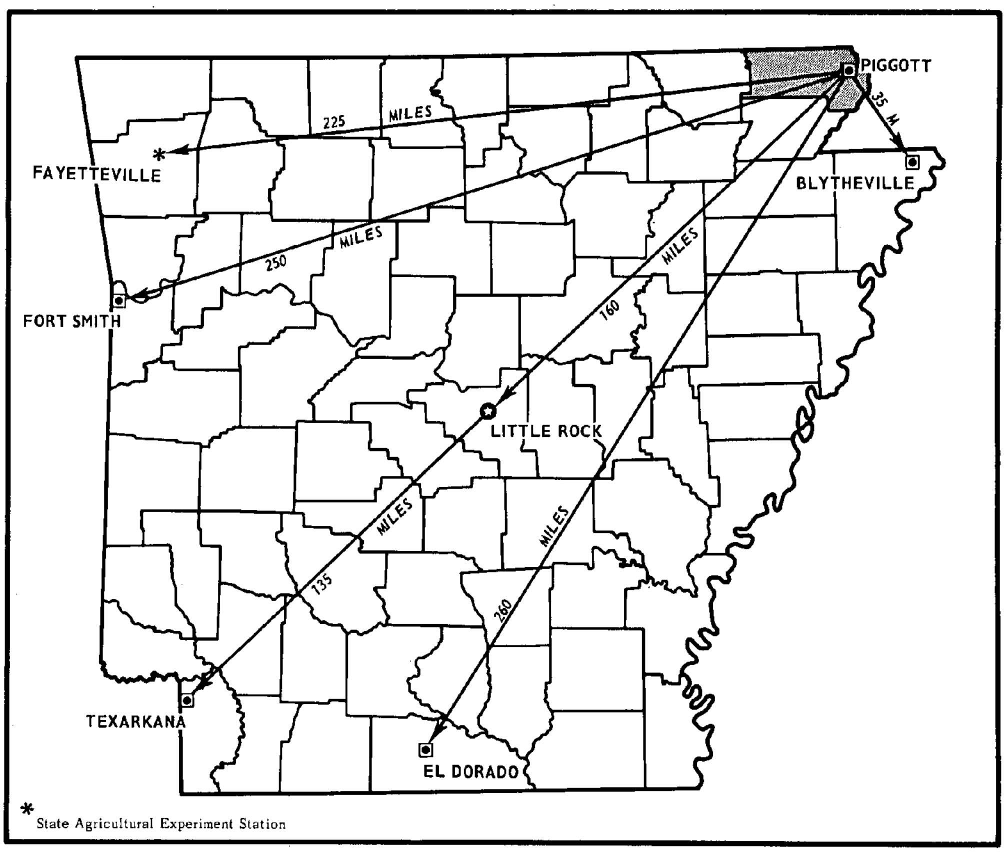
Great differences in soil properties can occur even within short distances. Soils may be seasonally wet or subject to flooding. They may be shallow to bedrock. They may be too unstable to be used as a foundation for buildings or roads. Very clayey or wet soils are poorly suited to septic tank absorption 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.

M J Spears

M.J. Spears
State Conservationist
Soil Conservation Service



Location of Clay County in Arkansas.

SOIL SURVEY OF CLAY COUNTY, ARKANSAS

Soils surveyed by Richard T. Fielder, Dick V. Ferguson, and Jerry L. Hogan,
Soil Conservation Service

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

CLAY COUNTY is in the northeastern part of Arkansas. (See facing page.) It is roughly rectangular in shape and has a land area of about 409,088 acres, or 639 square miles. It is about 20 miles from north to south and about 38 miles from east to west.

The county is bounded on the north and east by the State of Missouri, on the south by Greene County, and on the west by Randolph County.

In 1970 the population of Clay County was 18,771. Piggott with a population of 3,361 and Corning with a population of 3,156 are the county seats and important trading centers. Rector has a population of 2,218 and is also an important trading center.

The economy of the county is based on farming. Except for a few manufacturing plants in Corning, Piggott, and Rector, most of the business provides farm services.

General nature of the county

The farming, physiography, drainage, and climate of Clay County are discussed in this section.

Uplands, where the soils formed in thick layers of windblown sediment, make up about 22 percent of the county. The uplands lie across the east central part of the county from north to south. Most of the uplands are on Crowley's Ridge.

Except for the steep slopes on Crowley's Ridge, most of the upland soils are suitable for cultivation or improved pasture. Just as excess water is a moderate to severe hazard where soils are level, so erosion is a moderate to severe hazard where they are more sloping.

About 78 percent of the county is bottom land and associated lakes and rivers east and west of Crowley's Ridge. The soils in this area are suited to farming. Except for a few large wooded tracts such as those within the Black River Wildlife Management Area in the southwestern part of the county, most of the area is cultivated. Excess water drains away slowly or is ponded, and it is a moderate to severe hazard over the area. Erosion is significant in a few places.

Elevations above mean sea level in the county range from about 524 feet at a point about 3 miles north of Rector atop Crowley's Ridge to about 240 feet near the southeast boundary of the county along the St. Francis River.

Most of the soils in the county contain moderate to high amounts of plant nutrients and are among the most fertile soils in the state. The bottom land area is part of the combined flood plains of the St. Francis, Cache, Little Black, Black, and Current Rivers. Most of the bottom land was subject to flooding by these rivers until levees were constructed. Levees along the St. Francis and Black Rivers protect part of the area from flooding. Since these levees were constructed, major flooding has been negligible except in areas between the rivers and their levees and along Cache River Ditch and its tributaries. Even in the areas subject to frequent flooding, which includes about 9 percent of the land area, floods occur mainly between January and June. Thus, warm-season crops can be grown most years.

Farming

Farming in Clay County spreads from the better drained parts of the uplands to the higher parts of the natural levees, then gradually to the poorly drained flats. According to the 1969 Census of Agriculture, about 345,521 acres, or 85 percent of the county, is in farms. The rest is woodland, cities and towns, state owned land, and transportation and utility facilities. The early economy was based on the plantation system, and cotton was the main cash crop.

Farming is still the principal means of livelihood, but cropping systems have become more diversified. The acreage of cotton, corn, and other feed crops has declined in importance and soybeans and small grains have increased in importance.

Most farming in Clay County is of a general nature. Soybeans, cotton, and wheat are the main crops, and some rice and grain sorghum are grown. Beef cattle are raised on some farms. Table 1 shows the acreage of principal crops for selected years, and table 2 gives the kind and number of livestock. Over much of the county, improved crop varieties, improved drainage outlets, major flood control measures (on the flood plains), and other improved management techniques have led to rapid expansion of farming in the wetter areas and a great reduction in the amount of acreage in woodland.

Farms in Clay County, as in most of eastern Arkansas, are decreasing in number and increasing in size. Between 1964 and 1969, the number of farms decreased from 1,694 to 1,469, but the average size increased from 198 acres to 235 acres.

Farms of 220 acres or more increased from 483 in 1964 to 529 in 1969. Farms smaller than 220 acres decreased in number. Those of less than 100 acres decreased in number the most—from 663 in 1964 to 491 in 1969. Those larger than 1,000 acres increased from 25 to 34. In 1969, 673 farm operators were full owners, 466 were part owners, and 330 were tenants. Of these operators, 420 worked away from the farm 100 days or more.

The number of livestock in the county has been decreasing for several years. Most beef cattle are of good grade, and milk cows are generally kept mainly for home use.

Most of the farms are small enough for the family to do most of the work. Thus, outside labor is used only during peak seasons. On the larger farms laborers are hired and are supervised by the owner, manager, or tenant. Tenants pay a fixed rent or a percentage of the crop for use of the land. Most of the land is farmed by operators who have enough modern equipment to manage efficiently. Most farmers fertilize according to the needs of the crop, and many use chemicals for weed control.

Physiography and drainage

The geological deposits of the surface of Clay County are alluvium and loess. These deposits are the parent material of the soils in the county. Generally, the loess is on the uplands in the east central part of the county, mostly on Crowley's Ridge. The alluvial sediment is more than 200 feet thick and is over unconsolidated material. The loess is about 3 to more than 25 feet thick and is over unconsolidated old alluvium and coastal plain sediment. Depth to bedrock is probably many hundreds of feet throughout the county.

The alluvium is a mixture of minerals from throughout the Mississippi River and White River Basins. It is derived from many kinds of soils, rocks, and unconsolidated sediment that came from more than 24 states (*4*).

The topography of the county can be divided into two main areas. These areas are the level to undulating bottom lands and the nearly level to moderately steep uplands on Crowley's Ridge.

The topography of the bottom lands ranges from broad flats to areas of alternating swales and low ridges. Except along a few streambanks, differences in elevations are minor. Slopes generally are less than 1 percent, but they are as much as 8 percent on side slopes and low ridges.

In the Crowley's Ridge area, topography is characterized by ridges that have narrow winding tops, short side slopes, and narrow valleys between the ridges. Slopes on ridges range predominantly from 8 to 20 percent, but slopes along valley drainageways generally are less than 1 percent.

The drainage in the county is generally southwestward through a system of natural and improved drainageways and connecting artifical channels. The county is well supplied with drainageways. The major natural drains are the St. Francis, Black, Little Black, and Current Rivers; Little Rankine, Middle, and Hampton Sloughs; Murry, Dart, Johnson, Big, Post, White, Walnut, Oak, and Quick Creeks; Big Slough, Cache, Cypress, McNie, and Pomp Creeks; and Big Slough, Cache, and Cypress Ditches.

About 6,000 acres in the northeast corner of the county drains directly into the St. Francis River. The rest, east of the divide atop Crowley's Ridge, drains through Hampton and Middle Sloughs and Big Slough Ditch. These drain into the St. Francis River at a point south of Clay County. The area west of the divide atop Crowley's Ridge is drained by the Cache, Black, and Current Rivers. The Current River flows across the northwest part of the county and into the Black River at a point in Randolph County, which is west of Clay County. The Black River flows into White River at a point south of Clay County.

The many streams and such lakes as Murphy, Victor, Big Taylor, Corning, Woolfolk, Lower Woolfolk, Old River, and others furnish an abundant supply of surface water for recreation, farming, and industry. The supply of groundwater is abundant. Wells, ten inches in diameter and drilled to a depth of about 120 feet, furnish an unfailing flow of good to fair quality water at a rate of about 1,500 to 1,800 gallons per minute.

Climate

Clay County has long hot summers and rather cool winters. An occasional cold wave brings near freezing or subfreezing temperatures but seldom much snow. Precipitation is fairly heavy throughout the year, with a slight peak in winter, and prolonged droughts are rare. Summer precipitation falls mainly in afternoon thunderstorms and is adequate for all crops.

Table 3 gives data on temperature and precipitation for the survey area, as recorded at Corning, Arkansas, for the period 1951 to 1973. Table 4 shows probable dates of the first freeze in fall and the last freeze in spring. Table 5 provides data on length of the growing season. Data for this section were obtained from the National Climatic Center, Asheville, North Carolina.

In winter the average temperature is 39 degrees F, and the average daily minimum is 29 degrees. The lowest temperature on record, -14 degrees, occurred at Corning on February 2, 1951. In summer the average temperature is 79 degrees, and the average daily maximum is 91 degrees. The highest temperature, 108 degrees, was recorded on July 28, 1952.

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

Of the total annual precipitation, 24 inches, or 52 percent, usually falls during the period April through September, which includes the growing season for most crops. Two years in ten, the April through September rainfall is less than 18 inches. The heaviest rainfall in 1 day during the period of record was 6.47 inches at Corning on September 26, 1972. Thunderstorms occur about 57 times each year, 22 of them in summer.

The average seasonal snowfall is 8 inches. The greatest snow depth at any one time during the period of record was 8 inches.

The average relative humidity in midafternoon in spring is less than 60 percent. Humidity is higher at night than it is during the day in all seasons, and the average at dawn is about 85 percent. The percentage of possible sunshine is 72 percent in summer and 60 percent in winter. The prevailing direction of the wind is from the southwest. The average windspeed is highest, 10 miles per hour, in March.

Severe local storms, including tornadoes, may strike in or near the county occasionally but are of short duration, and damage is variable and spotty.

Rainfall is normally adequate for all crops in most of the county, but lower available water holding capacity of the sandy soils results in brief droughts almost every year.

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.

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.

Loamy and clayey soils that formed in alluvial sediment on flood plains, natural levees, and slack water areas characterized by broad flats and low terraces

These soils are in units 1 through 9 and together make up about 82 percent of the county. They are the Southern Mississippi Valley Alluvium Land Resource Area. The soils east of Crowley's Ridge formed in sediment of the St. Francis River and its local tributaries. The soils west of Crowley's Ridge formed in sediment of the Black River and its local tributaries. Soils in slack water areas on broad flats formed in loesslike material.

1. Amagon

Poorly drained, level, loamy soils on broad flats and in shallow depressions along natural drainageways

This map unit is in the northwestern and southeastern parts of the county. The soils are on broad flats on the lower parts of natural levees and in shallow depressions along natural drainageways. They formed in loamy sediment. Natural drainageways are mainly slow flowing intermittent streams.

This map unit occupies about 8 percent of the county. About 85 percent of it is Amagon soils, and the remaining 15 percent is minor soils and water areas.

Amagon soils are poorly drained and have a silt loam surface layer. These soils are saturated with water in late winter and early in spring.

The minor soils in this map unit are the poorly drained Calhoun, Foley, and Fountain soils and the somewhat poorly drained Dundee soils.

The soils in this map unit are used mainly for cultivated crops, but frequently flooded areas are used mostly for woodland. Wetness is the main limitation to use of these soils. Fieldwork is delayed several days after a rain because of excess water, and surface drains are needed.

When adequately drained, the soils have medium potential for row crops and small grains. Flooded areas have low potential for most cultivated crops. The soils have high potential for woodland, but wetness is a limitation when managing and harvesting the tree crops. These soils have low potential for most urban uses. The seasonal high water table, poor drainage, and low bearing capacity severely limit residential and industrial development.

2. Wardell-Foley

Poorly drained, level, loamy soils on broad flats and in depresssions on natural levees and on old flood plains

This map unit is in the northwestern part of the county. The soils formed in loamy sediment. They are on broad flats and in depressions on natural levees and on old flood plains along abandoned stream channels. Natural drainageways are mainly slow flowing intermittent streams.

This map unit makes up about 3 percent of the county. About 60 percent of it is Wardell soils, 16 percent is Foley soils, and the remaining 24 percent is minor soils.

Wardell soils are at slightly lower elevations than Foley soils. They have a surface layer of fine sandy loam, and Foley soils have a surface layer of silt loam. Both the Wardell and the Foley soils are poorly drained and have a seasonal high water table.

The minor soils in this map unit are the poorly drained Amagon, Bonn, Fountain, Kobel, and Tuckerman soils and the somewhat poorly drained Patterson soils. The well drained Bosket soils and the somewhat excessively drained Beulah soils are also in this map unit.

The soils in this map unit are used mainly for cultivated crops, except for small patches of hardwood trees along drainageways. Wetness is the main limitation, and the water table is within 12 inches of the surface during winter and early in spring.

The soils have medium potential for growing row crops. Farming operations are commonly delayed several days after a rain because of excess water, and surface drains are needed. The soils have a high potential for woodland; however, harvesting of lumber is usually limited to the drier seasons. Wetness is a severe limitation and difficult to overcome; therefore, these soils have low potential for residential and urban uses.

3. Bosket-Dexter-Beulah

Well drained and somewhat excessively drained, gently undulating and undulating, loamy soils on natural levees

This map unit is in the western part of the county. These soils formed in loamy and sandy alluvium along higher parts of natural levees. They are in gently undulating or undulating areas of alternating low ridges and narrow swales.

This map unit makes up about 6 percent of the county. About 36 percent of it is Bosket soils, 34 percent is Dexter soils, 10 percent is Beulah soils, and 20 percent is minor soils.

Beulah soils are somewhat excessively drained and are slightly higher in elevation than the well drained Bosket and Dexter soils. Beulah and Bosket soils have a surface layer of fine sandy loam, and Dexter soils have a surface layer of silt loam.

The minor soils in this map unit are the somewhat poorly drained Dundee and Patterson soils and the poorly drained Tuckerman and Wardell soils.

The soils in this map unit are used mainly for cultivated crops. Erosion is the main limitation to use of these soils for clean tilled crops.

The soils have medium to high potential for row crops and small grains. Erosion is a moderate to severe hazard along upper parts of slopes. The soils have high potential for woodland and for most urban uses.

4. Foley-Crowley-Jackport

Poorly drained, level, loamy and clayey soils, on broad flats and slack water areas

This map unit extends from north to south in the central part of the county. The soils formed in loamy and clayey sediment. The Foley and Crowley soils are on broad flats, and the Jackport soils are on broad slack water areas.

This map unit makes up about 34 percent of the county. Foley soils make up about 33 percent, Crowley soils about 18 percent, Jackport soils about 18 percent, and minor soils about 31 percent.

Foley and Crowley soils are on slightly higher elevations than the Jackport soils. These soils are poorly drained. The Foley and Crowley soils have a surface layer of silt loam and the Jackport soils have a surface layer of silty clay. These soils have seasonal high water tables within 12 inches of the surface late in winter and early in spring.

The minor soils in this map unit are the Amagon, Bonn, Calhoun, Dexter, Dundee, Fountain, and Kobel soils. The Amagon, Bonn, Calhoun, Fountain, and Kobel soils are poorly drained, the Dexter soils are well drained, and the Dundee soils are somewhat poorly drained.

The soils in this unit are used mainly for cultivated crops, but there are small patches of woodland. Wetness is the main limitation when using these soils for farming. Fieldwork is commonly delayed several days after a rain because of excess water, and surface drains are needed.

When they are adequately drained, the soils have medium potential for row crops. They have high potential for the production of rice. The soils have high potential for woodland, but wetness is a limitation for managing and harvesting tree crops. Because of severe limitations, which are difficult to overcome, the soils have low potential for residential and urban use.

5. Kobel

Poorly drained, level, clayey soils on broad slack water flats on flood plains

This map unit is in the southwestern and southeastern parts of the county. It includes the Black River Wildlife Management Area. The soils are on slack water flats on flood plains. They formed in clayey sediment.

The map unit makes up about 8 percent of the county. About 85 percent of it is Kobel soils, and the remaining 15 percent is minor soils and water areas.

Kobel soils are poorly drained and have a surface layer of silty clay. These soils have a seasonally high water table within 12 inches of the surface late in winter and early in spring.

The minor soils in this map unit are the poorly drained Jackport and Wardell soils.

The soils in this map unit that are protected from flooding are used mainly for cultivated crops. Where they are not protected, the soils are frequently flooded and are used mostly for woodland and wildlife habitat. Wetness is the main limitation to use of these soils for farming and most other purposes.

When adequately drained, the soils have medium potential for row crops and high potential for growing rice. Frequently flooded soils have low potential for most cultivated crops. These soils have high potential for woodland and wetland wildlife habitat. They have low potential for residential and other urban uses. Flooding, wetness, and shrink swell characteristics are severe limitations for most urban uses.

6. Fountain

Poorly drained, level, loamy soils on broad flats

This map unit is in the eastern part of the county. The soils are on broad flats. They formed in loamy sediment.

This map unit makes up about 8 percent of the county. About 80 percent of it is Fountain soils, and the remaining 20 percent is minor soils.

Fountain soils are poorly drained and have a silt loam surface layer These soils are saturated with water late in winter and early in spring.

The minor soils in this map unit are the poorly drained Amagon soils and the somewhat poorly drained Dundee soils.

This map unit is used mainly for cultivated crops. Wetness is the main limitation to use of these soils for farming and most other purposes. Fieldwork is delayed several days after a rain because of excess water, and surface drains are needed.

When adequately drained, the soils of this unit have medium potential for row crops and small grains. They have high potential for woodland, but wetness is a limitation when managing and harvesting tree crops. Because of the wetness, these soils have low potential for most urban uses.

7. Beulah-Patterson

Somewhat excessively drained and somewhat poorly drained, gently undulating and level, loamy soils on natural levees

This map unit is in the southeastern part of the county. The soils formed in stratified loamy and sandy alluvium. They are in areas where low ridges alternate with narrow swales.

This map unit makes up about 4 percent of the county. About 40 percent of it is Beulah soils, 36 percent is Patterson soils, and the remaining 24 percent is minor soils.

Beulah soils are on low ridges and are slightly higher in elevation than Patterson soils. Beulah soils are somewhat excessively drained, and Patterson soils are somewhat poorly drained. Both the Beulah and the Patterson soils have a surface layer of fine sandy loam. Patterson soils have a seasonal high water table.

The minor soils in this map unit are the well drained Bosket and Dubbs soils, the somewhat poorly drained Dundee soils, and the poorly drained Wardell soils.

The soils of this map unit are used mainly for cultivated crops. Droughtiness and wetness are the main limitations to use of these soils for cultivated crops.

The soils have medium potential for row crops and small grains. Droughtiness is a moderate limitation for the Beulah soils, and wetness is a moderate limitation for the Patterson soils. These soils have high potential for woodland. Beulah soils have high potential for most urban uses, but, because of their wetness, Patterson soils have low potential for most urban uses.

8. Commerce

Somewhat poorly drained, level, loamy soils on flood plains

This map unit is in the eastern part of the county. The soils are on flood plains. They formed in loamy sediment.

This map unit makes up about 2 percent of the county. About 75 percent of it is Commerce soils, and the remaining 25 percent is minor soils and water areas.

Commerce soils are somewhat poorly drained and have a surface layer of fine sandy loam, silt loam, or silty clay loam. Where these soils are not protected by levees, they are frequently flooded.

The minor soils in this map unit are the somewhat poorly drained Falaya and Patterson soils.

This map unit is used mainly for pasture and woodland. A few areas that are protected from flooding are used for row crops. Wetness and the hazard of flooding are the main limitations to use of these soils for farming.

Unless protected from flooding, the soils in this map unit have low potential for row crops. They have high potential for woodland, but wetness and flooding are limitations when managing and when harvesting the tree crops. These soils have low potential for most urban uses because of flooding and wetness.

9. Falaya-Collins

Somewhat poorly drained and moderately well drained, level, loamy soils on flood plains

This map unit is in the eastern part of the county. These soils formed in loamy sediment derived from loess. They are on upland drainageways and level areas adjacent to Crowley's Ridge.

This map unit makes up about 9 percent of the county. Falaya soils make up about 55 percent of it and Collins soils about 45 percent.

Falaya soils are somewhat poorly drained and are slightly lower in elevation than the Collins soils. Collins soils are moderately well drained. Both have silt loam surface layers.

This map unit is used mainly for cultivated crops and pasture. Wetness is the main limitation to use of these soils for farming. Fieldwork may be delayed a few days after a rain because of excess water, and surface drains may be needed.

When adequately drained, the soils in this unit have medium potential for pasture and row crops. They have high potential for woodland. These soils have medium to low potential for most urban uses, because some areas are occasionally flooded.

Loamy and gravelly soils that formed in windlaid sediment and coastal plain sediment on uplands characterized by narrow ridges that have moderately steep sides

These soils are in map units 10 and 11, and together they make up about 18 percent of the county. They are in the Crowley's Ridge part of the Southern Mississippi Valley Silty Uplands Land Resource Area. These soils formed in wind-sorted material from ancient flood plains deposited over older loamy and gravelly alluvium sediment.

10. Loring-Memphis

Moderately well drained and well drained, nearly level to moderately steep, loamy soils on uplands

This map unit is in the eastern part of the county. These soils formed in deposits of thick loess. They are nearly level to moderately steep and are on uplands.

This map unit makes up about 13 percent of the county. About 65 percent of it is Loring soils, about 15 percent is Memphis soils, and the remaining 20 percent is minor soils.

Loring soils are moderately well drained and have a fragipan in the subsoil. Memphis soils are well drained and are normally at a slightly higher elevation than the Loring soils. Both have a silt loam surface layer.

The minor soils in this map unit are the well drained Brandon and Saffell soils, the somewhat poorly drained Falaya soils, and the moderately well drained Collins soils.

This map unit is used mainly for pasture and woodland. Erosion is the main limitation to use of these soils.

Except where they are nearly level, the soils in this map unit have low potential for cultivated crops. Erosion is a severe to very severe hazard on slopes. These soils have high potential for pasture and woodland. They have medium to low potential for most urban uses.

11. Brandon-Saffell

Well drained, moderately sloping and moderately steep, loamy and gravelly soils on uplands

This map unit is in the eastern part of the county. The Brandon soils formed in a loess mantle about 2 to 4 feet thick overlying coastal plain sediment. The Saffell soils formed in coastal plain sediment of high gravel content. These soils are on narrow ridges that have moderately sloping and moderately steep sides and narrow winding valleys between ridges.

This map unit makes up about 5 percent of the county. About 57 percent of the map unit is Brandon soils, about 28 percent is Saffell soils, and the remaining 15 percent is minor soils.

Brandon and Saffell soils are both well drained. Brandon soils have a silt loam surface layer, and Saffell soils have a surface layer of gravelly fine sandy loam.

The minor soils in this map unit are the moderately well drained Collins and Loring soils, the well drained Memphis soils, and the somewhat poorly drained Falaya soils.

The soils in this map unit are used mainly for woodland or pasture. Erosion is the main limitation to the use of these soils.

The soils have low potential for cultivated crops. Erosion is a very severe hazard on side slopes. These soils have medium potential for pasture, but special erosion control measures may be needed. They have high potential for woodland. Because of the steepness of the slopes, these soils have low potential for most urban uses.

Broad land use considerations

Deciding which land should be used for urban development is an important issue in the survey area. Each year land is being developed for urban uses in Piggott, Corning, and other cities in this county. It is estimated that about 4,000 acres is urban land or land that has buildings or other structures on it. The general soil map is most helpful for planning the general outline of urban areas, but it cannot be used for the selection of sites for specific urban structures. In general, the soils in the county that have high potential for cultivated crops also have high potential for urban development. Most of the soils have high potential for woodland. Data relating to specific soils in this survey can be helpful in planning future land use patterns.

Areas where the soils are so unfavorable that urban development is prohibitive are not extensive in the survey area. Large areas of the Commerce map unit are on flood plains where flooding is a severe hazard. Also, the clayey soils of the Kobel map unit have low potential for urban development because of wetness, flooding, and high shrink-swell potential.

In large areas of this county are soils that can be developed for urban uses at lower costs than the soils of the Commerce and Kobel map units. These include soils of the Bosket-Dexter-Beulah map unit, the somewhat excessively drained Beulah soils in the Beulah-Patterson map unit, and the nearly level to gently sloping soils of the Loring-Memphis map unit. The soils in the first two of these map units have medium to high potential for farmland, and this potential should not be overlooked when broad land uses are considered. The Loring soil in the latter map unit is underlain by a fragipan at a depth of less than 40 inches, but other soil qualities are favorable for residential and other nonfarm uses.

In some areas there are soils that have high potential for rice production but low potential for nonfarm uses, for example, soils of the Foley-Crowley-Jackport map unit. Wetness and shrink-swell potential are the main limitations to nonfarm uses of these soils. These limitations can be overcome by proper design and installation of foundations. It should be noted, however, that these soils have medium potential for cultivated crops, and many farmers have provided sufficient drainage for these crops.

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 profile that is almost alike 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. The Memphis series, for example, was named for the town of Memphis in Shelby County.

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, Calhoun silty loam is one of several phases within the Calhoun series.

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

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. Bonn-Foley complex 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. Brandon-Saffell association, moderately steep, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because there is little value in separating them. The pattern and proportion of the soils are not uniform. An area shown on the map has at least one of the dominant (named) soils or may have all of them. Amagon soils, frequently flooded, is an undifferentiated group in this survey area.

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 6, 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.

10—Amagon silt loam. This level soil is on broad flats and shallow depressions on bottom land. Slope gradient is less than 1 percent. Individual areas range in size from about 20 to more than 1,000 acres.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsurface layer is light brownish gray, mottled silt loam about 6 inches thick. The upper part of the subsoil is light brownish gray, mottled silt loam about 13 inches thick. The middle part is light brownish gray, mottled silty clay loam about 19 inches thick. The lower part is gray, mottled silty clay loam about 16 inches thick. The underlying material is gray, mottled silty clay loam that extends to a depth of more than 72 inches.

Included with this soil in mapping are a few small areas of Dundee, Foley, Calhoun, and Fountain soils. A few small tracts of Amagon silt loam are occasionally flooded.

This soil is moderate in natural fertility and low in organic matter. The soil is medium acid to very strongly acid in the surface layer, very strongly acid to slightly acid in the subsoil, and strongly acid to moderately alkaline in the underlying material. Permeability is low, and available water capacity is high. The water table is seasonally high and is within 12 inches of the surface during winter and early in spring.

Amagon silt loam has medium potential for most crops commonly grown in the county. Nearly all of the acreage is cultivated. The principal crop is soybeans. Cotton (fig. 1), rice, and grain sorghum are suitable crops. Winter small grains can be grown if surface drainage is adequate. Adapted pasture plants are bermudagrass and tall fescue. This soil responds well to fertilization, and tilth is easy to maintain. A plow pan has formed beneath the plow depth in places. This restricts root penetration and movement of water through the soil.

This soil has a high potential for growing cottonwood, cherrybark oak, Nuttall oak, and sweetgum. Wetness is the main limitation to equipment use in managing and harvesting the tree crop, but it is usually overcome by logging during the drier seasons.

This soil has low potential for most urban uses. Poor drainage and seasonal high water table are severe limitations for dwellings, streets, and industrial sites. The slow permeability and seasonal high water table are severe limitations for septic tank absorption fields. These limitations are difficult or impractical to overcome. Capability unit IIIw-1; woodland suitability group 1w6.

11—Amagon soils, frequently flooded. This undifferentiated group consists of poorly drained soils on flood plains along Black River. It consists of Amagon soils that have a surface layer of silt loam and fine sandy loam and soils that are similar to Amagon soils except that they have a sandier subsoil. The soils are not in a regular pattern on the landscape. Individual areas are large enough to have been mapped separately, but because of present and predicted use, they were not separated in mapping. The soils are inundated several times in most years. The slope is dominantly less than 1 percent. Individual areas range in size from about 80 to more than 1,000 acres.

Typically, the surface layer is dark grayish brown silt loam or fine sandy loam about 6 inches thick. The subsurface layer is light brownish gray mottled silt loam about 6 inches thick. The upper part of the subsoil is light brownish gray, mottled silt loam about 13 inches thick. The middle part is light brownish gray, mottled silty clay loam about 19 inches thick. The lower part is gray, mottled silty clay loam about 16 inches thick. The underlying material is gray, mottled silty clay loam that extends to a depth of more than 72 inches.

Included with these soils in mapping are soils with neutral reaction within a depth of about 30 inches.

Amagon soils are medium acid to very strongly acid in the surface layer, very strongly acid to slightly acid in the subsoil, and strongly acid to moderately alkaline in the underlying material. Permeability is slow, and available water capacity is high. The water table is seasonally high, and flooding is frequent during winter and early in spring.

This undifferentiated group has low potential for farming because of the hazard of frequent flooding. In most years the flooding occurs during the period of December to June. Crops that require a short growing season such as soybeans can be grown, but some years flooding is likely to damage the crop. Most of the area is within a state-owned game management area.

This undifferentiated group of soils is well suited for woodland. It has a high potential for growing cottonwood, water oak, willow oak, Nuttall oak, and sweetgum. Wetness and flooding limit the use of equipment in managing and harvesting the tree crop, but this can be overcome by using special equipment and by logging during drier seasons.

The soils in this undifferentiated group have very low potential for urban use. Wetness and flooding are the main limitations and can be overcome only by major flood control and drainage measures. Capability unit IVw-1; woodland suitability group 1w6.

12—**Beulah fine sandy loam, gently undulating.** This somewhat excessively drained soil is on the higher parts of natural levees. It is in areas of alternating long narrow swales and low ridges that rise from 1 to 4 feet above the swales. These complex slopes range from 0 to 3 percent. Individual areas range in size from about 20 to 600 acres.

Typically, the surface layer is brown fine sandy loam about 7 inches thick. The subsoil is fine sandy loam and is dark yellowish brown in the upper part to a depth of 30 inches and yellowish brown in the lower part to a depth of 39 inches. The underlying material is yellowish brown loamy fine sand and brown loamy sand to a depth of 72 inches or more.

Included with this soil in mapping are a few small intermingled areas of Dubbs, Patterson, and Wardell soils.

This Beulah soil is moderate in natural fertility. Content of organic matter is medium to low. Permeability is moderately rapid, and available water capacity is medium to low. The soil is strongly acid through medium acid in the surface layer except where limed, strongly acid or very strongly acid in the subsoil, and slightly acid to medium acid in the underlying material.

This soil has medium potential for farming. The main crops are cotton and soybeans. Other suitable crops are peanuts, grain sorghum, and winter small grains. Truck crops such as okra, green beans, potatoes, sweet corn, tomatoes, and melons are also suitable. Adapted pasture plants are bermudagrass, bahiagrass, annual lespedeza, white clover, and tall fescue. The soil responds well to fertilization, and tilth is easy to maintain. The soil warms early in the spring and can be planted early. Because of the limited available water capacity, droughtiness is a problem during seasons below normal rainfall. The hazard of soil blowing is moderate during the spring if the soil surface is bare. Soils in the swales remain moist longer after a rain, but excess water rarely stands long enough to damage crops. Tillage is occasionally delayed for a few days after a heavy rain because of excess water in swales.

This soil has a high potential for growing cottonwood, cherrybark oak, and Nuttall oak. It has no significant limitation for woodland use or management.

This soil has high potential for dwellings, local roads and streets, light industry, and septic tank absorption fields. Sewage lagoons and sanitary landfills have severe limitations because soil permeability is moderately rapid. If this soil is used for sanitary facilities, there is a hazard of pollution of ground water in local areas. Capability unit IIs-1; woodland suitability group 2o4.

13—**Beulah fine sandy loam, undulating.** This somewhat excessively drained soil is in areas of alternating long narrow swales and wide ridges that rise from 2 to 10 feet above the swales. Slope gradient ranges from 0 to 8 percent. Individual areas range in size from about 20 to 600 acres.

Typically, the surface layer is brown fine sandy loam about 5 inches thick. The subsoil is fine sandy loam that extends to a depth of 39 inches. It is dark yellowish brown in the upper part and yellowish brown in the lower part. The underlying material is yellowish brown loamy fine sand and brown loamy sand that extends to a depth of 72 inches or more.

Included with this soil in mapping are small areas of Bosket, Patterson, and Wardell soils. Also included are small areas of soils similar to Beulah in which the lower part of the subsoil is sandy clay loam.

Natural fertility is moderate, and content of organic matter is low. Available water capacity is medium to low, and permeability is moderately rapid. The soil is medium acid through strongly acid in the surface layer except where limed, strongly acid or very strongly acid in the subsoil, and slightly acid to very strongly acid in the underlying material.

This soil has medium potential for farming. The main crops are soybeans and cotton. Other suitable crops are peanuts, grain sorghum, and winter small grains. Truck crops such as okra, green beans, potatoes, sweet corn, tomatoes, and melons are also suitable. Adapted pasture plants are bermudagrass, tall fescue, and lespedeza. Because of the limited available water capacity, droughtiness is a problem during seasons of below normal rainfall (fig. 2). Erosion is a moderate hazard on the upper part of slopes. The hazard of soil blowing is moderate during spring if the soil is bare. Soils in swales remain moist longer after a rain, but excess water rarely stands long enough to damage crops. Under good management, crops that leave large amounts of residue can be grown safely year after year.

This soil has a high potential for growing cottonwood, cherrybark oak, and Nuttall oak. It has no significant limitation for woodland use or management.

This soil has high potential for dwellings, local roads and streets, light industry, and septic tank absorption fields. Sewage lagoons and sanitary landfills have severe limitations because soil permeability is moderately rapid. If this soil is used for sanitary facilities, there is a hazard of pollution of ground water in local areas. Capability unit IIe-1; woodland suitability group 2o4.

14—Bonn-Foley complex. This complex consists of Bonn and Foley soils that are so intermingled it was impractical to map them separately. This level complex is on broad flats. Mapped areas range in size from about 40 to 600 acres.

This complex is about 50 percent Bonn silt loam and about 30 percent Foley silt loam. The rest of the unit is small areas of Calhoun and Crowley soils.

Typically, the Bonn soil has a dark grayish brown silt loam surface layer about 4 inches thick. The upper part of the subsoil is grayish brown, mottled silty clay loam about 34 inches thick. The lower part of the subsoil is olive gray, mottled silty clay loam which extends to a depth of 72 inches or more.

The Bonn soil is low in natural fertility and content of organic matter. Permeability is very slow, and available water capacity is medium. The soil is very strongly acid to medium acid in the surface layer and medium acid to strongly alkaline in the subsoil. Sodium and magnesium, at levels toxic to many plants, are present at a depth of 4 to 15 inches.

Typically, the Foley soil has a dark grayish brown silty loam surface layer about 5 inches thick. The subsurface layer is grayish brown, mottled silt loam about 5 inches thick. The upper part of the subsoil is gray, mottled silt loam about 6 inches thick. The middle part of the subsoil is gray, mottled silty clay loam about 38 inches thick. The lower part is olive gray, mottled silt loam. It extends to a depth of 72 inches or more.

The Foley soil is moderate in natural fertility. Permeability is slow, and available water capacity is medium. The soil is very strongly acid to medium acid in the surface layer and strongly acid to moderately alkaline in the subsoil. Because of the high content of sodium and magnesium in the lower part of the subsoil, the effective rooting depth is limited.

The Bonn soil has low potential for growing row crops because of droughtiness and the high concentration of sodium and magnesium in the subsoil. Land grading is hazardous because of the high content of sodium and magnesium in the subsoil of both soils. Depth to the sodium affected layers needs to be determined before cuts are made. The Foley soil has medium potential for growing row crops. Farming operations are commonly delayed several days after a rain because of excess water.

The Bonn soil has low potential for woodland because of droughtiness and the high concentration of sodium and magnesium in the subsoil (fig. 3). Post oak is the dominant tree commonly growing on this soil. The Foley soil has medium potential for woodland. Wetness is the main limitation to equipment use when managing and when harvesting tree crops.

The soils in this complex have low potential for most urban uses. Wetness is a severe limitation for dwellings, streets, industrial sites, septic tank absorption fields, and sanitary landfills. These limitations are difficult or impractical to overcome. Limitations are slight to moderate for sewage lagoons. The Bonn soil in capability unit IVs-1; the Foley soil in capability unit IIIw-3; woodland suitability group 3w9.

15—Bosket fine sandy loam, gently undulating. This well drained soil is on the higher parts of natural levees. It is in areas of alternating ridges and long narrow swales. Slopes range from 0 to 3 percent. Individual areas range in size from 20 to 200 acres.

Typically, the surface layer is dark brown fine sandy loam about 8 inches thick. The subsurface layer is dark yellowish brown fine sandy loam about 10 inches thick. The subsoil is brown clay loam about 24 inches thick. The underlying material is dark yellowish brown fine sandy loam.

Included with this soil in mapping are a few small areas of Beulah, Dexter, Dundee, and Patterson soils.

This Bosket soil is moderate in natural fertility. Content of organic matter is medium to low. Permeability is moderate, and available water capacity is medium. The soil is strongly acid to medium acid in the surface layer except where limed and strongly acid to very strongly acid in the subsoil and underlying material.

This soil has medium to high potential for growing row crops and small grains. Erosion is a moderate hazard if row crops are grown. Minimum tillage and the use of cover crops are practices that help reduce runoff and control erosion. The main crops are cotton and soybeans. Other suitable crops are grain sorghum and winter small grains. Adapted pasture plants are bermudagrass, tall fescue, and white clover. This soil responds well to fertilization, and tilth is easy to maintain by returning crop residue to the soil.

This soil has high potential for growing cottonwood, sweetgum, cherrybark oak, and willow oak. It has no significant limitation for woodland use or management.

This soil has high potential for most urban uses. Sewage lagoons and sanitary landfills have moderate to severe limitations because of permeability. Capability unit IIe-1; woodland suitability group 2o4.

16—Bosket fine sandy loam, undulating. This well drained soil is in areas where narrow swales alternate with low ridges that rise 2 to 5 feet above the swales. This soil is on the higher parts of natural levees. Slopes range from 0 to 8 percent. Individual areas range in size from 20 to 100 acres.

Typically, the surface layer is dark brown fine sandy loam about 7 inches thick. The subsurface layer is dark yellowish brown fine sandy loam about 10 inches thick. The subsoil is brown clay loam about 24 inches thick. The underlying material is dark yellowish brown fine sandy loam.

Included with this soil in mapping are spots of Beulah, Dexter, Dundee, and Patterson soils.

This Bosket soil is moderate in natural fertility. Content of organic matter is medium to low. Available water capacity is medium, and permeability is moderate. The soil is strongly acid to medium acid in the surface layer except where limed and strongly acid to very strongly acid in the subsoil and underlying material.

This soil has medium potential for growing row crops and small grains. Erosion is a moderate to severe hazard on long slopes. With good management that includes contour cultivation and terracing on long slopes, clean tilled crops that leave large amounts of residue can be grown year after year. The main crops are cotton and soybeans. Other suitable crops are peanuts, grain sorghum, and winter small grains. Truck crops such as okra, green beans, potatoes, sweet corn, tomatoes, and melons are also suitable. Adapted pasture plants are bermudagrass, tall fescue, and white clover. Management concerns include proper stocking and controlled grazing.

This soil has high potential for growing cottonwood, cherrybark oak, willow oak, and sweetgum. It has no significant limitation for woodland use or management.

This soil has high potential for dwellings, septic tank absorption fields, and industrial sites on 0 to 4 percent slopes. Limitations are moderate for local roads and streets, sewage lagoons, and industrial sites on 4 to 8 percent slopes. Limitations are severe for sanitary landfills because of permeability. Capabiltiy unit IIIe-1; woodland suitability group 2o4.

17—Brandon silt loam, 8 to 12 percent slopes. This well drained moderately sloping soil is on the top and upper part of side slopes of Crowley's Ridge. Individual areas range in size from 20 to 300 acres.

Typically, the surface layer is dark grayish brown silt loam about 3 inches thick. The subsurface layer is brown silty loam about 6 inches thick. The upper part of the subsoil to a depth of 35 inches, is brown silty clay loam, and the lower part is brown silty loam that extends to a depth of about 50 inches. The underlying material is brown gravelly loam.

Included with this soil in mapping are a few small areas of Loring and Saffell soils.

This Brandon soil is low in natural fertility and content of organic matter. Permeability is moderate in the subsoil and moderately rapid in the underlying gravelly material. The available water capacity is high, and this soil has fair response to fertilization. The soil is strongly acid or very strongly acid throughout. Tilth is easy to maintain.

This soil has low potential for cultivated crops. Runoff is medium to rapid, and the hazard of erosion is very severe. Under good management, crops that leave large amounts of residue can be grown year after year. Such management includes the growing of winter cover crops each year, terracing, and contour cultivation. Small grain and other drill-seeded crops can be grown occasionally in a cropping system that includes close-growing cover most of the time. A few fields are used to grow soybeans. This soil has medium potential for pasture. Adapted pasture plants are bermudagrass, bahiagrass, tall fescue, white clover, and annual lespedeza.

This soil has a moderate potential or growing northern red oak, shortleaf pine, and loblolly pine. It has no significant limitation for woodland use and management.

This soil has medium potential for dwellings and septic tank absorption fields. The limitations of slope can be overcome by good design and careful installation procedures. Seepage is a severe limitation for sewage lagoons and sanitary landfills. Pollution of groundwater in local areas is a hazard. Slopes of more than 8 percent severely limits light industry. Capability unit IVe-1; woodland suitability group 3o7.

18—Brandon-Saffell association, moderately steep. This association consists of well drained soils in a regular and repeating pattern. It is on narrow ridge crests and sides of uplands on Crowley's Ridge. The Brandon soil is mostly on narrow ridge crests and interfluves. It formed in moderately thick wind-laid sediment and underlying gravelly water-laid sediment. The Saffell soil is mainly on lower sides of uplands and formed in gravelly water-laid sediment. Slopes range from 12 to 20 percent. The mapped areas range in size from about 200 to more than 1,000 acres.

This association is about 40 to 60 percent Brandon silt loam and 20 to 40 percent Saffell gravelly fine sandy loam. The rest of the association is small areas of Loring and Memphis soils.

Typically, the Brandon soil has a dark grayish brown silt loam surface layer about 3 inches thick. The subsurface layer is brown silt loam about 6 inches thick. The upper part of the subsoil, to a depth of 35 inches, is brown silty clay loam, and the lower part is brown silt loam that extends to a depth of about 50 inches. The underlying material is brown gravelly loam.

The Brandon soil has moderate permeability in the subsoil and moderately rapid permeability in the underlying gravelly material. Natural fertility and content of organic matter are low. It is strongly acid or very strongly acid throughout. The available water capacity is high.

Typically, the Saffell soil has a dark grayish brown gravelly fine sandy loam surface layer about 2 inches thick. The subsurface layer is brown gravelly fine sandy loam about 8 inches thick. The upper part of the subsoil, to a depth of 21 inches, is strong brown very gravelly sandy clay loam, and the lower part is red very gravelly fine sandy loam that extends to a depth of about 41 inches. The underlying material is yellowish red very gravelly loamy sand.

The Saffell soil has moderate permeability and low available water capacity. Natural fertility and content of organic matter are low. This soil is strongly acid or very strongly acid throughout the profile.

This association has low potential for cultivation. It has medium potential for pasture if kept in permanent cover and special erosion control measures are used. Runoff is rapid, and the hazard of erosion is very severe. Management concerns include proper stocking, controlled grazing, and weed and brush control.

This association has moderate potential for growing loblolly pine and shortleaf pine. It has no significant limitation for woodland use and management.

This association has low potential for most urban uses. The moderately steep slopes have severe limitations for dwellings, local roads and streets, and septic tank absorption fields. The moderately rapid permeability below a depth of 28 inches is a severe limitation for this association. These soils have severe limitations for light industry. Brandon soil in capability unit VIe-1; woodland suitability group 3r7. Saffell soil in capability unit VIe-1; woodland suitability group 4f7.

19—**Calhoun silt loam.** This level poorly drained soil is on broad flats. Slope is less than 1 percent. Individual areas range in size from 20 to 500 acres.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsurface layer is light brownish gray, mottled silt loam about 8 inches thick. The upper part of the subsoil is light brownish gray, mottled silty clay loam about 23 inches thick. The lower part is light brownish gray, mottled silt loam about 11 inches thick. The material beneath is grayish brown, mottled silt loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few small areas of Amagon and Foley soils.

This Calhoun soil is moderate in natural fertility. Content of organic matter is low. The soil is medium acid to strongly acid in the surface layer except where limed, very strongly acid to neutral in the subsoil, and medium acid to mildly alkaline in the underlying material. Permeability is slow, and available water capacity is high.

This soil has medium potential for growing row crops and small grains. Farming operations may be delayed several days after a rain because of excess water, and surface drains may be needed. The main crop is soybeans. Other suitable crops are cotton, rice, and grain sorghum. Winter small grains can be grown where surface drainage is adequate. Adapted pasture plants are bermudagrass and tall fescue. This soil responds well to fertilization, and tilth is easy to maintain by returning crop residue to the soil.

This soil has a high potential for growing loblolly pine, water oak, and sweetgum. Wetness is the main limitation to equipment use in managing and harvesting tree crops, but it is usually overcome by logging during the drier seasons.

Calhoun silt loam has low potential for most urban uses. Wetness is a severe limitation for dwellings, streets, and industrial sites. The slow permeability and wetness are severe limitations for septic tank absorption fields. These limitations are difficult or impractical to overcome. Capability unit IIIw-2; woodland suitability group 3w9.

20—**Collins silt loam, occasionally flooded.** This level, moderately well drained soil is on upland drainageways and level areas adjacent to Crowley's Ridge. Slope is less than 1 percent. Individual areas range from about 20 to 600 acres in size.

Typically, the surface layer is brown silt loam about 6 inches thick. The upper part of the underlying material is brown silt loam about 8 inches thick. The middle part is brown, mottled silt loam about 10 inches thick. The lower part is pale brown and light brownish gray, mottled silt loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few areas of Falaya soils.

This Collins soil is moderate in natural fertility, and content of organic matter is low. It is strongly or very strongly acid throughout, except for the surface layer where limed. Permeability is moderate, and available water capacity is high.

Collins silt loam has medium potential for growing row crops and small grains. Occasional flooding for short durations is a slight to moderate hazard. The main crops are cotton, soybeans, corn, and small grains. This soil has high potential for pasture and hay crops. Adapted pasture plants are bermudagrass, tall fescue, and lespedeza. This soil responds well to fertilization, and tilth is easy to maintain by returning crop residue to the soil.

This soil has a high potential for growing eastern cottonwood, cherrybark oak, and green ash. It has no significant limitation for woodland use or management.

This soil has low potential for most urban uses. Occasional flooding is a severe limitation in some areas for community development and sanitary facilities. Capability unit IIw2; woodland suitability group 1o7.

21—**Commerce soils, frequently flooded.** This undifferentiated group consists of level, somewhat poorly drained soils on flood plains along the St. Francis River. It consists of Commerce silt loam and Commerce soils that have variable surface texture. These soils are not in a regular pattern on the landscape. Individual areas are large enough to have been mapped separately, but because of present and predicted use, they were not separated in mapping. Slope is generally less than 1 percent. The soils are inundated several times each year. Part of this unit is protected by privately owned levees which prevent some flooding.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The upper part of the subsoil is grayish brown, mottled silt loam about 12 inches thick. The lower part of the subsoil is grayish brown, mottled silty clay loam about 10 inches thick. The underlying material is grayish brown, mottled, stratified silt loam and fine sandy loam.

Included with these soils in mapping are a few areas of Falaya soils and a few water areas.

Commerce soils are medium acid to neutral in the surface layer and slightly acid to mildly alkaline in the subsoil and underlying material. Permeability is moderately slow, and available water capacity is high. The water table is seasonally high, and flooding is frequent during the winter and early in spring.

This undifferentiated group has low potential for farming, except in areas protected from flooding. In most years the flooding occurs during the period of December to June. Crops such as soybeans that require a short growing season can be grown, but flooding is likely to damage the crop some years. The soils are well suited to bermudagrass pasture.

This group is well suited to woodland. It has a high potential for growing cottonwood, Nuttall oak, water oak, and sycamore. Wetness and flooding limit the use of equipment in managing and harvesting the tree crop, but this can be overcome by using special equipment and by logging during drier seasons.

This group has a very low potential for urban use. Wetness and flooding are the main limitations. They can be overcome only by major flood control and drainage measures. Capability unit IVw-1; woodland suitability group 1w5.

22—Crowley silt loan. This level soil is on broad flats. Slope is less than 1 percent. Individual areas range in size from about 20 to more than 1,000 acres.

Typically, the surface layer is dark grayish brown, mottled silt loam about 6 inches thick. The subsurface layer is grayish brown, mottled silt loam about 9 inches thick. The upper part of the subsoil is grayish brown, mottled silty clay about 17 inches thick. The middle part is grayish brown, mottled silty clay loam about 8 inches thick. The lower part of the subsoil is olive gray, mottled silty clay loam that extends to a depth of 72 inches.

Included with this soil in mapping are a few areas of Bonn, Foley, and Jackport soils.

This Crowley soil is moderate in natural fertility, and content of organic matter is low. Permeability is very slow (fig. 4), and available water capacity is high. The soil is very strongly acid to medium acid in the surface layer except where limed, very strongly acid to slightly acid in the upper part of the subsoil, and medium acid to moderately alkaline in the lower part of the subsoil. The water table is seasonally high and is within 12 inches of the surface during the winter and early in spring.

This soil has high potential for growing rice (fig. 5). It has medium potential for row crops. Farming operations are commonly delayed several days after a rain because of excess water. Surface drains are needed. The main crops are soybeans and rice. Other suitable crops are cotton and grain sorghum. Adapted pasture plants are bermudagrass and tall fescue. This soil responds well to fertilization, and tilth is easy to maintain by returning crop residue to the soil. Clayey subsoil is a moderate hazard if deep cuts are to be made in grading and smoothing. Depth to this layer should be determined before cuts are made.

Crowley silt loam has a medium potential for growing loblolly pine and willow oak. Wetness is the main limitation to equipment use in managing and harvesting the tree crop, but this limitation is usually overcome by logging during the drier seasons.

This soil has low potential for most urban uses. Wetness and shrink swell potential severely limit use for dwellings, streets, and industrial sites. Very slow permeability and wetness are severe limitations for septic tank absorption fields. These limitations are difficult or impractical to overcome. Capability unit IIIw-2; woodland suitability group 3w9.

23—Dexter silt loam, gently undulating. This well drained soil is on the higher parts of natural levees bordering abandoned stream channels. Slopes range from 0 to 3 percent. Individual areas range in size from about 20 to 400 acres.

Typically, the surface layer is brown silt loam about 7 inches thick. The upper part of the subsoil is dark brown silt loam about 33 inches thick. The lower part is dark brown loam about 15 inches thick. The underlying material is dark brown fine sandy loam.

Included with this soil in mapping are a few areas of Bosket and Dundee soils, a few small areas with a level surface, and small areas with a fine sandy loam surface.

This soil is moderate in natural fertility, and content of organic matter is low. Permeability is moderate, and available water capacity is high. The soil is medium acid to strongly acid in the surface layer except where limed and strongly acid to very strongly acid in the subsoil and underlying material.

This Dexter soil has medium to high potential for growing row crops and small grains. Erosion is a moderate hazard if row crops are grown. Minimum tillage and the use of cover crops are practices that help reduce runoff and control erosion. The main crops are cotton (fig. 6) and soybeans. Other suitable crops are grain sorghum and winter small grains. Adapted pasture plants are bermudagrass, tall fescue, and white clover. This soil responds well to fertilization, and tilth is easy to maintain by returning crop residue to the soil.

This soil has high potential for growing cottonwood, cherrybark oak, sweetgum, Nuttall oak, and willow oak. It has no significant limitation for woodland use or management.

This soil has high potential for most urban uses. Sewage lagoons have moderate limitations because of moderate permeability. Capability unit IIe-1; woodland suitability group 2o4.

24—Dubbs very fine sandy loam. This well drained soil is on the higher parts of natural levees. Slopes range from 0 to 3 percent. Individual areas range in size from about 20 to 200 acres.

Typically, the surface layer is brown very fine sandy loam about 8 inches thick. The upper part of the subsoil is dark yellowish brown silt loam about 29 inches thick and is mottled in the lower 10 inches. The lower part is dark yellowish brown, mottled loam about 16 inches thick. The underlying material is dark yellowish brown fine sandy loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few areas of Beulah and Dundee soils.

This soil is moderate in natural fertility, and content of organic matter is low. Permeability is moderate, and available water capacity is high. The soil ranges from medium acid to strongly acid throughout except for the surface layer where limed.

This Dubbs soil has medium to high potential for growing row crops and small grains. Erosion is a moderate hazard if row crops are grown. Minimum tillage and the use of cover crops are practices that help reduce runoff and control erosion. The main crops are cotton and soybeans. Other suitable crops are grain sorghum and winter small grains. Adapted pasture plants are bermudagrass, tall fescue, and white clover. This soil responds well to fertilization, and tilth is easy to maintain by returning crop residue to the soil.

This soil has high potential for growing cottonwood, cherrybark oak, sweetgum, Nuttall oak, Shumard oak, and willow oak. It has no significant limitation for woodland use or management.

This soil has medium potential for most urban uses. Sewage lagoons have moderate limitations because of moderate permeability. Capability unit IIe-1; woodland suitability group 2o4.

25—**Dundee silt loam.** This level soil is on the lower part of natural levees. Slope gradient is less than 1 percent. Individual areas range in size from about 20 to 300 acres.

Typically, the surface layer is brown silt loam about 7 inches thick. The upper part of the subsoil is grayish brown, mottled silt loam about 24 inches thick. The middle part is grayish brown, mottled silty clay loam about 10 inches thick. The lower part is light brownish gray, mottled silt loam about 18 inches thick. The underlying material is light brownish gray, mottled silt loam that extends to more than 72 inches.

Included with this soil in mapping are a few areas of Amagon, Bosket, Dubbs, Dexter, and Patterson soils.

This Dundee soil is moderate in natural fertility, and content of organic matter is low. The surface layer and subsoil are medium acid to very strongly acid except where the surface layer has been limed. The underlying material is very strongly acid to neutral. Permeability is moderately slow, and available water capacity is high. The water table is within about 2 feet of the surface during the winter and early in spring.

This soil has medium potential for growing row crops and small grains. Excess water is a moderate hazard, and surface drains may be needed. The main crops are cotton and soybeans. Other suitable crops are grain sorghum and winter small grains. Adapted pasture plants are bermudagrass and tall fescue. This soil responds well to fertilization, and tilth is easy to maintain by returning crop residue to the soil.

Dundee silt loam has a high potential for growing cottonwood, cherrybark oak, sweetgum, and water oak. Wetness is a moderate limitation in managing and harvesting the tree crop.

This soil has a medium to low potential for most urban uses. Wetness is a moderate limitation for dwellings without basements and streets. Wetness and slow permeability are severe limitations for dwellings with basements and septic tank absorption fields. These limitations are difficult or impractical to overcome. Capability unit IIw-1; woodland suitability group 2w5.

26—**Falaya silt loam.** This level, somewhat poorly drained soil is on flood plains of upland drainageways and in level areas adjacent to Crowley's Ridge. Slope is less than 1 percent. Individual areas range in size from about 40 to more than 1,000 acres.

Typically, the surface layer is brown silt loam about 6 inches thick. The upper part of the underlying material is brown, mottled silt loam about 8 inches thick. The middle part is grayish brown, mottled silt loam about 27 inches thick. The lower part is light gray, mottled silt loam about 15 inches thick. Below is an old buried soil of light brownish gray, mottled silt loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few areas of Collins soils and areas that are occasionally flooded.

This Falaya soil is moderate in natural fertility, and content of organic matter is low. It is strongly or very strongly acid throughout, except where the surface layer has been limed. Permeability is moderate, and available water capacity is high.

This soil has medium potential for growing row crops. Excess water is a moderate hazard, and surface drains are needed. The main crops are cotton, soybeans, corn, and small grains. This soil has high potential for pasture and hay crops. Adapted pasture plants are bermudagrass, lespedeza, and tall fescue. This soil responds well to fertilization, and tilth is easy to maintain by returning crop residue to the soil.

This soil has a high potential (fig. 7) for growing cottonwood, cherrybark oak, Nuttall oak, and water oak. Wetness is a moderate limitation for managing and for harvesting tree crops.

This soil has low potential for most urban uses. Wetness and flooding are severe limitations for dwellings, industrial sites, and septic tank absorption fields. These limitations are impractical or difficult to overcome. Capability unit IIw-2; woodland suitability group 1w8.

27—**Foley silt loam.** This level soil is on broad flats. Slope is less than 1 percent. Individual areas range in size from about 20 to more than 1,000 acres.

Typically, the surface layer is dark grayish brown silt loam about 5 inches thick. The subsurface layer is grayish brown, mottled silt loam about 5 inches thick. The upper part of the subsoil is gray, mottled silt loam about 6 inches thick. The middle part is gray, mottled silty clay loam about 38 inches thick. The lower part is olive gray, mottled silt loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few areas of Amagon, Bonn, Calhoun, Crowley, and Fountain soils.

This Foley soil is moderate in natural fertility, and content of organic matter is low. Permeability is very slow, and available water capacity is medium. The soil is very strongly acid to medium acid in the surface layer except where limed and strongly acid to moderately alkaline in the subsoil. The water table is seasonally high and is within 12 inches of the surface during the winter and early in spring.

This soil has medium potential for growing row crops. Farming operations are commonly delayed several days after a rain because of excess water, and surface drains are needed. This soil has medium to high potential for growing rice. The main crops are soybeans (fig. 8) and rice. Other suitable crops are cotton and grain sorghum. Adapted pasture plants are bermudagrass and tall fescue.

This soil responds well to fertilization, and tilth is easy to maintain by returning crop residue to the soil. The high content of sodium and magnesium in the lower part of the subsoil is a severe hazard if deep cuts are to be made in grading and smoothing. Depth to this layer needs to be determined before cuts are made.

This soil has medium potential for woodland. Some important trees are sweetgum, cherrybark oak, and water oak. Wetness is the main limitation to equipment use in managing and harvesting the tree crop, but this limitation is usually overcome by logging during the drier seasons.

Foley silt loam has low potential for most urban uses. Wetness is a severe limitation for dwellings, streets, and industrial sites. Very slow permeability and wetness are severe limitations for septic tank absorption fields. These limitations are difficult or impractical to overcome. Capability unit IIIw-3; woodland suitability group 3w9.

28—**Fountain silt loam.** This level, poorly drained soil is on broad flats. Slope is less than 1 percent. Individual areas range in size from about 20 to more than 1,000 acres.

Typically, the surface layer is dark grayish brown, mottled silt loam about 9 inches thick. The subsurface layer is light brownish gray, mottled silt loam about 8 inches thick. The subsoil is grayish brown, mottled silty clay loam about 43 inches thick. The underlying material is grayish brown, mottled sandy clay loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few areas of Amagon and Foley soils.

This soil is moderate in natural fertility, and content of organic matter is low. The soil is strongly acid or medium acid in the surface layer except where limed and slightly acid to moderately alkaline in the subsoil and underlying material. Permeability is moderately slow, and available water capacity is high.

This Fountain soil has medium potential for growing row crops and small grains. Farming operations may be delayed several days after a rain because of excess water, and surface drains will probably be needed. The main crop is soybeans. Other suitable crops are cotton, rice, and grain sorghum (fig. 9). Winter small grains can be grown where surface drainage is adequate. Adapted pasture plants are bermudagrass and tall fescue. This soil responds well to fertilization, and tilth is easy to maintain by returning crop residue to the soil.

This soil has high potential for growing loblolly pine, sweetgum, and water oak. Wetness is the main limitation to equipment use in managing and harvesting the tree crop, but this limitation is usually overcome by logging during the drier seasons.

This soil has low potential for most urban uses. Wetness is a severe limitation for dwellings, streets, and industrial sites. Slow permeability and wetness are severe limitations for septic tank absorption fields. These limitations are difficult or impractical to overcome. Capability unit IIIw-1; woodland suitability group 2w9.

29—**Jackport silty clay.** This level soil is on broad flats that were backswamps of former streams. Slope is less than 1 percent. Individual areas range in size from about 20 to more than 1,000 acres.

Typically, the surface layer is dark grayish brown, mottled silty clay about 5 inches thick. The upper part of the subsoil is grayish brown, mottled silty clay about 11 inches thick. The middle part is grayish brown, mottled clay about 21 inches thick. The lower part is olive gray silty clay about 19 inches thick. The underlying material is olive gray, mottled silty clay that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few areas of Crowley and Kobel soils.

This Jackport soil is moderate in natural fertility, and content of organic matter is medium to low. The soil is very strongly acid to medium acid in the surface layer, very strongly acid to mildly alkaline in the subsoil, and strongly acid to moderately alkaline in the underlying material. Permeability is very slow, and available water capacity is high. The water table is seasonally high and within 12 inches of the surface during the winter and early in the spring. This soil shrinks and cracks when dry, and these cracks seal when the soil becomes wet.

This soil has high potential for growing rice (fig. 10). It has medium potential for row crops. Farming operations are commonly delayed several days after a rain because of excess water, and surface drains are needed. The main crops are soybeans and rice. Other suitable crops are cotton and grain sorghum. Adapted pasture plants are bermudagrass and tall fescue. This soil responds well to fertilization. Tilth is difficult to maintain because of high clay content in the surface layer, and the surface forms clods if plowed when wet.

This Jackport soil has high potential for growing water oak, willow oak, and sweetgum. Wetness is the main limitation to equipment use in managing and harvesting the tree crop, but this limitation is usually overcome by logging during the drier seasons.

This soil has low potential for most urban uses. Wetness and shrink-swell potential severely limit use for dwellings, streets, and industrial sites. The very slow permeability and seasonal high water table are severe limitations for septic tank absorption fields. These limitations are difficult or impractical to overcome. Capability unit IIIw-4; woodland suitability group 2w6.

30—**Kobel silty clay.** This level soil is on broad slack water flats. Slope is less than 1 percent. Individual areas range in size from about 80 to more than 1,000 acres.

Typically, the surface layer is very dark gray silty clay about 5 inches thick. The subsoil is dark gray and gray, mottled clay about 50 inches thick. The underlying material is gray, mottled sandy clay and silty clay that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few areas of Beulah, Jackport, and Wardell soils and a few small areas of water.

This soil is high in natural fertility, and content of organic matter is medium. The soil is strongly acid to neutral in the surface layer, slightly acid to moderately alkaline in the subsoil, and neutral to moderately alkaline in the underlying material. Permeability is very slow, and available water capacity is medium to high. The water table is seasonally high and within 12 inches of the surface during the winter and early in the spring. This soil shrinks and cracks when dry, and these cracks seal when wet.

This Kobel soil has high potential for growing rice and medium potential for row crops. Farming operations are commonly delayed several days after a rain because of excess water, and surface drains are needed. The main crops are soybeans and rice. Other suitable crops are cotton and grain sorghum. Adapted pasture plants are bermudagrass and tall fescue. This soil responds well to fertilization. Tilth is difficult to maintain because of high clay content in the surface layer. Clods form if the soil is plowed when wet.

This soil has high potential for woodland. Some important trees are cottonwood, cherrybark oak, sweetgum, and water oak. Wetness is the main limitation to equipment use in managing and harvesting the tree crop.

This soil has low potential for most urban uses. Wetness and shrink swell potential are severe limitations for dwellings, streets, and industrial sites. The very slow permeability and wetness are severe limitations for septic tank absorption fields. These limitations are impractical or difficult to overcome. Capability unit IIIw-4; woodland suitability group 2w6.

31—Kobel soils, frequently flooded. This undifferentiated group consists of poorly drained soils in slack water areas on flood plains along the Black River. If flooding were uncontrolled, the areas would be inundated several times in most years (fig. 11). Most areas of these soils are in the Black River Wildlife Management Area. Induced flooding to provide waterfowl habitat, causes the areas to be flooded 4 to 6 months during fall, winter, and spring. The slope is dominantly less than 1 percent. Individual areas range in size from about 80 to several thousand acres.

Typically, Kobel soils have a very dark gray silty clay surface layer about 5 inches thick. In this undifferentiated group of soils the surface layer ranges from silt loam to silty clay. The subsoil is dark gray and gray, mottled clay about 50 inches thick. The underlying material is gray, mottled sandy clay and silty clay that extends to a depth of 72 inches or more.

Included with this undifferentiated group in mapping are small water areas, a few areas of Wardell soils, and a few sandy spots.

Kobel soils are high in natural fertility and medium in content of organic matter. The soil is strongly acid to neutral in the surface layer, slightly acid to moderately alkaline in the subsoil, and neutral to moderately alkaline in the underlying material. Permeability is very slow, and available water capacity is medium to high. The water table is seasonally high, and flooding is frequent during winter and early in spring.

This undifferentiated group of soils has low potential for row crops because of the hazard of frequent flooding. It has moderately high potential for woodland and high potential for wildlife habitat; it is used mainly for these purposes. Some important trees are green ash, cottonwood, Nuttall oak, and water oak. Wetness and flooding limit the use of equipment needed in managing and harvesting tree crops, but this limitation can be overcome by using special equipment and by harvesting during drier seasons.

This undifferentiated group of soils has very low potential for urban uses because of wetness and flooding. Capability unit Vw-1; woodland suitability group 3w6.

32—Loring silt loam, 1 to 3 percent slopes. This moderately well drained, nearly level soil is on uplands of Crowley's Ridge. Individual areas range in size from 10 to 120 acres.

Typically, the surface layer is brown silt loam about 6 inches thick. The subsoil extends to a depth of 72 inches or more. The upper part of the subsoil is dark yellowish brown silt loam about 5 inches thick and brown silty clay loam about 19 inches thick. The middle part, a brittle fragipan, is dark yellowish brown, mottled silty clay loam and silt loam about 25 inches thick. The lower part of the subsoil is dark yellowish brown silt loam.

Included with this soil in mapping are spots of Brandon and Memphis soils.

This Loring soil is moderate in natural fertility and low in content of organic matter. The soil is strongly acid or medium acid in the surface layer and very strongly acid to medium acid in the subsoil. Permeability is moderately slow, and available water capacity is medium. The fragipan restricts the penetration of roots and movement of water, but this does not seriously affect soil productivity and the choice of plants. This soil responds well to fertilization, and good tilth is easy to maintain.

This soil has medium potential for cultivated crops. Runoff is medium, and erosion is a hazard on long slopes. Clean tilled crops that leave large amounts of residue can be grown year after year if contour cultivation, terracing on long slopes, and other good management practices are used. The principal crops are soybeans and cotton. Other crops are corn, grain sorghum, and winter small grains. Adapted pasture plants are bermudagrass, tall fescue, and white clover.

This soil has high potential for growing cherrybark oak, loblolly pine, and sweetgum. It has no significant limitation for woodland use or management.

This soil has medium potential for dwellings, local roads and streets, light industry, sewage lagoons, and sanitary landfills. Septic tank absorption fields have severe limitations because of slow percolation in the fragipan. Capability unit IIe-2; woodland suitability group 3o7.

33—Loring silt loam, 3 to 8 percent slopes. This moderately well drained, gently sloping soil is on uplands of Crowley's Ridge. Individual areas range in size from about 10 to 200 acres.

Typically, the surface layer is brown silt loam about 5 inches thick. The subsoil extends to a depth of 72 inches or more. The upper part of the subsoil is dark yellowish brown silt loam about 5 inches thick. The next layer is brown silty clay loam about 19 inches thick. The middle part, a brittle fragipan, is dark yellowish brown, mottled silty clay loam and silt loam about 25 inches thick. The lower part of the subsoil is dark yellowish brown silt loam.

Included with this soil in mapping are spots of Memphis and Brandon soils and a few shallow gullies.

This Loring soil is moderate in natural fertility and low in content of organic matter. The soil is strongly acid or medium acid in the surface layer and very strongly acid to medium acid in the subsoil. Permeability is moderately slow, and available water capacity is medium. The fragipan restricts the penetration of roots and the movement of water, but this does not seriously affect soil productivity or the suitability of plants.

This soil has medium potential for cultivated crops. Runoff is medium to rapid, and erosion is a hazard. Under good management that includes contour cultivation and terracing, sown crops that leave large amounts of residue can be safely grown year after year. Clean-tilled crops can be grown most years, if the cropping system includes a sod crop or winter cover crop. Conservation practices need to be intensified as slope length and gradient increase. The surface of this soil puddles and crusts readily after a rain because of the low content of organic matter and weak structure of the soil material. Cultivated crops are mostly winter small grains, soybeans, grain sorghum, and (in places) cotton. This soil has high potential for pasture. Adapted pasture plants are bermudagrass, tall fescue, and white clover.

This soil has a high potential for growing sweetgum, cherrybark oak, and loblolly pine. It has no significant limitation for woodland use and management.

This soil has medium potential for dwellings, local roads and streets, light industry, sewage lagoons, and sanitary landfills. Limitations for septic tank absorption fields are severe because of slow percolation in the fragipan. Capability unit IIIe-2; woodland suitability group 3o7.

34—**Loring silt loam, 8 to 12 percent slopes, eroded.** This moderately well drained, moderately sloping soil is on uplands of Crowley's Ridge. Individual areas range in size from about 20 to more than 1,000 acres.

Typically, the surface layer is brown silt loam about 3 inches thick. The subsoil extends to a depth of 72 inches. The upper part of the subsoil is dark yellowish brown silt loam about 5 inches thick. The next layer is brown silty clay loam about 19 inches thick. The middle part, a brittle fragipan, is dark yellowish brown, mottled silty clay loam and silt loam about 25 inches thick. The lower part of the subsoil is dark yellowish brown silt loam.

Included with this soil in mapping are a few spots of Memphis soils and a few gullied spots.

This Loring soil is moderate to low in natural fertility and low in content of organic matter. The soil is strongly acid or medium acid in the surface layer and very strongly acid to medium acid in the subsoil. Permeability is moderately slow, and available water capacity is medium. The fragipan restricts the penetration of roots and the movement of water.

This soil has a low potential for cultivated crops. Runoff is rapid, and erosion is a severe hazard. Small grains and other drilled crops can be safely grown occasionally if the cropping system includes close growing cover crops most of the time.

This soil has high potential (fig. 12) for use as pasture. Suitable pasture plants are bermudagrass, tall fescue, and white clover. Management concerns include proper stocking, controlled grazing, and weed and brush control.

This soil has high potential for growing loblolly pine, cherrybark oak, and sweetgum. It has no significant limitation for woodland use and management.

This soil has medium potential for dwellings, local roads and streets, and sanitary landfills. Limitations are severe for light industry, septic tank absorption fields, and sewage lagoons because of slope, permeability, and the seasonal water table perched above the fragipan. Capability unit IVe-1; woodland suitability group 3o7.

35—**Memphis association, moderately steep.** This association consists of well drained soils in a regular and repeating pattern. It is on moderately steep side slopes and narrow ridgetops of Crowley's Ridge in the eastern part of the county. The Memphis soil is along the side slopes bordering the narrow ridgetops. It formed in deposits of thick loess. Slopes range from 12 to 20 percent. The mapped areas of this association range in size from about 100 to more than 1,000 acres.

The Memphis soil makes up about 70 percent of this association. The Loring soil is on narrow ridgetops and makes up about 20 percent of this association. Brandon and Saffell soils make up the remaining 10 percent of this association.

Typically, the Memphis soil has a dark grayish brown silt loam surface layer about 2 inches thick. The subsurface layer is dark yellowish brown silt loam about 8 inches thick. The subsoil is dark brown silty clay loam that extends to a depth of about 48 inches. The underlying material is dark brown silt loam that extends to a depth of 72 inches or more.

The Memphis soil has moderate permeability, and available water capacity is high. Natural fertility is moderate, and organic matter content is medium to low. This soil is strongly acid to very strongly acid throughout the profile.

This association has low potential for cultivated crops. It has high potential for pasture if kept in permanent cover and special erosion control measures are used. Adapted pasture plants are bermudagrass and tall fescue. Runoff is rapid, and the hazard of erosion is severe. Management concerns include proper stocking, controlled grazing, and weed and brush control.

The soils in this association have high potential for growing cherrybark oak, loblolly pine, sweetgum, and yellow-poplar. It has no significant limitation for woodland use and management.

This association has low potential for most urban uses. Soils with moderately steep slopes have severe limitations for dwellings, local roads and streets, and septic tank absorption fields. This association also has severe limitations for light industry and sewage lagoons. Capability unit VIe-1; woodland suitability group 2r8.

36—**Patterson fine sandy loam.** This level soil is in depressions on natural levees. Slope is less than 1 percent. Individual areas range in size from about 10 to 200 acres.

Typically, the surface layer is dark grayish brown fine sandy loam about 11 inches thick. The subsoil is grayish brown, mottled fine sandy loam about 15 inches thick. The underlying material, to a depth of 43 inches, is grayish brown, mottled fine sandy loam. Below this is stratified layers of gray, mottled sandy clay loam and loamy fine sand that extend to a depth of 72 inches or more.

Included with this soil in mapping are a few areas of Beulah, Bosket, Dundee, Tuckerman, and Wardell soils.

This Patterson soil is moderate in natural fertility, and content of organic matter is low. Permeability is moderately rapid, and available water capacity is medium. The soil is strongly acid or medium acid in the surface layer except where limed, very strongly acid or strongly acid in the subsoil, and strongly acid to neutral in the underlying material. The water table is seasonally high and is within 12 inches of the surface during the winter and early in spring.

This soil has medium potential for growing row crops. Excess water is a moderate hazard and may cause farming operations to be delayed several days after a rain. Surface drains are probably needed in most areas. The main crop is soybeans. Other suitable crops are cotton and grain sorghum. Winter small grains may be grown if surface drainage is adequate. Adapted pasture plants are bermudagrass and tall fescue. This soil responds well to fertilization, and tilth is easy to maintain by returning crop residue to the soil.

This soil has high potential for growing woodland. Some important trees are cherrybark oak, Nuttall oak, water oak, willow oak, and sweetgum. Wetness is a moderate limitation for equipment use in managing and harvesting the tree crop, but this limitation is usually overcome by logging during the drier seasons.

This soil has low potential for most urban uses. Wetness is a severe limitation for dwellings, industrial sites, and septic tank absorption fields. Wetness is a moderate limitation for local roads and streets. These limitations are difficult or impractical to overcome. Capability unit IIw-1; woodland suitability group 2s5.

37—**Tuckerman fine sandy loam.** This level soil is on the lower parts of older natural levees. Slope is less than 1 percent. Individual areas range in size from about 20 to more than 400 acres.

Typically, the surface layer is dark grayish brown fine sandy loam about 8 inches thick. The upper part of the subsoil is gray, mottled fine sandy loam about 6 inches thick. The middle part is gray, mottled sandy clay loam about 28 inches thick. The lower part is gray, mottled loam 14 inches thick. The underlying material is gray, mottled fine sandy loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few areas of Patterson and Wardell soils.

This Tuckerman soil is moderate in natural fertility, and content of organic matter is low. Permeability is moderately slow, and available water capacity is medium to high. The soil is strongly acid or medium acid in the surface layer except where limed, very strongly acid to medium acid in the subsoil, and strongly acid to neutral in the underlying material. The water table is seasonally high and is within 12 inches of the surface during the winter and early in the spring.

This soil has medium potential for growing row crops. Farming operations are commonly delayed several days after a rain because of excess water, and surface drains are needed. The main crop is soybeans. Other suitable crops are cotton and grain sorghum. Adapted pasture plants are bermudagrass and tall fescue. This soil responds well to fertilization, and tilth is easy to maintain by returning crop residue to the soil.

This soil has high potential for woodland. Some important trees are cottonwood, sweetgum, water oak, and willow oak. Wetness is a limitation to equipment use in managing and harvesting the tree crop, but this limitation is usually overcome by logging during the drier seasons.

This soil has low potential for most urban uses. Wetness is a severe limitation for dwellings, streets, and industrial sites. Slow permeability and wetness are severe limitations for septic tank absorption fields. These limitations are difficult or impractical to overcome. Capability unit IIIw-1; woodland suitability group 1w6.

38—**Wardell fine sandy loam.** This level soil is in depresssions on natural levees and on flood plains along abandoned stream channels. Slope gradient is less than 1 percent. Individual areas range in size from about 40 to more than 1,000 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 9 inches thick. The upper part of the subsoil is dark gray fine sandy loam about 8 inches thick. The lower part is dark gray, mottled sandy clay loam about 29 inches thick. The underlying material is dark gray, mottled fine sandy loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few areas of Beulah, Foley, Patterson, Knob, and Tuckerman soils.

This soil is moderate in natural fertility, and content of organic matter is medium. Permeability is slow, and available water capacity is medium to high. The soil is medium acid to neutral in the surface layer, strongly acid to slightly acid in the subsoil, and medium acid to mildly alkaline in the underlying material. The water table is seasonally high and is within 12 inches of the surface during the winter and early in spring.

This Wardell soil has medium potential for growing row crops. Farming operations are commonly delayed several days after a rain because of excess water, and surface drains are needed. The main crop is soybeans. Other suitable crops are cotton and grain sorghum. Adapted pasture plants are bermudagrass and tall fescue. This soil responds well to fertilization, and tilth is easy to maintain by returning crop residue to the soil.

This soil has high potential for woodland. Some important trees are cottonwood, water oak, and sweetgum. Wetness is a limitation to equipment use in managing and harvesting the tree crop, but this limitation is usually overcome by logging during the drier seasons.

This soil has low potential for most urban uses. Wetness is a severe limitation for dwellings, streets, and industrial sites. Slow permeability and wetness are severe limitations for septic tank absorption fields. These limitations are difficult or impractical to overcome. Capability unit IIIw-1; woodland suitability group 1w6.

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

W. WILSON FERGUSON, conservation agronomist, Soil Conservation Service, assisted in preparing 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 289,284 acres in the survey area was used for crops and pasture in 1969, according to the Census of Agriculture. Of this total, 243,636 acres was harvested cropland. (See table 1 for principal crops harvested.)

The potential of the soils in Clay County for increased production of food is good. Production could 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. 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."

Contour cultivation, terraces, vegetated waterways, or combinations of these erosion control treatments are needed on sloping soils that are used for clean-tilled crops. Row arrangement and suitable surface drainage are needed for dependable growth on wet areas. Many tracts that are subject to frequent flooding are unsuited or only marginally suited for most crops commonly grown in the county.

Annual cover crops or grasses and legumes should be grown regularly in the cropping system if the erosion hazard is severe or if the crops grown leave only small amounts of residue. Seedbed preparation should be delayed until spring to secure maximum benefit from crop residue. Residue should be shredded and spread evenly to provide protective cover and active organic matter to the soils.

A plowpan commonly develops in loamy soils that are improperly tilled or are tilled frequently with heavy equipment. Keeping tillage to a minimum, varying the depth of tillage, and tilling when soil moisture content is favorable will help prevent formation of a plowpan. Growing deep-rooted grasses and legumes in the cropping system will help break up plowpans.

If left bare, many soils tend to puddle, pack, and crust during periods of heavy rainfall. Growing cover crops and managing crop residue help preserve or improve tilth.

Perennial grasses or legumes, or mixtures of these, are grown for pasture and hay. The mixtures generally consist of either a summer or a winter perennial grass and a suitable legume.

Coastal bermudagrass and common bermudagrass are the summer perennials most commonly grown. Coastal bermudagrass is fairly new to this county, but it is highly satisfactory in production of good quality forage. Tall fescue, the chief winter perennial grass now grown in the county, grows well only on soils that have a favorable soil-moisture relationship. All of these grasses respond well to fertilizer and particularly to nitrogen. White clover, crimson clover, annual lespedeza, and sericea lespedeza are the most commonly grown legumes.

Proper grazing is essential for the production of high-quality forage, stand survival, and erosion control. Other treatments and management practices such as brush and weed control, fertilization, and renovation of the pasture are also important.

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 7. 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 7.

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.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown; that good quality irrigation water is uniformly applied in proper amounts as needed; and that tillage is kept to a minimum.

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 7 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 classes and subclasses

Capability classes and subclasses show, 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.

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 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 management and productivity

JAMES T. BEENE forester, Soil Conservation Service, assisted in preparing this section.

When the first settlers arrived in Clay County, virgin forest covered all except river sandbars and scattered, small openings where the Indians grew such crops as corn, beans, and squash.

In the lowlands the principal tree species were sweetgum, water tupelo, baldcypress, bottom land oaks, ash, sycamore, eastern cottonwood, and hickory. On the uplands and loess plains were beech, black walnut, butternut, cucumbertree, black cherry, red oak, black oak, white oak, hickory, ash, and sycamore.

Woodland, including woodland pasture, now makes up only about 27,049 acres, or 7 percent of the land area of the county, according to the 1969 Census of Agriculture. About 14,000 acres of the woodland is in the Black River Wildlife Management Area. The rest is privately owned. In recent years, there has been a trend to convert several hundred acres each year from woodland to cropland. It is expected that this trend will continue, but at a gradually reduced rate.

Table 8 contains information useful to woodland owners or forest managers planning use of soils for wood crops. Map unit symbols for soils suitable for wood crops are listed, and the woodland suitability group for each soil is given. All soils in the same group require the same general kinds of woodland management and have about the same potential productivity.

The first part of the *woodland suitability group*, 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 element in the symbol, a numeral, indicates the kind of trees for which the soils in the group are best suited and also indicates the severity of the hazard or limitation. The numerals 1, 2, and 3 indicate slight, moderate, and severe limitations, respectively, and suitability for needleleaf trees. The numerals 4, 5, and 6 indicate slight, moderate, and severe limitations, respectively, and suitability for broadleaf trees. The numerals 7, 8, and 9 indicate slight, moderate, and severe limitations, respectively, and suitability for both needleleaf and broadleaf trees.

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.

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

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. Stones, boulders, and shallowness to bedrock interfere with installation. 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 and gravel or fractured bedrock 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. Soils that are very high in content of organic matter and those that have cobbles, stones, or boulders are not suitable. 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 solid waste (refuse) and soil material that is placed 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 or gravelly 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. Large stones and organic matter in a soil downgrade the suitability of a soil for use in embankments, dikes, and levees.

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; salinity and alkalinity; and availability of outlets for drainage.

Irrigation is affected by such features as slope, susceptibility to flooding, hazards of water erosion and soil blowing, texture, presence of salts and alkali, depth of root zone, rate of water intake at the surface, permeability of the soil below the surface layer, available water capacity, need for drainage, and depth to the water table.

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 blowing, 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

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 has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing 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, and do not have slopes or stones or boulders that will increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones or boulders, 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 and have few or no stones or boulders on the surface.

Wildlife habitat

ROY A. GRIZZELL, JR., biologist, Soil Conservation Service, assisted in preparing this section.

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, wheat, oats, and barley.

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, bromegrass, clover, and alfalfa.

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, goldenrod, beggarweed, 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.

Coniferous plants are cone-bearing trees, shrubs, or ground cover plants that furnish habitat or supply food in the form of browse, seeds, or fruitlike cones. Soil properties that have a major effect on the growth of coniferous plants are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, or foliage used by wildlife or that provide cover and shade for some species of wildlife. Major soil properties that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and moisture. Shrubs are not rated as a habitat element in this survey.

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, wildrice, saltgrass, and cordgrass and rushes, sedges, and reeds.

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, and 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, pheasant, meadowlark, field sparrow, cottontail rabbit, and red fox.

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, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

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, muskrat, mink, and beaver.

Rangeland habitat consists of areas of wild herbaceous plants and shrubs. It is not rated as habitat for wildlife in this survey.

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 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 estimated AASHTO 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.

In some surveys, the estimates are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterburg limits extend a marginal amount across classification boundaries (1 or 2 percent), the classification in the marginal zone is omitted in table 15.

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.

Salinity is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of the nonirrigated soils. The salinity of individual irrigated fields is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of individual fields can differ greatly from the value given in table 16. Salinity affects the suitability of a soil for crop production, its stability when used as a construction material, and its potential to corrode metal and concrete.

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.

Cemented pans are hard subsurface layers, within a depth of 5 or 6 feet, that are strongly compacted (indurated). Such pans cause difficulty in excavation. The hardness of pans is similar to that of bedrock. A rippable pan can be excavated, but a hard pan generally requires blasting.

Physical and chemical analyses of selected soils

Physical and chemical data resulting from laboratory analyses can be useful to the soil scientist in classifying soils. These data are helpful in estimating available water capacity, acidity, cation exchange cpacity, mineralogical composition, organic matter content, and other soil characteristics that affect management needs. The data are also helpful in developing concepts of soil formation. More recently, laboratory data have proved helpful in rating soils for nonfarm uses, that is, for residential, industrial, recreational, or transportational use.

Several factors are involved in selecting soils for laboratory analyses. Soils that are extensive and most important in the survey area are considered first. A review of available laboratory data is made to determine the need for additional information on these particular soils. Generally, priority is given to soils for which little or no laboratory data are available.

In Clay County, soils representing three soil series were selected for laboratory analyses. Profiles of these soils are described in the section "Soil series and morphology." The analyses were made by the University of Arkansas in Fayetteville. Tables 18 and 19 show the results.

Silt and clay particle size distribution was determined by the hydrometer method (*3*). Sands were measured by sieving (*8*).

Organic matter was determined by a modified Walkley-Black method. The organic matter is digested with potassium dichromate-sulfuric acid and the quantity of chromic acid reduced is measured colorimetrically.

Soil pH was determined on 1:1 soil to water mixture. Available phosphorus was extracted with the Bray No. 1 solution (0.03 *N* ammonium fluoride and 0.025 *N* hydrochloric acid) and measured colorimetrically.

The bases were extracted with 1*N*, pH 7.0, ammonium acetate. Calcium, potassium, and sodium were determined with a flame-photometer and magnesium was measured by atomic absorption. The extractable acidity was determined by the barium chloride-triethanolamine method (*18*).

The total extractable calcium, potassium, magnesium, sodium, and extractable acidity is an approximation of the cation exchange capacity of the soil. Except in soils that contain soluble salts, base saturation was determined by dividing this total into the sum of calcium, potassium, magnesium, and sodium, and multiplying by 100.

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 (*7*). 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."

Amagon series

The Amagon series consists of poorly drained, slowly permeable soils that formed in beds of loamy sediment. These soils are on broad flats on the lower parts of old natural levees and in shallow depressions along natural drainageways. They are saturated with water late in winter and early in spring. The native vegetation is hardwood forest, which includes mainly water tolerant species of oak. The slope is dominantly less than 1 percent.

Amagon soils are geographically associated with Calhoun, Dundee, Foley, and Fountain soils. Dundee soils are on lower parts of natural levees bordering abandoned stream channels and are better drained than Amagon soils. Foley, Calhoun, and Fountain soils are on broad flats and have tongues of the A2 horizon extending into the B horizon. Foley soils also have a high content of sodium in the B horizon.

Typical pedon of Amagon silt loam in a cultivated area of Amagon silt loam in the SE1/4SW1/4SW1/4, sec. 3, T. 21 N., R. 3 E.:

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; weak medium granular structure; friable; many fine roots; few small dark concretions; medium acid; abrupt smooth boundary.

A2g—6 to 12 inches; light brownish gray (10YR 6/2) silt loam; common fine distinct dark yellowish brown mottles; weak medium subangular blocky structure; friable; common fine pores; few small dark concretions; strongly acid; clear smooth boundary.

B21tg—12 to 25 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct dark yellowish brown (10YR 4/4) and few fine faint light gray mottles; moderate medium subangular blocky structure; firm; common medium pores; patchy clay films in pores and on faces of peds; few small dark concretions; very strongly acid; gradual wavy boundary.

B22tg—25 to 44 inches; light brownish gray (10YR 6/2) silty clay loam; few fine distinct dark yellowish brown and common fine faint light gray mottles; moderate medium subangular blocky structure; firm; common medium pores; patchy clay films on faces of peds and in pores; few fine dark concretions; very strongly acid; gradual boundary.

B3g—44 to 60 inches; gray (10YR 5/1) silty clay loam; few medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; light gray silt coatings on faces of peds; few fine dark concretions and black patchy stains on faces of peds; slightly acid; clear wavy boundary.

Cg—60 to 72 inches; gray (10YR 5/1) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; massive; firm; few lenses and small pockets of light gray (10YR 7/1) silt; common fine dark concretions; moderately alkaline.

Thickness of the solum ranges from 50 to 70 inches or more. Reaction is very strongly acid to medium acid in the A horizon, very strongly acid to slightly acid in the B horizon, and strongly acid to moderately alkaline in the C horizon.

The A horizon is generally less than 15 inches thick, but it ranges to 20 inches. The Ap horizon has a hue of 10YR, a value of 4 or 5, and a chroma of 2. The A2g horizon has a hue of 10YR, a value of 6, and a chroma of 1 or 2. Texture is silt loam or fine sandy loam.

The B2tg horizon either has a hue of 10YR, a value of 6, and a chroma of 1 or 2, or it has a hue of 2.5Y, a value of 5 or 6, and a chroma of 2. Texture is silt loam and silty clay loam. Few to common fine or medium yellowish brown or gray mottles are throughout the horizon. The B3 horizon has a hue of 10YR, values of 5 to 7, and a chroma of 1. Texture is loam, silt loam, or silty clay loam.

The Cg horizon has a hue of 10YR or 2.5Y, a value of 5 or 6, and a chroma of 1. Texture is silty clay loam, silt loam, or loam. Medium sized brown and yellow mottles along with small pockets or veins of light gray silt are common.

Beulah series

The Beulah series consists of somewhat excessively drained undulating soils on the higher parts of natural levees bordering bayous and along abandoned stream channels. These soils formed in stratified loamy and sandy sediment. The natural vegetation is hardwood trees. Permeability is moderately rapid, and slopes range from 0 to 8 percent.

Beulah soils are geographically associated with Bosket, Dubbs, Patterson, and Wardell soils. Bosket and Dubbs soils are on natural levees bordering abandoned stream channels, and they have more clay in their B horizon. The Patterson and Wardell soils are in depressions of natural levees. They are grayer throughout the profile, and they are more poorly drained. The Wardell soils also have a dark surface horizon.

Typical pedon of Beulah fine sandy loam in a cultivated area of Beulah fine sandy loam, gently undulating, in the NW1/4SW1/4SE1/4, sec. 9. T. 19 N., R. 9 E.:

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

B21—7 to 30 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium subangular blocky structure; very friable; common fine roots; strongly acid; clear wavy boundary.

B22—30 to 39 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine subangular blocky structure; very friable; few fine roots; strongly acid; clear wavy boundary.

C1—39 to 46 inches; yellowish brown (10YR 5/4) loamy fine sand; single grained; very friable; strongly acid; clear wavy boundary.

C2—46 to 72 inches; brown (10YR 5/3) loamy sand; single grained; loose; medium acid.

Thickness of the solum ranges from 24 to 50 inches. Reaction is strongly acid or medium acid in the A horizon, very strongly acid or strongly acid in the B horizon, and strongly acid to slightly acid in the C horizon.

The A horizon is less than 10 inches thick in most pedons. It has a hue of 10YR, a value of 4, and a chroma of 2 or 3. Texture is fine sandy loam or sandy loam.

The B2 horizon either has a hue of 10YR, a value of 4 or 5, and a chroma of 4, or it has a hue of 7.5YR, a value of 4, and a chroma of 4. Texture ranges from fine sandy loam to loam.

The C horizon has a hue of 10YR, a value of 5, and a chroma of 3 or 4. Texture is loamy sand, loamy fine sand, or fine sandy loam.

Bonn series

The Bonn series consists of poorly drained, very slowly permeable soils that formed in silty sediment that has many characteristics similar to those of loess. These soils are on broad flats. The native vegetation is open stands of hardwoods (predominantly post oaks) and an understory of forbs and grasses. Slope is generally less than 1 percent.

Bonn soils are geographically associated with Calhoun, Crowley, and Foley soils. Crowley and Calhoun soils are on broad flats and do not have a natric horizon. Foley soils are also on broad flats and do not have a high content of sodium and magnesium in the upper part of the B horizon.

Typical pedon of Bonn silt loam in an idle area of the Bonn-Foley complex, in the SW1/4NE1/4SE1/4, sec. 35, T. 21 N., R. 5 E.:

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

B&Ag—4 to 13 inches; grayish brown (10YR 5/2) silty clay loam; moderate coarse prismatic parting to moderate medium subangular blocky structure; very firm; tongues of light gray silt loam between prisms; patchy clay films and silt coatings on faces of peds; few fine pores; few fine roots; few small dark concretions; medium acid; clear wavy boundary.

B22tg—13 to 23 inches; light grayish brown (2.5YR 6/2) silty clay loam; few fine distinct dark yellowish brown mottles; moderate coarse prismatic parting to moderate medium subangular blocky structure; very firm; tongues of light gray silt loam extend through the horizon; clay films and silt coatings on faces of peds; few fine pores; common small dark concretions; moderately alkaline; gradual wavy boundary.

B23tg—23 to 38 inches; light grayish brown (2.5YR 6/2) silty clay loam; few fine distinct dark yellowish brown and yellowish brown mottles; weak medium prismatic structure; very firm; few tongues of light gray silt loam in vertical seams between peds; few patchy clay films on faces of peds; few black weblike stains; common small dark concretions; moderately alkaline; gradual wavy boundary.

B24tg—38 to 51 inches; olive gray (5Y 5/2) silty clay loam; common medium distinct dark yellowish brown (10YR 4/4) and olive (5Y 4/3) mottles; weak coarse prismatic parting to moderate medium angular blocky structure; very firm; few patchy clay films and silt coatings on faces of peds; few fine pores; many black weblike stains; common dark concretions; few medium calcium carbonate nodules; moderately alkaline; gradual wavy boundary.

B3g—51 to 72 inches; olive gray (5Y 5/2) silty clay loam; few medium distinct dark yellowish brown (10YR 4/4) mottles; weak fine subangular blocky structure; very firm; small pockets or veins of light brownish gray silt loam; many black patchy weblike stains; few medium calcium carbonate nodules; moderately alkaline.

Thickness of the solum ranges from 30 to 70 inches or more. Depth to the natric horizon ranges from 4 to 15 inches. Reaction is very strongly acid to medium acid in the A horizon and medium acid to strongly alkaline in the B horizon.

The A horizon is 3 to 16 inches thick. It has a hue of 10YR, a value of 4 or 5, and a chroma of 2.

The B and B&A horizons either have a hue of 10YR or 5Y, a value of 5, and a chroma of 1 or 2, or they have a hue of 2.5Y, a value of 6, and a chroma of 2. Texture of these horizons is silt loam or silty clay loam. Few to common fine and medium yellow and brown mottles are throughout the horizons. Tongues or pockets of light gray silt loam are throughout the B horizon in most pedons.

Bosket series

The Bosket series consists of well drained, gently undulating to undulating soils that formed in loamy alluvium. These soils are on natural levees that border abandoned stream channels. Permeability is moderate in these soils. The native vegetation is mixed hardwoods and an understory of vines and canes. Slope ranges from 0 to 8 percent.

Bosket soils are geographically associated with Beulah, Dexter, and Dundee soils. Beulah soils are on higher parts of natural levees. They border abandoned stream channels and have coarser textures than Bosket soils. Dexter soils are on older natural levees bordering abandoned stream channels and have finer textures than Bosket soils. Also, Beulah and Dexter soils do not have a dark colored surface horizon. Dundee soils are on lower parts of natural levees, have grayer colors, and are more poorly drained than Bosket soils. Patterson soils are in depressions on older natural levees, have grayer colors, and are more poorly drained than Bosket soils.

Typical pedon of Bosket fine sandy loam in a cultivated area of Bosket fine sandy loam, gently undulating, in the **SW1/4SW1/4SE1/4, sec. 22, T. 20 N., R. 3 E.**:

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

A3—8 to 18 inches; dark yellowish brown (10YR 3/4) fine sandy loam; weak medium subangular blocky structure; friable; common fine roots; strongly acid; gradual wavy boundary.

B2t—18 to 42 inches; brown (7.5YR 4/4) clay loam; moderate medium subangular blocky structure; firm; thin discontinuous clay films on faces of peds; few fine roots; few patchy black stains; strongly acid; gradual wavy boundary.

C—42 to 72 inches; dark yellowish brown (10YR 4/4) fine sandy loam; massive; very friable; few patchy black stains; strongly acid.

Thickness of the solum ranges from 25 to 50 inches. Reaction is medium acid to strongly acid in the A horizon and strongly acid or very strongly acid in the B and C horizons.

The Ap horizon is 6 to 9 inches thick. It has a hue of 10YR, a value of 3, and a chroma of 2 or 3. The A3 horizon is 0 to 11 inches thick. It has a hue of 10YR, values of 3 through 5, and a chroma of 4.

The B2t horizon either has a hue of 10YR, a value of 4 or 5, and a chroma of 3, or it has a hue of 7.5YR, a value of 4, and a chroma of 4. Texture is sandy clay loam, clay loam, or fine sandy loam.

The C horizon has a hue of 10YR, a value of 4 or 5, and a chroma of 4. Texture ranges from fine sandy loam to loamy fine sand.

Brandon series

The Brandon series consists of well drained, moderately permeable soils on moderately sloping and moderately steep uplands of Crowley's Ridge. These soils formed in moderately thick deposits of windlaid sediment that overlies gravelly waterlaid sediment. Slope ranges from 8 to 20 percent. The natural vegetation is hardwood trees.

Brandon soils are geographically associated with Loring, Memphis, and Saffell soils. Loring and Memphis soils are on nearly level to moderately steep uplands. They formed in thick loess and have a base saturation of more than 35 percent at 50 inches below the upper boundary of the argillic horizon. Unlike Brandon soils, Loring soils have a fragipan. Saffell soils are on lower sides of uplands and formed in predominantly gravelly, loamy waterlaid material similar to the material that underlies the Brandon soils.

Typical pedon of Brandon silt loam in a wooded area of Brandon-Saffell association, moderately steep, in the **NE1/4SW1/4SE1/4, sec. 28, T. 21 N., R. 8 E.**:

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

B2—3 to 9 inches; brown (10YR 5/3) silt loam; weak fine subangular blocky structure; friable; many fine roots; very strongly acid; clear smooth boundary.

B21t—9 to 21 inches; brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; thin patchy clay films on faces of peds; few fine roots; very strongly acid; gradual wavy boundary.

B22t—21 to 35 inches; brown (7.5YR 4/4) silty clay loam; ped surfaces are reddish brown (5YR 4/4); moderate medium subangular blocky structure; firm; discontinuous clay films on faces of peds; few fine roots; very strongly acid; gradual wavy boundary.

B3—35 to 50 inches; brown (7.5YR 4/4) silt loam; ped surfaces are reddish brown (5YR 4/4); weak medium subangular blocky structure; friable; few small pebbles; patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

IIC—50 to 72 inches; brown (7.5YR 4/4) gravelly loam; massive; friable; about 75 percent by volume round pebbles as much as 1 1/2 inches in diameter; very strongly acid.

Thickness of the solum ranges from 24 to 52 inches. Reaction is strongly acid or very strongly acid through the profile.

The A horizon is generally less than 10 inches thick, but thickness ranges to as much as 12 inches. The A horizon has a hue of 10YR, a value of 4 or 5, and a chroma of 2 or 3. Some pedons have a thin A1 horizon that has a darker chroma than the Ap horizon.

The B horizon has a hue of 7.5YR or 5YR, a value of 4 or 5, and a chroma of 4 to 6. Texture is silty clay loam and silt loam.

The IIC horizon has a hue of 7.5YR or 5YR, a value of 4 or 5, and a chroma of 4 or 5. It is 30 to 75 percent gravel, and the fine earth texture is silt loam, loam, clay loam, or fine sandy loam.

Calhoun series

The Calhoun series consists of poorly drained, slowly permeable soils that formed in loamy sediment. These soils are on broad flats. They are saturated with water late in winter and early in spring. The native vegetation is mixed hardwoods. Slope is generally less than 1 percent.

Calhoun soils are geographically associated with Amagon and Foley soils. Amagon soils are on the lower parts of old natural levees and lack tonguing of the A2 horizon into the B horizon. Foley soils are on broad flats and have a natric horizon.

Typical pedon of Calhoun silt loam in a cultivated area in the NE1/4SE1/4SE1/4, sec. 16, T. 21 N., R. 3 E.:

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; weak medium granular structure; friable; common fine roots; few fine pores; few fine black concretions; medium acid; abrupt smooth boundary.

A2g—6 to 14 inches; light brownish gray (10YR 6/2) silt loam; few fine distinct dark yellowish brown mottles; weak medium subangular blocky structure; friable; few fine roots; few fine pores; few fine black concretions; strongly acid; clear irregular boundary.

B&Ag—14 to 37 inches; light brownish gray (10YR 6/2) silty clay loam; common fine distinct dark yellowish brown mottles; moderate coarse prismatic parting to moderate medium subangular blocky structure; firm; patchy clay films; light gray silt coatings around peds; tongues of light gray silt extend to lower boundary of the horizon; few fine pores; common fine black concretions; very strongly acid; gradual boundary.

B3g—37 to 48 inches; light brownish gray (2.5Y 6/2) silt loam; common fine faint light gray mottles; weak medium subangular blocky structure; friable; few fine brown and black concretions; few brown stains; strongly acid; gradual boundary.

Cg—48 to 72 inches; grayish brown (10YR 5/2) silt loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; massive; firm; common black and brown stains; common fine black concretions; mildly alkaline.

Thickness of the solum ranges from 40 to 70 inches or more. Reaction is strongly acid or medium acid in the A horizon, very strongly acid to neutral in the B horizon, and medium acid to mildly alkaline in the C horizon.

The A horizon is 10 to 24 inches thick. The Ap horizon has a hue of 10YR, a value of 4 or 5, and a chroma of 2, or it has a value of 4 and a chroma of 3. The A2g horizon and the Ag part of the B&Ag horizon have a hue of 10YR, values of 5 to 7, and a chroma of 2.

The B horizon either has a hue of 10YR, a value of 5 or 6, and a chroma of 1 or 2, or it has a hue of 2.5Y, a value of 5 or 6, and a chroma of 2. Texture is silt loam or silty clay loam. Few to common fine yellow, brown, or gray mottles are throughout the horizon.

The C horizon has a hue of 10YR, a value of 5 or 6, and a chroma of 1 or 2.

Collins series

The Collins series consists of moderately well drained, moderately permeable soils that formed in silty alluvium derived from thick loess. These soils are on upland drainageways and level areas adjacent to Crowley's Ridge. The native vegetation is mixed hardwoods. Slope is generally less than 1 percent.

Collins soils are geographically associated with Falaya soils. Falaya soils are on flood plains of upland drainagways and are more poorly drained than Collins soils.

Typical pedon of Collins silt loam, occasionally flooded, in a cultivated area in the NE1/4SE1/4NW1/4, sec. 2, T. 21 N., R. 7 E.:

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

C1—6 to 14 inches; brown (10YR 4/3) silt loam; massive; friable; few fine roots; common fine pores; strongly acid; clear smooth boundary.

C2—14 to 18 inches; brown (10YR 4/3) silt loam; few medium faint pale brown (10YR 6/3) mottles; massive; friable; common fine pores; strongly acid; clear smooth boundary.

C3—18 to 24 inches; brown (10YR 5/3) silt loam; few fine faint dark brown and light brownish gray (10YR 6/2) mottles; massive; friable; common fine pores; strongly acid; clear smooth boundary.

C4—24 to 39 inches; pale brown (10YR 6/3) silt loam; common medium faint light brownish gray (10YR 6/2) and distinct strong brown (7.5YR 5/6) mottles; massive; friable; few fine pores; few black and brown stains; strongly acid; gradual wavy boundary.

C5g—39 to 72 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct dark yellowish brown (10YR 4/4) and fine faint pale brown mottles; massive; friable; few black and brown stains; strongly acid.

Reaction of the soil is very strongly acid to strongly acid except for the surface layer where limed.

The A horizon ranges from 6 to 9 inches in thickness. The A horizon has a hue of 10YR, a value of 4 or 5, and a chroma of 3 or 4.

The C1 and C2 horizons have a hue of 10YR, a value of 4 or 5, and a chroma of 3 or 4. The C3 horizon has a hue of 10YR, a value of 4 or 5, and a chroma of 3. The C4 horizon has a hue of 10YR, a value of 5 or 6, and a chroma of 3. These horizons have few to common fine and medium brown and gray mottles. The C5g horizon has a hue of 10YR, a value of 5 to 7, and a chroma of 1 or 2.

Commerce series

The Commerce series consists of somewhat poorly drained, moderately slowly permeable soils that formed in loamy alluvium. These soils are on flood plains along the St. Francis River. The native vegetation is mixed hardwoods. Slope is generally less than 1 percent.

Commerce soils are geographically associated with Falaya soils. Falaya soils are on flood plains, are more acid than Commerce soils, and have less than 18 percent clay in the control section.

Typical pedon of Commerce silt loam in a cultivated area of Commerce soils, frequently flooded, in the NE1/4SE1/4NW1/4, sec. 2, T. 19N., R. 9 E.:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; weak medium granular structure; friable; many fine roots; few fine concretions; few fine pores; slightly acid; abrupt smooth boundary.

B21—8 to 20 inches; grayish brown (10YR 5/2) silt loam; common medium distinct dark yellowish brown (10YR 4/4) and a few fine distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; few fine roots; common fine pores; few concretions; slightly acid; clear smooth boundary.

B22—20 to 30 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; few fine pores; few fine dark brown soft masses; few black stains; slightly acid; clear smooth boundary.

C1—30 to 52 inches; grayish brown (10YR 5/2) silt loam; common medium distinct strong brown (7.5YR 5/6) and dark yellowish brown (10YR 4/4) mottles; massive; friable; few fine pores; few fine dark concretions; common dark brown soft masses; neutral; gradual wavy boundary.

IIC2—52 to 62 inches; grayish brown (10YR 5/2) fine sandy loam; common medium distinct dark yellowish brown (10YR 4/4) and brown (10YR 4/3) mottles; massive; friable; few fine brown concretions; few dark brown soft masses; neutral; clear smooth boundary.

IIIC3—62 to 72 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium prominent strong brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; firm; common fine pores; common black and brown stains; neutral.

Thickness of the solum ranges from 20 to 40 inches. Reaction is medium acid to neutral in the A horizon, slightly acid to mildly alkaline in the B horizon, and neutral or mildly alkaline in the C horizon.

The A horizon is 6 to 10 inches thick. The A horizon has a hue of 10YR, a value of 4 or 5, and a chroma of 2. Textures are fine sandy loam, silt loam, and silty clay loam.

The B horizon has a hue of 10YR, a value of 4 or 5, and a chroma of 2. It has common fine and medium yellow or brown mottles. It is silt loam or silty clay loam.

The C horizon has a hue of 10YR, a value of 4 or 5, and a chroma of 1 or 2. It has common fine or medium brown or yellow mottles. Texture is fine sandy loam, loam, silt loam, or silty clay loam.

Crowley series

The Crowley series consists of somewhat poorly drained, very slowly permeable soils that formed primarily in loamy sediment. These soils are on broad flats. They have a seasonally high water table late in winter and early in spring. The native vegetation is mixed hardwood forests. Slope is generally less than 1 percent.

Crowley soils are geographically associated with Bonn, Foley, and Jackport soils. Bonn and Foley soils are on broad flats and have a natric horizon. Jackport soils are on broad flats in abandoned backswamps. They do not have the abrupt textural change between the A and B horizons that is characteristic of the Crowley soils.

Typical pedon of Crowley silt loam in a cultivated area in the NW1/4SE1/4SW1/4, sec. 1, T. 20 N., R. 5 E.:

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

A2g—6 to 15 inches; grayish brown (10YR 5/2) silt loam; common medium distinct dark yellowish brown (10YR 4/4) and few fine and medium faint light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; light gray (10YR 7/1) silt coatings on faces of some peds; common fine roots; common fine black and brown concretions; very strongly acid; abrupt smooth boundary.

B21tg—15 to 22 inches; grayish brown (10YR 5/2) silty clay; common fine and medium prominent red (2.5YR 4/8) mottles; strong medium subangular blocky structure; firm; continuous distinct clay films on faces of peds; few fine roots; few fine pores; few black stains and fine concretions; very strongly acid; gradual wavy boundary.

B22tg—22 to 32 inches; grayish brown (10YR 5/2) silty clay; few medium distinct yellowish brown (10YR 5/4) and yellowish red (5YR 5/6) mottles; moderate fine subangular blocky structure; firm; patchy distinct clay films on faces of peds; few fine roots; few fine pores; few black stains and fine concretions; very strongly acid; gradual wavy boundary.

B23tg—32 to 40 inches; grayish brown (10YR 5/2) silty clay loam; few medium distinct olive gray (5Y 5/2) and common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; patchy distinct clay films on faces of peds; few fine pores; common fine and medium concretions; common black stains; strongly acid; gradual wavy boundary.

B3g—40 to 72 inches; olive gray (5Y 5/2) silty clay loam; common medium distinct grayish brown (2.5Y 5/2) and common medium prominent strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; patchy distinct clay films on faces of peds; few fine pores; common fine and medium concretions; abundant black stains; few old roots and root channels; moderately alkaline.

Thickness of the solum ranges from about 40 to 75 inches. Reaction is very strongly acid to medium acid in the A horizon, very strongly acid to slightly acid in the B2tg horizon, and medium acid to moderately alkaline in the B3g horizon.

The A horizon ranges from 12 to 25 inches in thickness. The Ap horizon has a hue of 10YR, a value of 4 or 5, and a chroma of 2. The A2 horizon has a hue of 10YR and either a value of 5 and a chroma of 1 or 2 or a value of 6 and a chroma of 1.

The B2tg horizon has a hue of 10YR, a value of 5, and a chroma of 1 or 2. The B3g horizon has a hue of 10YR, a value of 5 or 6, and a chroma of 1, or it has a hue of 2.5Y or 5Y, a value of 5, and a chroma of 2. Common fine and medium prominent yellowish red or red mottles are present in the B2 horizon and brown and red in the B3 horizon. Texture of the B horizon is silty clay or silty clay loam.

Dexter series

The Dexter series consists of well drained, moderately permeable soils that formed in loamy alluvium. These soils are on higher parts of older natural levees bordering abandoned stream channels. The native vegetation is mixed hardwoods. Slope ranges from 0 to 3 percent.

Dexter soils are geographically associated with Bosket and Dundee soils. Bosket soils are on natural levees bordering abandoned stream channels. They are coarser textured and have a darker colored surface horizon than Dexter soils. Dundee soils are on the lower parts of natural levees bordering abandoned stream channels and are more poorly drained than Dexter soils.

Typical pedon of Dexter silt loam, gently undulating, in a cultivated area in the SE1/4NE1/4NW1/4, sec. 27, T. 21 N., R. 4 E.:

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

B1—7 to 14 inches; dark brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; friable; common fine roots; common fine pores; strongly acid; clear smooth boundary.

B2t—14 to 40 inches; dark brown (7.5YR 4/4) silt loam; ped surfaces are yellowish red (5YR 5/6); moderate coarse prismatic parting to moderate medium subangular blocky structure; firm; thin almost continuous clay films on faces of peds; few fine roots; few fine pores; common patchy black stains; very strongly acid; gradual wavy boundary.

B3—40 to 55 inches; dark brown (7.5YR 4/4) loam; weak medium subangular blocky structure; friable; common thin patchy clay films on faces of peds; few patchy black stains; very strongly acid; gradual wavy boundary.

C1—55 to 72 inches; dark brown (7.5YR 4/4) fine sandy loam; massive; very friable; strongly acid.

Thickness of the solum ranges from 32 to 60 inches. Reaction is medium acid or strongly acid in the A horizon and strongly acid or very strongly acid in the B and C horizons.

The A horizon is 5 to 10 inches thick. It has a hue of 10YR, a value of 4 or 5, and a chroma of 3 or 4.

The B and C horizons have a hue of 7.5YR or 5YR, a value of 4 or 5, and a chroma of 4. Texture of the B2t horizon is silt loam or silty clay loam. The B3 and C horizons are fine sandy loam, loam, clay loam, or sandy clay loam.

Dubbs series

The Dubbs series consists of well drained, moderately permeable soils that formed in loamy alluvium. These soils are on natural levees bordering abandoned stream channels. The native vegetation is mixed hardwoods. Slope ranges from 0 to 3 percent.

Dubbs soils are geographically associated with Beulah and Dundee soils. Beulah soils are on higher parts of natural levees bordering bayous and are coarser textured than Dubbs soils. Dundee soils are on lower parts of natural levees bordering abandoned stream channels and are more poorly drained than Dubbs soils.

Typical pedon of Dubbs very fine sandy loam, in a cultivated area in the NE1/4NE1/4NE1/4, sec. 20, T. 19 N., R. 8 E.:

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

B1—8 to 16 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; common fine roots; few fine pores; strongly acid; clear smooth boundary.

B21t—16 to 27 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure; friable; common fine pores; strongly acid; clear smooth boundary.

B22t—27 to 37 inches; dark yellowish brown (10YR 4/4) silt loam; few medium distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable; common fine pores; very strongly acid; gradual wavy boundary.

B3—37 to 53 inches; dark yellowish brown (10YR 4/4) loam; common medium distinct grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; few black stains; very strongly acid; gradual wavy boundary.

C—53 to 72 inches; dark yellowish brown (10YR 4/4) fine sandy loam; massive; very friable; medium acid.

Thickness of the solum ranges from 20 to 55 inches. Reaction is medium acid to very strongly acid throughout.

The A horizon is 4 to 8 inches thick. It has a hue of 10YR, a value of 4 or 5, and a chroma of 3.

The B horizon either has a hue of 10YR, a value of 4 or 5, and a chroma of 3 or 4, or it has a hue of 7.5YR, a value of 4 or 5, and a chroma of 4. Texture is silt loam, loam, or silty clay loam.

The C horizon has a hue of 10YR, a value of 4 or 5, and a chroma of 4. Texture ranges from fine sandy loam to loamy sand.

Dundee series

The Dundee series consists of somewhat poorly drained, moderately slowly permeable soils that formed in beds of loamy alluvium. These soils are on the lower parts of natural levees bordering abandoned stream channels. The native vegetation is mixed hardwoods. Slope is generally less than 1 percent.

Dundee soils are geographically associated with Amagon, Bosket, Dubbs, Dexter, and Patterson soils. Amagon soils are on broad flats on the lower parts of old natural levees and are more poorly drained than Dundee soils. Bosket, Dubbs, and Dexter soils are on older natural levees bordering abandoned stream channels and are better drained than Dundee soils. Patterson soils are in depressions on older natural levees and have coarser texture.

Typical pedon of Dundee silt loam in a cultivated area in the SE1/4NW1/4NW1/4, sec. 15, T. 19 N., R. 5 E.:

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

B1g—7 to 16 inches; grayish brown (10YR 5/2) silt loam; common fine faint dark grayish brown and distinct yellowish brown mottles; weak medium subangular blocky structure; friable; few fine roots; common fine pores; few dark concretions; strongly acid; clear smooth boundary.

B21tg—16 to 31 inches; grayish brown (10YR 5/2) silt loam; few fine faint light brownish gray and distinct yellowish brown mottles; weak medium subangular blocky structure; friable; few patchy clay films on faces of peds; few fine roots; few fine pores; few fine brown and black concretions; very strongly acid; gradual wavy boundary.

B22tg—31 to 41 inches; grayish brown (10YR 5/2) silty clay loam; common medium faint light brownish gray (10YR 6/2) and distinct yellowish brown (10YR 5/4, 5/6) mottles; moderate medium subangular blocky structure; firm; patchy distinct clay films on faces of peds; few fine pores; common fine brown and black concretions; common black stains; very strongly acid; gradual wavy boundary.

B3g—41 to 59 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; few patchy clay films on faces of peds; common fine brown and black concretions; common black and brown stains; very strongly acid; gradual wavy boundary.

Cg—59 to 72 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4) mottles; massive; friable; common fine brown and black concretions; common black and brown stains; strongly acid.

Thickness of the solum ranges from 24 to 60 inches. Reaction is very strongly acid to medium acid in the A and B horizons and very strongly acid to neutral in the C horizon.

The Ap horizon is 4 to 8 inches thick. It has a hue of 10YR, a value of 4 or 5, and a chroma of 2 or 3.

The B2t horizon has a hue of 10YR or 2.5Y, a value of 4 or 5, and a chroma of 2. The B3 horizon has a hue of 10YR, a value of 6, and a chroma of 1 or 2. The B horizon is silt loam, loam, or silty clay loam.

The C horizon has a hue of 10YR and either a value of 5 or 6 and a chroma of 1 or a value of 6 and a chroma of 2. Texture is silt loam, loam, or fine sandy loam.

Falaya series

The Falaya series consists of somewhat poorly drained, moderately permeable soils that formed in silty alluvium derived from loess deposits. These soils are on upland drainageways and level areas adjacent to Crowley's Ridge. The native vegetation is mixed hardwoods. Slope is generally less than 1 percent.

Falaya soils are geographically associated with Collins soils. Collins soils are on upland drainageways and are better drained than Falaya soils.

Typical pedon of Falaya silt loam in a cultivated area in the SW1/4SE1/4NE1/4, sec. 6, T. 19 N., R. 7 E.:

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

C1—6 to 14 inches; brown (10YR 4/3) silt loam; common medium distinct pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; common fine roots; common fine pores; strongly acid; clear smooth boundary.

C2g—14 to 27 inches; grayish brown (10YR 5/2) silt loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; few fine roots; common fine pores; few dark brown stains; strongly acid; gradual wavy boundary.

C3g—27 to 41 inches; grayish brown (10YR 5/2) silt loam; common medium distinct dark yellowish brown (10YR 4/4) and faint light gray (10YR 6/1) mottles; weak medium platy structure; friable; common fine pores; strongly acid; gradual wavy boundary.

C4g—41 to 56 inches; light gray (10YR 6/1) silt loam; common medium distinct dark yellowish brown (10YR 4/4) and faint grayish brown (10YR 5/2) mottles; weak medium platy structure; friable; few fine pores; strongly acid; clear smooth boundary.

Bxb—56 to 72 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/4) mottles; weak coarse prismatic parting to weak medium subangular blocky structure; brittle, firm; common fine pores; light gray silt coatings on faces of prisms; common dark concretions; strongly acid.

Reaction of the soil is strongly acid or very strongly acid throughout except where the surface layer is limed. Depth to buried horizons is 30 to 60 inches.

The A horizon is 5 to 10 inches thick. The A horizon has a hue of 10YR, a value of 4 or 5, and a chroma of 2 or 3.

The C1 horizon has a hue of 10YR, a value of 4 or 5, and a chroma of 2 or 3. The Cg horizon has a hue of 10YR, a value of 5 or 6, and a chroma of 1 or 2. Common fine or medium brown and yellow mottles are present throughout this horizon.

Foley series

The Foley series consists of poorly drained, very slowly permeable soils that formed in loamy sediment. These soils are on broad flats. They have a seasonally high water table in winter and early in spring. The native vegetation is mixed hardwood forests. Slope is generally less than 1 percent.

Foley soils are geographically associated with Amagon, Bonn, Calhoun, Crowley, and Fountain soils. Amagon soils are on broad flats on the lower parts of old natural levees and in shallow depressions. They do not have a natric horizon. Calhoun, Crowley, and Fountain soils are on broad flats and also do not have a natric horizon. Bonn soils are on broad flats. The upper part of the B horizon has a higher content of sodium and magnesium than the upper part of the B horizon in Foley soils.

Typical pedon of Foley silt loam in a cultivated area in the SW1/4NE1/4NE1/4, sec. 27, T. 21 N., R. 6 E.:

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam; weak medium granular structure; friable; many fine and medium roots; common pores; few dark concretions; very strongly acid; abrupt smooth boundary.

A2g—5 to 10 inches; grayish brown (10YR 5/2) silt loam; few fine faint gray and light brownish gray mottles and common medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; common fine roots; common pores; few dark concretions; strongly acid; clear wavy boundary.

B&A—10 to 16 inches; gray (10YR 5/1) silt loam; few fine faint grayish brown and common medium distinct dark yellowish brown (10YR 4/4) mottles; moderate medium prismatic parting to weak medium subangular blocky structure; friable; common fine roots; many pores; light gray silt interfingering throughout matrix; few fine black concretions; strongly acid; clear wavy boundary.

B21tg—16 to 26 inches; gray (10YR 5/1) silty clay loam; few medium distinct strong brown (7.5YR 5/6) mottles; moderate coarse prismatic parting to moderate medium subangular structure; firm; patchy clay films on faces of peds; gray silt streaks in vertical seams between prisms; few fine roots; few pores; few medium black concretions; strongly acid; gradual wavy boundary.

B22tg—26 to 40 inches; gray (10YR 5/1) silty clay loam; common medium distinct olive (5Y 5/3) mottles; moderate coarse prismatic parting to moderate medium subangular blocky structure; firm; patchy clay films on faces of peds; gray silt streaks in vertical seams between prisms; few fine roots; few pores; few medium black concretions; few black weblike stains; neutral; gradual wavy boundary.

B23tg—40 to 54 inches; gray (10YR 5/1) silty clay loam; common fine distinct olive and yellowish brown mottles; moderate medium prismatic parting to moderate medium subangular blocky structure; firm; patchy clay films on faces of some peds; gray silt streaks in vertical seams between prisms; few old roots; few pores; few black stains; few medium black concretions; few medium calcium carbonate nodules; neutral; gradual wavy boundary.

B3g—54 to 72 inches; olive gray (5Y 5/2) silt loam; common medium distinct gray (10YR 5/1) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few black stains; common medium calcium carbonate nodules; moderately alkaline.

Thickness of the solum ranges from about 40 to more than 72 inches. Reaction is very strongly acid to medium acid in the A horizon and strongly acid to moderately alkaline in the B horizon. Depth to the natric horizon ranges from about 18 to 30 inches.

The A horizon is about 6 to 15 inches thick. The Ap horizon has a hue of 10YR and either a value of 4 or 5 and a chroma of 2 or a value of 5 and a chroma of 3. The A2g horizon has a hue of 10YR and either a value of 5 or 6 and a chroma of 2 or a value of 6 and a chroma of 1.

The B horizon has a hue of 10YR, 2.5Y, or 5Y; values of 4 to 6; and a chroma of 1 or 2. Texture is silt loam or silty clay loam.

Fountain series

The Fountain series consists of poorly drained, moderately slowly permeable soils that formed in loamy sediment. These soils are on broad flats. They are saturated with water late in winter and early in spring. The native vegetation is mixed hardwoods. Slope is generally less than 1 percent.

Fountain soils are geographically associated with Amagon and Foley soils. Amagon soils are on broad flats on the lower parts of old natural levees and do not have tonguing of the A2 horizon into the B horizon. Foley soils are on broad flats and have a natric horizon.

Typical pedon of Fountain silt loam in a cultivated area in the SW1/4NW1/4NW1/4, sec. 18, T. 20 N., R. 9 E.:

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam; few fine faint grayish brown mottles; weak medium granular structure; friable; many fine roots; few dark concretions; few brown stains; few fine pores; medium acid; abrupt smooth boundary.

A12—5 to 9 inches; dark grayish brown (10YR 4/2) silt loam; common fine faint grayish brown mottles; weak medium subangular blocky structure; friable; many fine roots; few fine pores; few dark concretions; few brown stains; medium acid; abrupt smooth boundary.

A&B—9 to 17 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/4) and few medium prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; common fine pores; common black and brown stains; medium acid; clear wavy boundary.

B21tg—17 to 42 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct yellowish brown (10YR 5/4) and few fine distinct strong brown mottles; weak medium prismatic parting to moderate medium subangular blocky structure; friable; patchy distinct clay films on faces of peds; tongues of light gray silt loam extend to about 40 inches; common small and medium dark concretions; common fine pores; neutral; gradual wavy boundary.

B3g—42 to 60 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium distinct yellowish brown (10YR 5/4) and few fine prominent strong brown mottles; weak medium subangular blocky structure; firm; few patchy clay films; few fine pores; few fine black concretions; few medium calcium carbonate concretions; mildly alkaline; gradual wavy boundary.

Cg—60 to 72 inches; grayish brown (2.5Y 5/2) sandy clay loam; common coarse prominent strong brown (7.5YR 5/6) and common medium distinct yellowish brown (10YR 5/4) mottles; massive; firm; common fine black concretions; common black and brown stains; mildly alkaline.

Thickness of the solum ranges from 40 to 60 inches. Reaction is strongly acid or medium acid in the A horizon and slightly acid to moderately alkaline in the B and C horizons.

The A horizon is 6 to 18 inches thick. The Ap horizon has a hue of 10YR, a value of 4 or 5, and a chroma of 2. The A part of the A&B horizon has a hue of 10YR, a value of 5 or 6, and a chroma of 1 or 2.

The B horizon has a hue of 10YR or 2.5Y, a value of 5 or 6, and a chroma of 2. Texture is silt loam or silty clay loam. Few to common fine and medium brown, gray, or yellow mottles are throughout the horizon.

The C horizon has a hue of 10YR or 2.5Y, a value of 5 or 6, and a chroma of 1 or 2. Texture is silt loam, silty clay loam, or sandy clay loam.

Jackport series

The Jackport series consists of poorly drained, very slowly permeable soils that formed in beds of predominantly clayey sediment. These soils are on broad flats that were backswamps of former streams. They have a seasonally high water table late in winter and early in spring. The native vegetation is hardwood forests. Slope is generally less than 1 percent.

Jackport soils are geographically associated with Crowley and Kobel soils. Crowley soils are on broad flats and have an abrupt textural change from the A horizon to the B horizon. Kobel soils are in slack water areas on flood plains. They do not have an argillic horizon and are less acid than Jackport soils.

Typical pedon of Jackport silty clay in a cultivated area in the SW1/4SW1/4SW1/4, sec. 20, T. 21 N., R. 7 E.:

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silty clay; few fine faint grayish brown and strong brown mottles; weak fine subangular blocky structure; firm; many fine roots; few fine dark concretions; strongly acid; abrupt smooth boundary.

B21tg—5 to 16 inches; grayish brown (10YR 5/2) silty clay; common medium distinct strong brown (7.5YR 5/6) mottles; strong coarse subangular blocky structure parting to fine subangular blocky; firm; common fine roots; peds have shiny faces; very strongly acid; gradual smooth boundary.

B22tg—16 to 37 inches; grayish brown (2.5Y 5/2) clay; common medium distinct strong brown (7.5YR 5/6) mottles; moderate fine subangular blocky structure; firm; plastic; common fine roots; peds have shiny faces; few slickensides; common pressure faces; very strongly acid; gradual wavy boundary.

B3g—37 to 56 inches; olive gray (5Y 5/2) silty clay; moderate medium angular blocky structure parting to weak medium subangular blocky; firm, plastic; few fine roots; peds have shiny faces; common black stains; few fine black concretions; few medium calcium carbonate nodules; mildly alkaline; gradual wavy boundary.

Cg—56 to 72 inches; olive gray (5Y 5/2) silty clay; few medium distinct dark yellowish brown (10YR 4/4) and strong brown (7.5YR 5/6) mottles; massive; firm; common medium calcium carbonate concretions; common black stains; few fine dark concretions; mildly alkaline.

Thickness of the solum ranges from about 30 to 60 inches. Reaction is very strongly acid to medium acid in the A horizon, very strongly acid to mildly alkaline in the B horizon, and strongly acid to moderately alkaline in the C horizon.

The A horizon is 4 to 8 inches thick. The Ap horizon has a hue of 10YR, a value of 4 or 5, and a chroma of 2.

The B2tg horizon has a hue of 10YR or 2.5Y, a value of 5, and a chroma of 2. Texture is silty clay or clay. Common medium brown or yellow mottles are present throughout. The B3g horizon has a hue of 10YR, 2.5Y, or 5Y; a value of 5; and a chroma of 2. Texture is silty clay or silty clay loam.

The Cg horizon has a hue of 10YR and either a value of 5 and a chroma of 1 or 2 or a value of 6 and a chroma of 1. It can also have a hue of 2.5Y or 5Y, a value of 5, and a chroma of 2. Texture is silty clay, silty clay loam, or silt loam.

This soil has slightly less than 60 percent clay in the control section which is less than that described in the range for the Jackport series. This difference does not greatly alter the use, behavior, and management of the soil.

Kobel series

The Kobel series consists of poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are in slack water areas in the flood plains. They have a seasonally high water table late in winter and early in spring. The native vegetation is mixed hardwood forests, predominantly water tolerant species. Slope is generally less than 1 percent.

Kobel soils are geographically associated with Jackport and Wardell soils. Jackport soils are on broad flats of abandoned backswamps and have an argillic horizon. Wardell soils are in depressions on natural levees. They have coarser textures than Kobel soils and have an argillic horizon.

Typical pedon of Kobel silty clay in a cultivated area in the SW1/4SE1/4NE1/4, sec. 33, T. 19 N., R. 8 E.:

Ap—0 to 5 inches; very dark gray (10YR 3/1) silty clay; weak fine subangular blocky structure; firm; many fine roots; slightly acid; abrupt smooth boundary.

B21g—5 to 17 inches; dark gray (10YR 4/1) clay; common medium distinct yellowish brown (10YR 5/6) mottles; strong medium angular blocky structure; very firm; few fine roots; peds have shiny faces; neutral; clear smooth boundary.

B22g—17 to 45 inches; gray (10YR 5/1) clay; common medium distinct yellowish brown (10YR 5/6) and common medium faint dark gray (10YR 4/1) mottles; moderate medium angular blocky structure; very firm; plastic; few slickensides; few fine black concretions; neutral; gradual boundary.

B3g—45 to 55 inches; gray (10YR 5/1) clay; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; very firm, plastic; few slickensides; few fine black concretions; few black stains; mildly alkaline; gradual boundary.

C1g—55 to 63 inches; gray (10YR 5/1) sandy clay; common medium distinct strong brown (7.5YR 5/6) mottles; massive; firm; few fine black concretions; few black stains; moderately alkaline; gradual boundary.

C2g—63 to 72 inches; gray (10YR 5/1) silty clay; common medium faint dark gray (10YR 4/1) mottles; massive; firm, very plastic; few old roots; few black stains; moderately alkaline.

Thickness of the solum ranges from about 30 to 60 inches. Reaction is strongly acid to neutral in the A horizon, slightly acid to moderately alkaline in the B horizon, and neutral to moderately alkaline in the C horizon.

The A horizon is about 3 to 8 inches thick. The A horizon has a hue of 10YR and either a value of 3 and a chroma of 1 or 2 or a value of 4 and a chroma of 2.

The B horizon has a hue of 10YR, values of 4 to 6, and a chroma of 1. Texture is silty clay loam, silty clay, or clay.

The C horizon has a hue of 10YR or 5Y, values of 4 to 6, and a chroma of 1. Texture is typically silty clay or sandy clay, but it ranges from fine sandy loam to clay and is stratified below 40 inches.

Loring series

The Loring series consists of moderately well drained soils that formed in deposits of thick loess. These nearly level to moderately sloping soils are on uplands. They have moderately slow permeability. These soils have a fragipan that restricts the penetration of roots and the movement of water. Slope ranges from 1 to 12 percent. The native vegetation is mixed hardwoods.

Loring soils are geographically associated with Brandon and Memphis soils. Brandon soils are moderately sloping and moderately steep and are on uplands. They do not have the fragipan that is characteristic of Loring soils, and they have a base saturation of less than 35 percent at 50 inches below the upper boundary of the argillic horizon. Memphis soils are moderately steep and are on uplands. They do not have a fragipan.

Typical pedon of Loring silt loam in an idle area of Loring silt loam, 8 to 12 percent slopes, eroded; in the NE1/4NE1/4SW1/4, sec. 33, T. 21 N., R. 8 E.:

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

B1—3 to 8 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine subangular blocky structure; friable; many fine roots; few pores; strongly acid; clear smooth boundary.

B2t—8 to 27 inches; brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; patchy clay films on faces of peds; common fine roots; common medium pores; strongly acid; clear smooth boundary.

Bx1—27 to 41 inches; dark yellowish brown (10YR 4/4) silty clay loam; common medium distinct brown (7.5YR 4/4) and grayish brown (10YR 5/2) mottles; moderate coarse prismatic parting to moderate medium subangular blocky structure; firm, brittle; patchy clay films on faces of peds within prisms; light brownish gray (10YR 6/2) silt in seams between prisms and on faces of peds; few fine pores; few fine roots in seams; strongly acid; gradual wavy boundary.

Bx2—41 to 52 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct brown (7.5YR 4/4) and grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm, brittle; patchy clay films on faces of peds; gray silt coatings on faces of peds; common medium pores; strongly acid; gradual wavy boundary.

B3—52 to 72 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; few grayish brown (10YR 5/2) silt pockets, few black stains; medium acid; gradual wavy boundary.

Thickness of the solum ranges from 45 to 75 inches. Reaction is strongly acid or medium acid in the A horizon and very strongly acid to medium acid in the B horizon.

The A horizon is generally less than 6 inches thick, but thickness ranges to as much as 9 inches. The A horizon has a hue of 10YR and either a value of 4 and a chroma of 3 or a value of 5 and a chroma of 4.

The B1 and B2t horizons either have a hue of 10YR or 7.5YR, a value of 4, and a chroma of 4, or they have a hue of 10YR, a value of 5, and a chroma of 4 or 6. The Bx horizon either has a hue of 7.5YR or 10YR, a value of 4, and a chroma of 4, or it has a hue of 7.5YR, a value of 5, and a chroma of 4. Mottles are in shades of yellow, brown, or gray. Depth to the fragipan ranges from 22 to 32 inches.

Memphis series

The Memphis series consists of well drained, moderately permeable soils that formed in deposits of thick loess. These moderately steep soils are on uplands of Crowley's Ridge. Slope ranges from 12 to 20 percent. The native vegetation is mixed hardwoods.

Memphis soils are geographically associated with the Loring, Brandon, and Saffell soils. Loring soils are on nearly level to moderately sloping uplands. They have a fragipan. Brandon soils are moderately sloping and moderately steep on uplands. They have a fine-silty control section over gravelly loamy material. Saffell soils are moderately steep on uplands and have a loamy-skeletal control section.

Typical pedon of Memphis silt loam, moderately steep, in a wooded area in the SE1/4SW1/4SE1/4, sec. 22, T. 20 N., R. 7 E.:

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

A2—2 to 10 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; many fine and medium roots; common fine pores; very strongly acid; clear smooth boundary.

B21t—10 to 32 inches; dark brown (7.5YR 4/4) silty clay loam; strong medium subangular blocky structure; firm; patchy clay films on faces of peds; common fine roots; common fine pores; very strongly acid; gradual wavy boundary.

B22t—32 to 48 inches; dark brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; patchy clay films on faces of peds; pale brown and gray silt coatings between peds and in cracks; common fine pores; few fine roots; very strongly acid; gradual wavy boundry.

C—48 to 72 inches; dark brown (7.5YR 4/4) silt loam; massive; friable; pale brown and gray silt coatings in cracks or crevices; organic stains on faces of peds; strongly acid.

Thickness of the solum ranges from 32 to 72 inches. Reaction of the A horizon is strongly acid or medium acid, and the B and C horizons are very strongly acid or strongly acid.

The A horizon is generally less than 12 inches thick, but it ranges to 14 inches. It has a hue of 10YR and either a value of 3 or 4 and a chroma of 2 or 3 or a value of 4 and a chroma of 4.

The B horizon either has a hue of 7.5YR or 10YR, a value of 4 or 5, and a chroma of 4, or it has a hue of 7.5YR or 10YR, a value of 5, and a chroma of 6. Texture is silt loam and silty clay loam. Some pedons do not have gray or pale brown silt coatings in cracks and between peds. Clay films on faces of peds range from patchy to continuous.

The C horizon has a hue of 7.5YR or 10YR, a value of 4 or 5, and a chroma of 4, or it has a hue of 7.5YR or 10YR, a value of 5, and a chroma of 6.

Patterson series

The Patterson series consists of somewhat poorly drained, moderately rapidly permeable soils that formed in sandy alluvium. These soils are in depressions on older natural levees. They have a seasonally high water table during winter and early in spring. The native vegetation is mixed hardwood forests. Slope is generally less than 1 percent.

Patterson soils are geographically associated with Beulah, Bosket, Dundee, Tuckerman, and Wardell soils. Beulah and Bosket soils are on higher parts of natural levees and are better drained than Patterson soils. Dundee and Tuckerman soils are on lower parts of natural levees and have finer textures. Wardell soils are in depressions on natural levees and also have finer textures. In addition, Tuckerman and Wardell soils are more poorly drained than Patterson soils.

Typical pedon of Patterson fine sandy loam in a cultivated area in the NW1/4NW1/4SW1/4, sec. 16, T. 19 N., R. 9 E.:

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

A12—6 to 11 inches; dark grayish brown (10YR 4/2) fine sandy loam; few fine faint grayish brown mottles; weak medium subangular blocky structure; friable; common fine roots; few fine pores; medium acid; abrupt smooth boundary.

B2tg—11 to 26 inches; grayish brown (10YR 5/2) fine sandy loam; common medium distinct dark yellowish brown (10YR 4/4) and few medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; common clay bridges between sand grains; few fine roots; few fine pores; few fine dark concretions; strongly acid; gradual wavy boundary.

C1g—26 to 43 inches; grayish brown (10YR 5/2) fine sandy loam; common medium distinct dark yellowish brown (10YR 4/4) and few fine faint light brownish gray mottles; massive; very friable; few fine dark concretions; strongly acid; clear wavy boundary.

IIC2g—43 to 62 inches; gray (10YR 5/1) sandy clay loam; common medium distinct dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) mottles; massive; friable; medium acid; clear wavy boundary.

IIIC3g—62 to 72 inches; gray (10YR 5/1) loamy fine sand; few fine distinct dark yellowish brown and yellowish brown mottles; massive; very friable; neutral.

Thickness of the solum ranges from about 20 to 60 inches. Reaction is strongly acid or medium acid in the A horizon, very strongly acid or strongly acid in the B horizon, and strongly acid to neutral in the C horizon.

The A horizon is about 6 to 15 inches thick. The A horizon has a hue of 10YR and either a value of 4 and a chroma of 2 or 3 or a value of 5 and a chroma of 3.

The B horizon has a hue of 10YR, a value of 4 or 5, and a chroma of 2. Texture is fine sandy loam or sandy loam. Common, fine, and medium brown or gray mottles are present throughout.

The C horizon has a hue of 10YR, a value of 5 or 6, and a chroma of 1 or 2. Texture ranges from loamy fine sand to sandy clay loam.

Saffell series

The Saffell series consists of well drained, moderately steep soils on uplands of Crowley's Ridge. These soils formed in gravelly, loamy waterlaid sediment. Slope ranges from 12 to 20 percent. The native vegetation is upland hardwood forest.

Saffell soils are geographically associated with Brandon soils. Brandon soils are mostly on narrow ridge crests and interfluves. They have more fines in the upper part of the B horizon and few or no pebbles.

Typical pedon of Saffell gravelly fine sandy loam in an idle area of Brandon-Saffell association, moderately steep, in the SW1/4NW1/4NE1/4, sec. 12, T. 19 N., R. 7 E.:

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

A2—2 to 10 inches; brown (10YR 5/3) gravelly fine sandy loam; weak fine granular structure; very friable; many fine roots; about 20 percent by volume, pebbles as much as 3 inches in diameter; very strongly acid; clear smooth boundary.

B2t—10 to 21 inches; strong brown (7.5YR 5/6) very gravelly sandy clay loam; moderate fine subangular blocky structure; friable; common fine roots; about 40 percent by volume, pebbles as much as 3 inches in diameter; thin patchy clay films on faces of peds; few fine pores; very strongly acid; gradual wavy boundary.

B3—21 to 41 inches; red (2.5YR 4/6) very gravelly fine sandy loam; weak fine subangular blocky structure; friable; about 60 percent by volume, pebbles as much as 3 inches in diameter; sand grains and pebbles coated and bridged with clay; very strongly acid; gradual wavy boundary.

C—41 to 72 inches; yellowish red (5YR 4/6) very gravelly loamy sand; single grained; very friable; about 70 percent by volume of pebbles as much as 3 inches in diameter; very strongly acid.

Thickness of the solum ranges from 35 to 60 inches. Reaction is strongly acid or very strongly acid throughout the profile.

The A horizon is generally less than 11 inches thick, but thickness ranges up to as much as 13 inches. It has a hue of 10YR and either a value of 4 or 5 and a chroma of 3 or a value of 4 and a chroma of 2. The content of gravel ranges from about 2 to 30 percent. Texture is gravelly fine sandy loam, gravelly sandy loam, fine sandy loam, and sandy loam.

The B horizon has a hue of 5YR, a value of 4 or 5, and a chroma of 4 or 6; a hue of 7.5YR, a value of 5, and a chroma of 6; or a hue of 2.5YR, a value of 4 or 5, and a chroma of 6. The content of gravel ranges from 35 to 65 percent. Texture is very gravelly fine sandy loam, very gravelly sandy clay loam, and very gravelly loam. In most pedons sand grains and pebbles are coated and bridged with clay, and faces of peds have discontinuous clay films.

The C horizon has a hue of 7.5YR, 5YR, or 2.5YR, a value of 4 or 5, and a chroma of 4 or 6. The content of gravel ranges from 35 to 80 percent. Texture is very gravelly loamy sand or very gravelly sandy loam.

Tuckerman series

The Tuckerman series consists of poorly drained, moderately slowly permeable soils that formed in loamy alluvium. These soils are on the lower parts of natural levees. They have a seasonally high water table during winter and early in spring. The native vegetation is hardwood forests. Slope is generally less than 1 percent.

Tuckerman soils are geographically associated with Patterson and Wardell soils. Patterson soils are in depressions of older natural levees, have a coarser texture in the B horizon, and are better drained than Tuckerman soils. Wardell soils are in depressions on natural levees and have a darker colored surface horizon.

Typical pedon of Tuckerman fine sandy loam in a cultivated area in SW1/4NE1/4NW1/4, sec. 23, T. 19 N., R. 4 E.:

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

B1g—8 to 14 inches; gray (10YR 5/1) fine sandy loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; common pores; few fine roots; very strongly acid; clear wavy boundary.

B21tg—14 to 28 inches; gray (10YR 5/1) sandy clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; firm; patchy clay films on faces of peds; common fine pores; common fine roots; few fine dark concretions; very strongly acid; clear wavy boundary.

B22tg—28 to 42 inches; gray (10YR 6/1) sandy clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; patchy clay films on faces of peds; common fine pores; few fine roots; few fine dark concretions; very strongly acid; clear wavy boundary.

B3g—42 to 56 inches; gray (10YR 6/1) loam; common medium distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine dark concretions; strongly acid; gradual wavy boundary.

Cg—56 to 72 inches; gray (10YR 6/1) fine sandy loam; common medium distinct strong brown (7.5YR 5/6) mottles; massive; friable; strongly acid.

Thickness of the solum ranges from 36 to 60 inches. Reaction is strongly acid or medium acid in the A horizon, very strongly acid to medium acid in the B horizon, and strongly acid to neutral in the C horizon.

The A horizon is 5 to 10 inches thick. It has a hue of 10YR, a value of 4 or 5, and a chroma of 2.

The B horizon has a hue of 10YR and either a value of 5 or 6 and a chroma of 1 or a value of 6 and a chroma of 2. It has common medium yellow or brown mottles throughout. The B1 horizon is fine sandy loam or loam, the B2tg is sandy clay loam or loam, and the B3g is fine sandy loam or loam.

The C horizon has a hue of 10YR, a value of 5 or 6, and a chroma of 1 or 2. Texture is fine sandy loam, sandy loam, or loamy fine sand.

Wardell series

The Wardell series consists of poorly drained, slowly permeable soils that are formed in loamy alluvium. These soils are in depressions on natural levees and on old flood plains along abandoned stream channels. They have a seasonally high water table during winter and early in spring. The native vegetation is mixed hardwood forests. Slope is generally less than 1 percent.

Wardell soils are geographically associated with Beulah, Patterson, and Tuckerman soils. Beulah soils are on higher parts of natural levees, are better drained, and have a coarser texture than Wardell soils. Kobel soils are in slack water areas and are finer textured. Like the Wardell soils, Patterson and Tuckerman are also in depressions on natural levees. Patterson soils are better drained and have a coarser texture. Tuckerman soils do not have the dark colored surface horizon that is characteristic of Wardell soils.

Typical pedon of Wardell fine sandy loam in a cultivated area in the NE1/4SE1/4SE1/4, sec. 20, T. 21 N., R. 4 E.:

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; friable; common fine roots; slightly acid; abrupt smooth boundary.

A12—6 to 9 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak medium subangular blocky structure; friable; common fine roots; few medium pores; medium acid; clear smooth boundary.

B1g—9 to 17 inches; dark gray (10YR 4/1) fine sandy loam; weak medium subangular blocky structure; friable; few fine roots; common medium pores; few pockets of light gray sandy loam; medium acid; clear wavy boundary.

B21tg—17 to 31 inches; dark gray (10YR 4/1) sandy clay loam; few fine distinct yellowish brown mottles; moderate medium subangular blocky structure; firm; patchy dark gray clay films on faces of peds and in old root channels; common medium pores; strongly acid; gradual wavy boundary.

B22tg—31 to 46 inches; dark gray (10YR 4/1) sandy clay loam; few fine distinct yellowish brown mottles; moderate medium subangular blocky structure; firm; patchy dark gray clay films on faces of peds and in old root channels; few fine pores; few fine dark concretions; few black stains; slightly acid; gradual wavy boundary.

Cg—46 to 72 inches; dark gray (10YR 4/1) fine sandy loam; common fine; faint gray mottles; massive; friable; few small concretions; mildly alkaline.

Thickness of the solum ranges from about 24 to 48 inches. Reaction is medium acid to neutral in the A horizon, strongly acid to slightly acid in the B horizon, and medium acid to mildly alkaline in the C horizon.

The A horizon is 6 to 9 inches thick. It has a hue of 10YR, a value of 3, and a chroma of 1 to 3.

The B horizon has a hue of 10YR, a value of 4 or 5, and a chroma of 1. Texture is loam, sandy clay loam, or clay loam.

The C horizon has a hue of 10YR, a value of 4 or 5, and a chroma of 1 or 2. Texture is sandy to clayey.

Classification of the soils

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" (*9*).

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 20, 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 preceding 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

In this section, the processes of soil formation are discussed and related to the soils in the survey area.

Factors of soil formation

Soil is a natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

The interaction of five main factors results in differences among the soils. These factors are the physical and chemical compositon of the parent material, the climate during and after the accumulation of the parent material, the kind of plants and organisms living in the soil, the relief of the land and its effect on runoff, and the length of time it took the soil to form.

The effect of a particular factor can differ from place to place, but the interaction of all the factors determines the kind of soil that forms. In the following paragraphs the factors of soil formation are discussed as they relate to the soils in the survey area.

Climate

The climate of Clay County is characterized by mild winters, warm or hot summers, and generally abundant rainfall. The generally warm temperatures and high precipitation probably are similar to the climate under which the soils in the county formed. The average daily maximum temperature at Corning in July is about 92 degrees F, and the average in January is about 47 degrees F. The total annual rainfall is about 46 inches and is well distributed throughout the year. For additional information about the climate, refer to the section "General nature of the county."

The warm, moist climate promotes rapid soil formation, and the warm temperature encourages rapid chemical reactions. The large amount of water that moves through the soils is instrumental in removing dissolved or suspended materials. Because remains of plants decompose rapidly, the organic acids thus formed hasten the formation of clay minerals and the removal of carbonates. Because the soils are frozen only to shallow depths and for short periods, soil formation continues throughout most of the year. The climate throughout the county is uniform, though its effect is modified locally by runoff. Climate alone does not account for differences in the soils of the county.

Living organisms

The higher plants and animals, as well as insects, bacteria, and fungi, are important in the formation of soils. Among the changes they cause are gains and losses in organic matter and nitrogen in the soils, gains or losses in plant nutrients, and changes in structure and porosity.

Before Clay County was settled, the native vegetation probably had more influence on soil formation than did animal activity. Hardwood forests, broken by swamps, and a few canebreaks covered the county. Differences in native vegetation seem to have been related mainly to variations in drainage and, to a lesser degree, parent material. Because the type of vegetation is relatively uniform over the county, differences among the soils cannot be directly related to vegetation.

Man is important to the future rate and direction of soil formation. He clears the forests, cultivates the soils, and introduces new kinds of plants. He adds fertilizer and lime and chemicals for insect, disease, and weed control. Building levees for flood control, improving drainage, and grading the surface of the soil also affect the future development of soils. Results of these changes may not be evident for many centuries. Nevertheless, the complex of living organisms affecting soil formation in this county has been drastically changed by man. Thus, man has become the most important organism affecting soil formation.

Parent material

The soils of Clay County formed in water-deposited alluvium and wind-transported loess.

The alluvium was deposited by the Mississippi River (*4*) when it flowed in the channels now occupied by the Black and Cache Rivers. The alluvium consists of a mixture of minerals washed from the many kinds of soil, rocks, and unconsolidated sediment in about 24 states (*11*). In this great basin, which extends from Montana to Pennsylvania, sedimentary rocks of various kinds are widespread. Other kinds of rock also are exposed in many places and serve as sources of sediment. Large areas of the upper basin are mantled by glacial drift and loess. Consequently, the alluvium consists of many kinds of minerals, most of which are only slightly weathered.

The wide range in texture of alluvium in the county results from the differences in the site of deposition. When a river overflows and spreads over its flood plain, the coarse sediment is deposited in bands roughly parallel to the channel. Thus, low ridges known as natural levees are formed (*11*). On these ridges, Beulah, Bosket, Dexter and Dubbs soils formed. Finer sediment, high in silt, is deposited as the floodwaters spread and lose velocity. This sediment contains some sand and clay. Soils such as Commerce and Dundee and Fountain formed here. When the flood recedes and water is left standing as shallow lakes or swamps, the clay and finer silt settle. The Kobel and Jackport soils formed in this sediment.

This simple pattern of sediment distribution is not now common along the river bottom lands because, through the centuries, the river channel has meandered back and forth across the flood plain. Sometimes the channel has cut out all or parts of natural levees. At other times it has deposited sandy or loamy sediment over slack water clays, or it has deposited slack water clays over sandy or loamy sediment. The natural pattern of sediment distribution from a single channel has been truncated in many places, and more recent beds of alluvium have been superimposed. Parts of former stream channels have been filled and are now wide, flat-bottomed depressions in which Amagon soils formed.

During much of the Pleistocene epoch, the Mississippi River Flood Plain was west of Crowley's Ridge, and the Ohio River flowed on the east side of the ridge (*4*).

Thousands of years ago the wide trough carved west of Crowley's Ridge was partially refilled with sediment by the Mississippi River in much the same manner as the river deposits of recent time were laid down. Finally, the vast complex of alluvial terraces west of the ridge was abandoned by the Mississippi River in favor of the Ohio River channel on the east side of the ridge. The broad, abandoned flood plain was subsequently drained by smaller, more localized streams that occupied former braided channels of the Mississippi River. These smaller streams were inadequate to maintain the entire area as an active flood plain. Those parts of the plain above overflow were progressively mantled with loess-like material or loamy sediment.

The soils on the uplands of the county formed in loess that was deposited during the Pleistocene epoch. This mantle of wind-transported material was deposited over older alluvium. On the uplands the mantle is thick enough so that the sola of most soils formed entirely in loess. Generally, the loess is about 2 to 20 feet thick. It is unstratified and is mainly of silt-size particles. On the level parts of the plain, poorly drained soils, such as Calhoun soils, formed. In the nearly level to gently sloping areas, such moderately well drained and well drained soils as Loring and Memphis soils formed. The somewhat poorly drained Crowley soils formed at intermediate positions between these extremes.

In places are Foley and Bonn soils that formed in soil material containing large amounts of sodium and magnesium.

The loess in Clay County is typical of the loess on the Southern Mississippi Valley Silty Uplands. Most soils formed in the loess are acid, though the content of bases is moderately high.

Relief

Relief is the inequalities in elevation of a land surface. The other soil forming factors are affected by relief through its effect on drainage, runoff, erosion, and percolation of water through the soil. Some of the greatest differences among the soils are due mainly to differences in relief.

The bottom land area of Clay County has relief ranging from broad flats to undulating areas of alternating swales and low ridges. Local differences in relief generally are less than 1 foot on the flats, and range up to 8 feet in the areas of swales and low ridges. In a few areas of minor extent, differences in elevation are as much as 20 feet. The highest elevation in the bottom land area, about 310 feet above sea level, is in the north-central part of the county near McDougal. The lowest elevation, about 225 feet above sea level, is in the southeastern part of the county.

The upland area, or a part of Crowley's Ridge, ranging from 4 to 12 miles wide, traverses the county from the northeastern part to the south-central part. The relief of the uplands is characterized by ridges with narrow, winding tops, short to long side slopes, and narrow valleys between the ridges. Gradient ranges from 1 to 20 percent. The highest point above sea level is about 524 feet, and the lowest is about 300 feet on Crowley's Ridge.

A small area of uplands, of minor extent, is in the extreme northwestern corner of the county.

Time

The length of the time required for formation of a soil depends largely upon other factors of soil formation. Less time generally is required if the climate is warm and humid and the vegetation is luxuriant. If other factors are equal, less time also is required where the parent material is sandy or loamy than where it is clayey. It seems probable that the sediment now forming most of the land surface in Clay County was deposited during and after the advance of the continental glaciers. The last of these glaciers retreated from the North Central States about 11,000 years ago (*5*, *6*).

Thus, in terms of geological time, the soils in Clay County are young. In terms of soil formation, their age varies widely. On the smoother parts of the uplands, the soils are more mature, but on the stronger slopes where geologic erosion has more nearly kept pace with soil formation, the soils have less thick, less strongly developed horizons. On young natural levees and in areas of local alluvium, the soil material has been in place so short a time that the soils show relatively little evidence of development. Many such areas receive fresh deposits of sediment at frequent intervals. In these areas are soils such as Commerce, Collins, and Falaya.

Processes of soil formation

In this subsection a brief definition of the horizon nomenclature and processes responsible for soil formation are given.

The marks that the soil forming factors leave on the soil are recorded in the soil profile, which is a succession of layers or horizons from the surface to the parent material that has been altered but little by soil forming processes. The horizons differ in one or more properties, such as color, texture, structure, consistence, porosity, and reaction.

Most soil profiles contain three major horizons, called A, B, and C. Very young soils do not have a B horizon.

The A horizon is at the surface. Generally, where it is the horizon of maximum accumulation of organic matter, it is called the A1 horizon or the surface layer. A part of the A horizon can also be the horizon of maximum leaching of dissolved or suspended materials. This part is called the A2 horizon or the subsurface layer.

The B horizon lies immediately beneath the A horizon and is called the subsoil. It is the horizon of maximum accumulation of dissolved or suspended materials such as iron and clay. Commonly the B horizon has a blocky structure and is firmer than the horizons immediately above and below it (*10*).

Beneath the B is the C horizon. The C horizon has been affected little by the soil forming processes, although it can be materially modified by weathering. In some young soils the C horizon immediately underlies the A horizon and has been slightly modified by living organisms, as well as by weathering.

Several processes have been active in the formation of soil horizons in the soils of Clay County. Among these processes are: (1) the accumulation of organic matter, (2) the leaching of calcium carbonates and bases, (3) the reduction and transfer of iron, and (4) the formation and translocation of silicate clay minerals. In most of the soils of the county, more than one of these processes has been active in soil formation.

Accumulation of organic matter in the upper part of the profile to form an A1 horizon has been an important process of soil formation. The soils of Clay County range from high to low in content of organic matter.

Leaching of carbonates and bases has occured to some degree in nearly all the soils of Clay County. Among soil scientists, it is generally accepted that bases are leached downward in soils before silicate clay minerals begin to move. Some of the soils are only slightly leached, but most of the soils in the county are moderately leached, an important factor in horizon development.

Reduction and transfer of iron has occurred to a significant degree in the somewhat poorly drained and poorly drained soils of the county. In the naturally wet soils, this process is called gleying. Gray colors in the layers below the surface indicate the reduction and loss of iron. Some horizons contain reddish or yellowish mottles and concretions derived from segregated iron. Gleying is pronounced in many of the soils. Among the strongly gleyed soils are the Amagon, Calhoun, Jackport, and Kobel soils.

In several soils of Clay County, the translocation of clay minerals has contributed to the formation of horizons. In most places the eluviated A2 horizon has been destroyed by cultivation. Where there is an A2 horizon, its structure is blocky to platy, clay content is less than in the lower horizons, and soil material is lighter in color. Generally, clay films have accumulated in pores and on surfaces of peds in the B horizon. The soils were probably leached of carbonates and soluble salts to a great extent before translocation of silicate clay occurred, even though the content of bases is still high in all soils of the county.

Leaching of bases and translocation of silicate clay are among the most important processes in horizon differentiation in the soils of Clay County.

References

(1) American Association of State Highway [and Transportation] Officials. 1970. Standard specifications for highway materials and methods of sampling and testing. Ed. 10, 2 vol., illus.

(2) American Society for Testing and Materials. 1974. Method for classification of soils for engineering purposes. ASTM Stand. D 2487-69. *In* 1974 Annual Book of ASTM Standards, Part 19, 464 pp., illus.

(3) Day, Paul R, and others. 1956. Report of the committee on physical analysis, 1954-1955. Soil Sci. Soc. Am. Proc. 20: 167-169.

(4) Fisk, Harold N. 1944. Geological investigation of the alluvial valley of the lower Mississippi River. U.S. Army, Corps Eng., 78 pp., illus.

(5) Ruhe, Robert V. 1956. Ages and development of soil landscapes in relation to climatic and vegetational changes in Iowa. Soil Sci. Soc. Am. Proc. 20: 264-273, illus.

(6) Ruhe, Robert V. and W.H. Scholtes. 1955. Radiocarbon dates in central Iowa. J. Geol., vol. 63: 82-92, illus.

(7) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus. [Supplements replacing pp. 173-188 issued May 1962]

(8) United States Department of Agriculture. 1967. Soil survey laboratory methods and procedures for collecting soil samples. Soil Surv. Invest. Rep. 1. 50 pp., illus.

(9) United States Department of Agriculture, Soil Conservation Service. 1975. Soil taxonomy: a basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 436, 754 pp., illus.
(10) Winters, Eric and Roy W. Simonson. 1951. The subsoil, Adv. Agron. 3.
(11) Worchester, Phillip G. 1948. A textbook of geomorphology. Ed. 2, 584 pp., illus.

Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

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

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

Area reclaim. An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single mapping unit.

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

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	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.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to frequent flooding.

Broad-base terrace. A ridge-type terrace built to control erosion by diverting runoff along the contour at a nonscouring velocity. The terrace is 10 to 20 inches high and 15 to 30 feet wide and has gently sloping sides, a rounded crown, and a dish-shaped channel along the upper side. It may be nearly level or have a grade toward one or both ends.

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.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Channery soil. A soil, that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

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.

Coarse fragments. Mineral or rock particles up to 3 inches (2 millimeters to 7.5 centimeters) in diameter.

Coarse textured (light textured) soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the bases of steep slopes.

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.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is 40 or 80 inches (1 or 2 meters).

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

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

Delta. An alluvial deposit, commonly triangular in shape, formed largely beneath water and deposited at the mouth of a river or stream.

Depth to rock. Bedrock at a depth that adversely affects the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

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

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically 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."

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by 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.

Excess lime. Excess carbonates. Excessive carbonates, or lime, restrict the growth of some plants.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake. The rapid movement of water into the soil.

Favorable. Favorable soil features for the specified use.

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.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Fine textured (heavy textured) soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 37.5 centimeters) long.

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.

Foot slope. The inclined surface at the base of a hill.

Forage. Plant material used as feed by domestic animals. Forage can be grazed or cut for hay.

Forb. Any herbaceous plant not a grass or a sedge.

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.

Frost action. Freezing and thawing of soil moisture. Frost action can damage structures and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai. Typically, the microrelief of Vertisols—clayey soils having a high coefficient of expansion and contraction with changes in moisture content. Commonly a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope.

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.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material from 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Green manure (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table, which is the upper limit of saturation.

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.

Habitat. The natural abode of a plant or animal; refers to the kind of environment in which a plant or animal normally lives, as opposed to the range or geographical distribution.

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.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered, but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Landslide. The rapid downhill movement of a mass of soil and loose rock generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones. Rock fragments 10 inches (25 centimeters) or more across. Large stones adversely affect the specified use.

Leaching. The removal of soluble material from soil or other material by percolating water.

Light textured soil. Sand and loamy sand.

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.

Munsell notation. A designation of color by degrees of the three single 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.

Low strength. Inadequate strength for supporting loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is greater than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous areas. Areas that have little or no natural soil, are too nearly inaccessible for orderly examination, or cannot otherwise be feasibly classified.

Moderately coarse textured (moderately light textured) soil. Sandy loam and fine sandy loam.

Moderately fine textured (moderately heavy textured) soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material mixed with mineral soil material. The content of organic matter is more than 20 percent.

Munsell notation. A designation of color by degrees of the three single 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.

Narrow-base terrace. A terrace no more than 4 to 8 feet wide at the base. A narrow-base terrace is similar to a broad-base terrace, except for the width of the ridge and channel.

Neutral soil. A soil having a pH value between 6.6 and 7.3.

Nutrient, plant. Any element taken in by a plant, essential to its growth, and used by it in the production of food and tissue. Plant nutrients are nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps other elements obtained from the soil; and carbon, hydrogen, and oxygen obtained largely from the air and water.

Pan. A compact, dense layer in a soil. A pan impedes the movement of water and the growth of roots. The word "pan" is commonly combined with other words that more explicitly indicate the nature of the layer; for example, *hardpan*, *fragipan*, *claypan*, *plowpan*, and *traffic pan*.

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.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly. 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).

Phase, soil. A subdivision of a soil series or other unit in the soil classification system based on differences in the soil that affect its management. A soil series, for example, may be divided into phases on the bases of differences in slope, stoniness, thickness, or some other characterisitc that affects management. These differencees are too small to justify separate series.

pH value. (See Reaction, soil). A numerical designation of acidity and alkalinity in soil.

Piping. Moving water of 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.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents that commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on exposure to repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade, whereas ironstone cannot be cut but can be broken or shattered with a spade. Plinthite is one form of the material that has been called laterite.

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

Polypedon. A volume of soil having properties within the limits of a soil series, the lowest and most homogeneous category of soil taxonomy. A "soil individual."

Poorly graded. Refers to soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets. Surface or subsurface drainage outlets difficult or expensive to install.

Productivity (soil). The capability of a soil for producing a specified plant or sequence of plants under a specified system of management. Productivity is measured in terms of output, or harvest, in relation to input.

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

Range (or rangeland). Land that, for the most part, produces native plants suitable for grazing by livestock; includes land supporting some forest trees.

Range condition. The health or productivity of forage plants on a given range, in terms of the potential productivity under normal climate and the best practical management. Condition classes generally recognized are—*excellent*, *good*, *fair*, and *poor*. The classification is based on the percentage of original, or assumed climax vegetation on a site, as compared to what has been observed to grow on it when well managed.

Range site. An area of range where climate, soil, and relief are sufficiently uniform to produce a distinct kind and amount of native vegetation.

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

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock. Soil scientists regard as soil only the part of the regolith that is modified by organisms and other soil-building forces. Most engineers describe the whole regolith, even to a great depth, as "soil."

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulates over disintegrating rock.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth. Shallow root zone. The soil is shallow over a layer that greatly restricts roots. See Root zone.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged in stream channels from a drainage area. The water that flows off the land surface without sinking in is called surface runoff; that which enters the ground before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Seepage. The rapid movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon.

Series, soil. A group of soils, formed from a particular type of parent material, having horizons that, except for the texture of the A or surface horizon, are similar in all profile characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineralogical and chemical composition.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

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

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake. The slow movement of water into the soil.

Slow refill. The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones. Rock fragments 3 to 10 inches (7.5 to 25 centimeters) in diameter. Small stones adversely affect the specified use.

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* (0.005 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.

Stone line. A concentration of coarse fragments in soils that generally marks an old weathering surface. In a cross section, the line may be one fragment or more thick. The line generally overlies material that weathered in place and marks the top of a paleosol. It is ordinarily overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stratified. Arranged in strata, or layers. The term refers to geologic material. Layers in soils that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates 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.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface 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."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use or management.

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

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea. A stream terrace is frequently called a second bottom, in contrast with a flood plain, and is seldom subject to overflow. A marine terrace, generally wide, was deposited by the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand*, *loamy sand*, *sandy loam*, *loam*, *silt*, *silt loam*, *sandy clay loam*, *clay loam*, *silty clay loam*, *sandy clay*, *silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or " very fine."

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

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil (engineering). Presumably a fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Unstable fill. Risk of caving or sloughing in banks of fill material.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

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.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to a soil or soil material consisting of particles well distributed over a wide range in size or diameter. Such a soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point. (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Illustrations

Figure 1.—Cotton growing on Amagon silt loam in the foreground. Crowley's Ridge is in the background.

Figure 2.—Soil blowing and droughtiness are hazards for soybean crops on Beulah fine sandy loam, undulating.

Figure 3.—Bonn-Foley complex soils have low to medium potential for woodland because of high concentration of sodium in the subsoil and excess water.

Figure 4.—Irrigation of rice on Crowley silt loam. The very slowly permeable subsoil is ideal for rice production.

Figure 5.—Rice growing on Crowley silt loam, a soil well suited to this crop.

Figure 6.—Cotton ready for harvest on Dexter silt loam, gently undulating.

Figure 7.—Falaya silt loam has high potential for growing trees.

Figure 8.—A good stand of soybeans growing on Foley silt loam.

Figure 9.—Grain sorghum ready for harvest on Fountain silt loam.

Figure 10.—Rice nearly ready for harvest on Jackport silty clay.

Figure 11.—Kobel soils, frequently flooded, are covered with water several months most years. Note water mark on the tree trunk.

Figure 12.—Loring silt loam has high potential for pastures.

Tables

TABLE 1.--ACREAGE OF PRINCIPAL CROPS IN STATED YEARS

Crops	Acres in 1964	Acres in 1969
Soybeans (for beans)	137,975	162,642
Cotton	37,753	35,558
Wheat for grain	28,772	16,821
Other small grain (includes rice)	9,529	10,659
Corn (for all purposes)	12,304	5,567
Sorghum (for all purposes except sirup)	2,059	15,246
Hay (excluding sorghum hay)[1]	4,800	3,284
Pasture and rangeland[1]	13,346	7,499

[1]Excludes hay and pasture acreage on levees.

TABLE 2.--NUMBER OF LIVESTOCK IN STATED YEARS

Livestock	1964	1969
All cattle and calves	18,408	13,382
Milk cows	809	379
Hogs and pigs	10,492	14,917
Chickens[1]	91,643	107,250

[1]More than 3 months old.

TABLE 3.--TEMPERATURE AND PRECIPITATION DATA

Month	Temperature[1]						Precipitation[1]				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[2]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- 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----	46.8	27.2	37.0	72	2	0	3.99	1.79	5.77	6	2.2
February---	51.3	30.5	40.9	74	6	18	3.51	2.11	4.75	6	2.3
March------	60.1	38.3	49.2	83	15	145	4.63	2.46	6.39	7	2.0
April------	72.5	49.0	60.8	89	28	330	4.51	2.56	6.09	8	0
May--------	81.0	57.3	69.2	94	36	595	5.48	3.02	7.48	7	0
June-------	89.2	65.3	77.3	101	49	819	3.06	1.52	4.31	5	0
July-------	92.2	68.7	80.5	102	53	946	3.96	2.02	5.54	6	0
August-----	90.9	66.4	78.7	102	52	890	3.04	1.30	4.46	5	0
September--	84.0	59.4	71.7	98	40	651	3.70	1.36	5.57	5	0
October----	74.4	47.5	61.0	92	27	351	2.44	.81	3.74	4	0
November---	60.2	37.4	48.8	81	16	76	4.28	2.08	6.07	5	.6
December---	49.4	30.6	40.1	72	7	22	3.81	2.01	5.27	6	1.1
Year-----	71.0	48.1	59.6	104	0	4,843	46.41	38.15	54.24	70	8.2

[1]Recorded in the period 1951-74 at Corning, Ark.
[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 4.--FREEZE DATES IN SPRING AND FALL

Probability	Temperature[1]		
	24 F or lower	28 F or lower	32 F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 30	April 12	April 17
2 years in 10 later than--	March 24	April 6	April 13
5 years in 10 later than--	March 11	March 26	April 4
First freezing temperature in fall:			
1 year in 10 earlier than--	October 31	October 26	October 11
2 years in 10 earlier than--	November 6	October 30	October 15
5 years in 10 earlier than--	November 16	November 7	October 25

[1]Recorded in the period 1951-74 at Corning, Ark.

TABLE 5.--GROWING SEASON LENGTH

Probability	Daily minimum temperature during growing season[1]		
	Higher than 24 F	Higher than 28 F	Higher than 32 F
	Days	Days	Days
9 years in 10	224	205	185
8 years in 10	233	212	191
5 years in 10	250	225	203
2 years in 10	267	238	215
1 year in 10	276	244	221

[1]Recorded in the period 1951-74 at Corning, Ark.

TABLE 6.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
10	Amagon silt loam	27,020	6.6
11	Amagon soils, frequently flooded	10,430	2.5
12	Beulah fine sandy loam, gently undulating	6,680	1.6
13	Beulah fine sandy loam, undulating	2,550	0.6
14	Bonn-Foley complex	10,120	2.5
15	Bosket fine sandy loam, gently undulating	7,130	1.7
16	Bosket fine sandy loam, undulating	2,120	0.5
17	Brandon silt loam, 8 to 12 percent slopes	1,490	0.4
18	Brandon-Saffell association, moderately steep	22,440	5.5
19	Calhoun silt loam	1,840	0.5
20	Collins silt loam, occasionally flooded	18,740	4.6
21	Commerce soils, frequently flooded	6,320	1.5
22	Crowley silt loam	26,570	6.5
23	Dexter silt loam, gently undulating	13,790	3.4
24	Dubbs very fine sandy loam	1,170	0.3
25	Dundee silt loam	14,530	3.6
26	Falaya silt loam	25,710	6.3
27	Foley silt loam	48,050	11.7
28	Fountain silt loam	31,120	7.6
29	Jackport silty clay	26,930	6.6
30	Kobel silty clay	17,370	4.2
31	Kobel soils, frequently flooded	18,200	4.5
32	Loring silt loam, 1 to 3 percent slopes	1,190	0.3
33	Loring silt loam, 3 to 8 percent slopes	8,370	2.0
34	Loring silt loam, 8 to 12 percent slopes, eroded	25,038	6.1
35	Memphis association, moderately steep	9,240	2.3
36	Patterson fine sandy loam	9,800	2.4
37	Tuckerman fine sandy loam	1,810	0.4
38	Wardell fine sandy loam	11,700	2.9
	Water	1,620	0.4
	Total	409,088	100.0

TABLE 7.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. The estimates were made in 1975. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Cotton lint	Soybeans	Rice	Wheat	Bahiagrass	Common bermuda-grass	Tall fescue
	Lb	Bu	Bu	Bu	AUM[1]	AUM[1]	AUM[1]
Amagon:							
10	650	35	120	---	---	7.5	9.0
[2]11	---	---	---	---	---	7.5	9.0
Beulah:							
12	600	35	---	45	---	---	7.0
13	550	30	---	45	---	---	7.0
Bonn:							
[2]14	---	---	---	---	---	---	---
Bosket:							
15	750	35	---	50	---	10.0	9.0
16	650	35	---	45	---	10.0	9.0
Brandon:							
17	---	25	---	30	---	---	---
[2]18:							
Brandon part	---	---	---	---	---	---	---
Saffell part	---	---	---	---	4.0	3.0	---
Calhoun:							
19	400	25	120	---	6.5	5.0	---
Collins:							
20	800	40	---	40	---	---	10.0
Commerce:							
[2]21	---	---	---	---	---	---	---
Crowley:							
22	475	30	130	---	7.5	5.5	---
Dexter:							
23	700	35	---	---	9.0	7.0	---
Dubbs:							
24	850	40	---	45	---	---	10.0
Dundee:							
25	750	40	---	---	---	---	9.0
Falaya:							
26	750	40	---	36	8.0	10.5	8.5
Foley:							
27	650	30	120	40	---	6.0	8.0
Fountain:							
28	---	30	---	---	8.0	7.0	---
Jackport:							
29	550	35	130	---	---	7.0	8.0
Kobel:							
30	550	40	---	---	---	---	9.0
[2]31	---	---	---	---	---	---	---
Loring:							
32	700	30	---	40	---	---	---

See footnotes at end of table

TABLE 7.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Cotton lint	Soybeans	Rice	Wheat	Bahiagrass	Common bermuda-grass	Tall fescue
	Lb	Bu	Bu	Bu	AUM[1]	AUM[1]	AUM[1]
Loring:							
33	650	25	---	35	---	---	---
34	500	20	---	30	---	---	---
Memphis:							
[2]35	---	---	---	---	---	---	---
Patterson:							
36	550	30	---	30	---	---	---
Tuckerman:							
37	700	30	---	---	---	7.5	9.0
Wardell:							
38	700	30	---	---	---	7.5	9.0

[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 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 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed in this table. Absence of an entry indicates that information was not available]

Soil name and map symbol	Woodland suitability group	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Important trees	Potential productivity: Site index	Trees to plant
Amagon:							
10, [1]11	1w6	Slight	Severe	Moderate	Eastern cottonwood	100	Eastern cottonwood, cherrybark oak, Nuttall oak, Shumard oak, water oak, willow oak, sweetgum, American sycamore.
					Water oak	100	
					Willow oak	100	
					Cherrybark oak	90	
					Nuttall oak	100	
					Green ash	80	
					Sweetgum	100	
Beulah:							
12, 13	2o4	Slight	Slight	Slight	Eastern cottonwood	100	Eastern cottonwood, cherrybark oak, Nuttall oak, Shumard oak, water oak, willow oak, American sycamore, black walnut.
					Cherrybark oak	90	
					Nuttall oak	90	
					Water oak	90	
					Willow oak	---	
					American sycamore	---	
Bonn:							
[1]14:							
Bonn part.							
Foley part	3w9	Slight	Severe	Moderate	Sweetgum	80	Sweetgum, American sycamore, loblolly pine.
					Cherrybark oak	80	
					Water oak	80	
					Loblolly pine	60	
Bosket:							
15, 16	2o4	Slight	Slight	Slight	Eastern cottonwood	100	Eastern cottonwood, green ash, sweetgum, cherrybark oak, water oak, willow oak, Shumard oak, American sycamore, black walnut.
					Green ash	80	
					Sweetgum	90	
					Cherrybark oak	90	
					Water oak	90	
					Willow oak	90	
Brandon:							
17	3o7	Slight	Slight	Slight	Northern red oak	69	Shortleaf pine, loblolly pine.
					Shortleaf pine	70	
					Loblolly pine	80	
[1]18:							
Brandon part	3r7	Moderate	Moderate	Slight	Northern red oak	69	Shortleaf pine, loblolly pine.
					Shortleaf pine	70	
					Loblolly pine	80	
Saffell part	4f7	Slight	Slight	Moderate	Loblolly pine	70	Loblolly pine, shortleaf pine, eastern redcedar.
					Shortleaf pine	60	
					Eastern redcedar	---	
Calhoun:							
19	3w9	Slight	Severe	Moderate	Loblolly pine	84	Loblolly pine.
					Shortleaf pine	---	
					Sweetgum	---	
					Water oak	---	
					Willow oak	---	
Collins:							
20	1o7	Slight	Slight	Slight	Green ash	95	Green ash, eastern cottonwood, cherrybark oak, Shumard oak, black walnut.
					Eastern cottonwood	115	
					Cherrybark oak	110	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Woodland suitability group	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Important trees	Potential productivity: Site index	Trees to plant
Commerce:							
[1]21	1w5	Slight	Moderate	Slight	Green ash	80	Eastern cottonwood, American sycamore.
					Eastern cottonwood	105	
					Nuttall oak	90	
					Water oak	110	
					Pecan	---	
					American sycamore	---	
Crowley:							
22	3w9	Slight	Severe	Moderate	Loblolly pine	80	Loblolly pine.
					Shortleaf pine		
					Willow oak		
Dexter:							
23	2o4	Slight	Slight	Slight	Loblolly pine	90	Loblolly pine, eastern cottonwood, cherrybark oak, Nuttall oak, sweetgum, willow oak.
					Eastern cottonwood	100	
					Cherrybark oak	90	
					Nuttall oak	90	
					Sweetgum	90	
					Willow oak	90	
Dubbs:							
24	2o4	Slight	Slight	Slight	Cherrybark oak	100	Eastern cottonwood, green ash, Nuttall oak, sweetgum, American sycamore, yellow-poplar, black walnut.
					Eastern cottonwood	100	
					Green ash	80	
					Nuttall oak	95	
					Shumard oak	100	
					Sweetgum	95	
					Water oak	90	
					Willow oak	95	
Dundee:							
25	2w5	Slight	Moderate	Slight	Cherrybark oak	105	Cherrybark oak, eastern cottonwood, sweetgum, water oak.
					Eastern cottonwood	100	
					Sweetgum	100	
					Water oak	95	
Falaya:							
26	1w8	Slight	Moderate	Slight	Green ash	92	Green ash, eastern cottonwood, cherrybark oak, Nuttall oak, sweetgum, yellow-poplar.
					Eastern cottonwood	100	
					Cherrybark oak	102	
					Nuttall oak	109	
					Water oak	102	
					Loblolly pine	104	
Foley:							
27	3w9	Slight	Severe	Moderate	Sweetgum	80	Sweetgum, loblolly pine.
					Cherrybark oak	80	
					Water oak	80	
					Loblolly pine	60	
Fountain:							
28	2w9	Slight	Severe	Moderate	Sweetgum	---	Sweetgum, loblolly pine.
					Water oak	---	
					Loblolly pine	90	
Jackport:							
29	2w6	Slight	Severe	Moderate	Green ash	80	Green ash, eastern cottonwood, Nuttall oak, willow oak, sweetgum, American sycamore.
					Cherrybark oak	90	
					Water oak	90	
					Willow oak	90	
					Sweetgum	90	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Woodland suitability group	Management concerns			Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Important trees	Site index	
Kobel:							
30	2w6	Slight	Severe	Moderate	Green ash	85	Eastern cottonwood,
					Eastern cottonwood	100	American sycamore,
					Cherrybark oak	90	sweetgum,
					Sweetgum	90	Nuttall oak.
					Water oak	90	
					Pecan	---	
					American sycamore	---	
					Nuttall oak	---	
[1]31	3w6	Slight	Severe	Severe	Green ash	75	Eastern cottonwood,
					Eastern cottonwood	90	sweetgum.
					Water oak	80	
					Water hickory	---	
Loring:							
32, 33, 34	3o7	Slight	Slight	Slight	Cherrybark oak	85	Loblolly pine,
					Sweetgum	90	yellow-poplar,
					Southern red oak	75	southern red oak.
					Loblolly pine	85	
					Water oak	80	
Memphis:							
[1]35	2r8	Slight	Slight	Slight	Cherrybark oak	90	Cherrybark oak,
					Loblolly pine	90	loblolly pine,
					Sweetgum	90	sweetgum,
					Water oak	90	yellow-poplar.
Patterson:							
36	2s5	Slight	Moderate	Moderate	Green ash	70	Green ash,
					Cherrybark oak	95	cherrybark oak,
					Nuttall oak	85	Nuttall oak,
					Water oak	85	water oak,
					Willow oak	90	willow oak,
					Sweetgum	90	sweetgum,
							American sycamore,
							yellow-poplar.
Tuckerman:							
37	1w6	Slight	Severe	Moderate	Green ash	80	Green ash,
					Eastern cottonwood	100	eastern cottonwood,
					Cherrybark oak	95	sweetgum,
					Nuttall oak	95	American sycamore,
					Water oak	95	cherrybark oak,
					Willow oak	95	Nuttall oak,
					Sweetgum	---	water oak,
							willow oak.
Wardell:							
38	1w6	Slight	Severe	Moderate	Eastern cottonwood	90	Eastern cottonwood,
					Nuttall oak	---	pin oak,
					Willow oak	---	American sycamore,
							river birch,
							water oak,
							sweetgum.

[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

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
Amagon:					
10	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, low strength.
[1]11	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods, low strength.
Beulah:					
12	Severe: cutbanks cave, too sandy.	Slight	Slight	Slight	Slight.
13	Severe: cutbanks cave, too sandy.	Slight	Slight	Moderate: slope.	Slight.
Bonn:					
[1]14:					
Bonn part	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Foley part	Severe: wetness.	Severe: floods, wetness, low strength.	Severe: floods, wetness, low strength.	Severe: floods, wetness, low strength.	Severe: wetness, low strength.
Bosket:					
15	Slight	Slight	Slight	Slight	Moderate: low strength.
16	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength.
Brandon:					
17	Moderate: small stones.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength.
[1]18:					
Brandon part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Saffell part	Severe: slope, small stones.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Calhoun:					
19	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Collins:					
20	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
Commerce:					
[1]21	Severe: floods, wetness.	Severe: floods.	Severe: floods, wetness.	Severe: floods.	Severe: floods.

See footnote at end of table.

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
Crowley:					
22	Severe: wetness, too clayey.	Severe: shrink-swell, low strength, wetness.	Severe: shrink-swell, low strength, wetness.	Severe: shrink-swell, low strength, wetness.	Severe: low strength, shrink-swell.
Dexter:					
23	Slight	Slight	Slight	Slight	Moderate: low strength.
Dubbs:					
24	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.
Dundee:					
25	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.
Falaya:					
26	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
Foley:					
27	Severe: wetness.	Severe: floods, wetness, low strength.	Severe: floods, wetness, low strength.	Severe: floods, wetness, low strength.	Severe: wetness, low strength.
Fountain:					
28	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Jackport:					
29	Severe: wetness, too clayey.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.
Kobel:					
30	Severe: wetness, too clayey.	Severe: wetness, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.
[1]31	Severe: floods, wetness, too clayey.	Severe: floods, wetness, shrink-swell.	Severe: floods, wetness, shrink-swell.	Severe: floods, wetness, shrink-swell.	Severe: floods, wetness, shrink-swell.
Loring:					
32	Moderate: low strength, wetness.	Moderate: low strength.	Moderate: low strength.	Moderate: low strength.	Moderate: low strength.
33	Moderate: low strength, wetness.	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Moderate: low strength.
34	Moderate: slope, wetness, low strength.	Moderate: slope, low strength.	Moderate: slope, low strength.	Severe: slope.	Moderate: slope, low strength.
Memphis:					
[1]35	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

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
Patterson:					
36	Severe: wetness, too sandy, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.
Tuckerman:					
37	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Wardell:					
38	Severe: wetness.	Severe: wetness, floods, shrink-swell.	Severe: wetness, floods, shrink-swell.	Severe: wetness, floods, shrink-swell.	Severe: wetness, shrink-swell.

[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

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," and "fair." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Amagon:					
10	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
[1]11	Severe: wetness, percs slowly, floods.	Severe: floods.	Severe: wetness, floods.	Severe: wetness, floods.	Poor: wetness.
Beulah:					
12, 13	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Fair: thin layer, too sandy.
Bonn:					
[1]14:					
Bonn part	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Foley part	Severe: wetness, percs slowly.	Severe: floods.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Bosket:					
15, 16	Slight	Moderate: slope, seepage.	Severe: seepage.	Slight	Good.
Brandon:					
17	Moderate: slope.	Severe: slope.	Severe: seepage.	Severe: seepage.	Fair: thin layer.
[1]18:					
Brandon part	Severe: slope.	Severe: slope.	Severe: seepage.	Severe: slope.	Poor: slope.
Saffell part	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope, small stones.
Calhoun:					
19	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Collins:					
20	Severe: floods.	Severe: floods, seepage.	Severe: floods.	Severe: floods.	Good.
Commerce:					
[1]21	Severe: floods, percs slowly, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Fair: too clayey.
Crowley:					
22	Severe: percs slowly, wetness.	Slight	Severe: too clayey, wetness.	Severe: wetness.	Poor: too clayey.
Dexter:					
23	Slight	Moderate: seepage.	Slight	Slight	Good.

See footnote at end of table.

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
Dubbs:					
24	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Fair: too clayey.
Dundee:					
25	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey.
Falaya:					
26	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: wetness.
Foley:					
27	Severe: wetness, percs slowly.	Severe: floods.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Fountain:					
28	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Jackport:					
29	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: wetness, too clayey.
Kobel:					
30	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, wetness.
[1]31	Severe: floods, wetness, percs slowly.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: too clayey, wetness.
Loring:					
32, 33	Severe: percs slowly.	Moderate: slope.	Slight	Slight	Good.
34	Severe: percs slowly.	Severe: slope.	Slight	Moderate: slope.	Fair: slope.
Memphis:					
[1]35	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope.
Patterson:					
36	Severe: wetness.	Severe: seepage.	Severe: wetness, seepage, too sandy.	Severe: wetness, seepage.	Fair: thin layer.
Tuckerman:					
37	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
Wardell:					
38	Severe: wetness, percs slowly.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness.	Poor: wetness.

[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

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Amagon:				
10, [1]11	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
Beulah:				
12, 13	Good	Poor: excess fines.	Unsuited: excess fines.	Good.
Bonn:				
[1]14:				
Bonn part	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness, excess sodium.
Foley part	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness, area reclaim.
Bosket:				
15, 16	Fair: low strength.	Poor: excess fines.	Unsuited: excess fines.	Good.
Brandon:				
17	Fair: low strength.	Unsuited: excess fines.	Poor: excess fines.	Fair: slope.
[1]18:				
Brandon part	Fair: low strength.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope.
Saffell part	Fair: slope.	Poor: excess fines.	Fair: excess fines.	Poor: slope, small stones.
Calhoun:				
19	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
Collins:				
20	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Commerce:				
[1]21	Fair: low strength, shrink-swell, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Crowley:				
22	Poor: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, wetness.
Dexter:				
23	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
Dubbs:				
24	Fair: shrink-swell, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, too clayey.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Dundee:				
25	Fair: wetness, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
Falaya:				
26	Fair: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Foley:				
27	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness, area reclaim.
Fountain:				
28	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
Jackport:				
29	Poor: wetness, low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness, too clayey.
Kobel:				
30, [1]31	Poor: wetness, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey, wetness.
Loring:				
32, 33, 34	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Memphis:				
[1]35	Fair: low strength, slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Patterson:				
36	Fair: wetness.	Poor: excess fines.	Unsuited: excess fines.	Good.
Tuckerman:				
37	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
Wardell:				
38	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.

[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

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
Amagon:						
10, [1]11	Slight	Moderate: unstable fill, compressible, low strength.	Percs slowly, wetness.	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Beulah:						
12, 13	Severe: seepage.	Severe: seepage, piping.	Not needed	Complex slope, droughty, fast intake.	Complex slope, too sandy.	Droughty, slope.
Bonn:						
[1]14:						
Bonn part	Slight	Moderate: piping, erodes easily, excess sodium.	Cutbanks cave, percs slowly, excess sodium.	Droughty, excess sodium, wetness.	Not needed	Droughty, erodes easily, excess sodium.
Foley part	Slight	Moderate: unstable fill, compressible, low strength.	Wetness, percs slowly.	Wetness, slow intake.	Wetness	Wetness.
Bosket:						
15, 16	Severe: seepage.	Moderate: piping, unstable fill.	Not needed	Complex slope, erodes easily, slope.	Erodes easily, slope.	Erodes easily, slope.
Brandon:						
17	Moderate: seepage, slope.	Moserate: seepage, piping, low strength.	Not needed	Slope, erodes easily, seepage.	Slope, erodes easily, piping.	Slope, erodes easily.
[1]18:						
Brandon part	Moderate: seepage, slope.	Moderate: seepage, piping, low strength.	Not needed	Slope, erodes easily, seepage.	Slope, erodes easily, piping.	Slope, erodes easily.
Saffell part	Moderate: seepage.	Moderate: seepage, piping, thin layer.	Not needed	Droughty, fast intake, seepage.	Erodes easily, piping, slope.	Droughty, erodes easily, slope.
Calhoun:						
19	Slight	Moderate: piping, erodes easily, low strength.	Percs slowly, cutbanks cave.	Wetness, percs slowly.	Not needed	Wetness.
Collins:						
20	Moderate: seepage.	Moderate: piping, unstable fill.	Cutbanks cave, floods.	Erodes easily, floods.	Erodes easily, piping.	Erodes easily.
Commerce:						
[1]21	Moderate: seepage.	Slight	Floods	Floods	Not needed	Favorable.
Crowley:						
22	Slight	Moderate: compressible, low strength.	Percs slowly	Slow intake, percs slowly.	Not needed	Favorable.

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	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
Dexter:						
23	Moderate: seepage.	Slight	Not needed	Slope, erodes easily.	Erodes easily	Favorable.
Dubbs:						
24	Moderate: seepage.	Moderate: compressible, piping, unstable fill.	Not needed	Slow intake	Slope, erodes easily.	Favorable.
Dundee:						
25	Moderate: seepage.	Moderate: seepage, compressible, piping.	Favorable	Wetness, slow intake.	Not needed	Wetness, percs slowly.
Falaya:						
26	Moderate: seepage.	Moderate: compressible, piping.	Floods, cutbanks cave.	Favorable	Not needed	Not needed.
Foley:						
27	Slight	Moderate: unstable fill, compressible, low strength.	Wetness, percs slowly.	Wetness, slow intake.	Wetness	Wetness.
Fountain:						
28	Slight	Slight	Favorable	Wetness	Not needed	Wetness.
Jackport:						
29	Slight	Moderate: unstable fill, compressible, low strength.	Wetness, percs slowly.	Slow intake, wetness.	Wetness	Wetness.
Kobel:						
30	Slight	Moderate: low strength, shrink-swell, compressible.	Percs slowly, poor outlets.	Slow intake, wetness.	Wetness, percs slowly.	Wetness, percs slowly.
[1]31	Slight	Moderate: low strength, shrink-swell, compressible.	Floods, percs slowly.	Floods, wetness, slow intake.	Wetness, percs slowly.	Wetness, percs slowly.
Loring:						
32, 33, 34	Moderate: seepage.	Moderate: piping, low strength.	Not needed	Rooting depth, erodes easily, slope.	Erodes easily, slope.	Rooting depth, erodes easily, slope.
Memphis:						
[1]35	Moderate: seepage.	Moderate: piping, compressible, erodes easily.	Not needed	Erodes easily, slope.	Erodes easily, slope, piping.	Erodes easily, slope.
Patterson:						
36	Severe: seepage.	Severe: seepage, piping.	Cutbanks cave, wetness.	Favorable	Not needed	Not needed.
Tuckerman:						
37	Moderate: seepage.	Moderate: unstable fill, piping, compressible.	Cutbanks cave, wetness.	Wetness	Wetness, piping.	Wetness.
Wardell:						
38	Moderate: seepage.	Moderate: unstable fill, piping, compressible.	Wetness, poor outlets, percs slowly.	Slow intake, wetness.	Wetness, piping.	Wetness.

[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

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Amagon:				
10, [1]11	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Beulah:				
12	Slight	Slight	Slight	Slight.
13	Slight	Slight	Moderate: slope.	Slight.
Bonn:				
[1]14:				
Bonn part	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, percs slowly.	Severe: wetness.
Foley part	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, percs slowly.	Severe: wetness.
Bosket:				
15	Slight	Slight	Slight	Slight.
16	Slight	Slight	Moderate: slope.	Slight.
Brandon:				
17	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
[1]18:				
Brandon part	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Saffell part	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: small stones, slope.
Calhoun:				
19	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Collins:				
20	Severe: floods.	Moderate: floods.	Moderate: floods.	Slight.
Commerce:				
[1]21	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
Crowley:				
22	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, percs slowly.	Severe: wetness.
Dexter:				
23	Slight	Slight	Slight	Slight.
Dubbs:				
24	Slight	Slight	Slight	Slight.
Dundee:				
25	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, percs slowly.	Moderate: wetness.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Falaya:				
26	Severe: floods, wetness.	Moderate: floods, wetness.	Severe: floods, wetness.	Moderate: floods, wetness.
Foley:				
27	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, percs slowly.	Severe: wetness.
Fountain:				
28	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Jackport:				
29	Severe: wetness, percs slowly, too clayey.	Severe: wetness, too clayey	Severe: wetness, percs slowly, too clayey.	Severe: wetness, too clayey.
Kobel:				
30	Severe: wetness, percs slowly, too clayey.	Severe: wetness, too clayey	Severe: wetness, too clayey, percs slowly.	Severe: wetness, too clayey.
[1]31	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
Loring:				
32, 33	Slight	Slight	Moderate: slope.	Slight.
34	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Memphis:				
[1]35	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Patterson:				
36	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Tuckerman:				
37	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Wardell:				
38	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

[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 14.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
Amagon:												
10, [1]11	Fair	Fair	Fair	Fair	Fair	---	Good	Good	Fair	Fair	Good	---
Beulah:												
12, 13	Fair	Fair	Fair	Good	Poor	---	Very poor.	Very poor.	Fair	Good	Very poor.	---
Bonn:												
[1]14:												
Bonn part	Poor	Poor	Poor	Poor	---	---	Poor	Good	Poor	Poor	Fair	---
Foley part	Fair	Fair	Fair	Fair	Fair	---	Good	Good	Fair	Fair	Good	---
Bosket:												
15	Good	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.	---
16	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.	---
Brandon:												
17	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.	---
[1]18:												
Brandon part	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.	---
Saffell part	Poor	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.	---
Calhoun:												
19	Poor	Fair	Good	Good	---	---	Good	Good	Fair	Fair	Good	---
Collins:												
20	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor	---
Commerce:												
[1]21	Poor	Fair	Fair	Good	---	---	Fair	Fair	Fair	Good	Fair	---
Crowley:												
22	Fair	Fair	Fair	Fair	---	---	Good	Good	Fair	Fair	Good	---
Dexter:												
23	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.	---
Dubbs:												
24	Good	Good	Good	Good	---	---	Poor	Very poor	Good	Good	Very poor.	---
Dundee:												
25	Fair	Good	Good	Good	---	---	Fair	Fair	Good	Good	Fair	---
Falaya:												
26	Fair	Good	Good	Good	Good	---	Fair	Fair	Good	Good	Fair	---
Foley:												
27	Fair	Fair	Fair	Fair	Fair	---	Good	Good	Fair	Fair	Good	---
Fountain:												
28	Fair	Fair	Good	Good	---	---	Good	Good	Fair	Good	Good	---

See footnote at end of table.

TABLE 14.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
Jackport:												
29	Fair	Fair	Fair	Fair	---	---	Good	Good	Fair	Fair	Good	---
Kobel:												
30	Fair	Fair	Fair	Fair	---	---	Good	Good	Fair	Fair	Good	---
[1]31	Poor	Fair	Fair	Fair	---	---	Good	Good	Fair	Fair	Good	---
Loring:												
32	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.	---
33, 34	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.	---
Memphis:												
[1]35	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.	---
Patterson:												
36	Fair	Good	Good	Good	Good	---	Fair	Poor	Good	Good	Poor	---
Tuckerman:												
37	Fair	Fair	Fair	Fair	---	---	Good	Fair	Fair	Fair	Fair	---
Wardell:												
38	Fair	Fair	Fair	Fair	Fair	---	Good	Good	Fair	Fair	Good	---

[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 more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Amagon:											
10, [1]11	0-6	Silt loam	ML, CL, CL-ML	A-4	0	---	100	85-100	85-100	<30	NP-10
	6-25	Silt loam	CL, CL-ML	A-4, A-6	0	---	100	85-100	85-100	25-40	7-18
	25-44	Silt loam, silty clay loam.	CL	A-6, A-7	0	---	100	85-100	85-100	30-45	11-22
	44-72	Silt loam, loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	---	100	80-100	60-100	20-45	1-22
Beulah:											
12, 13	0-7	Fine sandy loam	SM	A-2, A-4	0	100	100	75-100	25-45	---	NP
	7-39	Fine sandy loam, very fine sandy loam, loam.	SM, ML	A-2, A-4	0	100	100	85-100	25-60	---	NP
	39-72	Loamy sand, loamy fine sand, fine sandy loam.	SM	A-2, A-4	0	100	100	65-100	15-45	---	NP
Bonn:											
[1]14:											
Bonn part	0-4	Silt loam	ML, CL-ML	A-4	0	100	100	95-100	75-100	20-30	2-7
	4-38	Silt loam, silty clay loam.	CL	A-6	0	95-100	90-100	85-100	65-100	30-40	12-22
	38-72	Silt loam, silty clay loam.	CL	A-6, A-4	0	100	95-100	90-100	75-100	28-38	8-18
Foley part	0-10	Silt loam	ML, CL, CL-ML	A-4, A-5, A-6, A-7	0	100	100	95-100	70-100	25-45	3-20
	10-16	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	90-100	30-49	11-25
	16-54	Silty clay loam, silt loam.	CL, CH	A-6, A-7	0	100	100	95-100	90-100	40-60	18-32
	54-72	Silt loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-45	11-20
Bosket:											
15, 16	0-18	Fine sandy loam	SM	A-2, A-4	0	100	100	75-100	25-45	<20	NP-3
	18-42	Sandy clay loam, clay loam, fine sandy loam.	SC, SM-SC, CL, CL-ML	A-2, A-4	0	100	100	85-100	30-70	25-40	5-17
	42-72	Fine sandy loam, loamy fine sand.	SM	A-2, A-4	0	100	100	75-100	25-45	<20	NP-3
Brandon:											
17	0-9	Silt loam	ML, CL, CL-ML	A-4	0	100	95-100	90-100	85-100	<30	NP-10
	9-50	Silty clay loam, silt loam.	CL, ML, CL-ML	A-4, A-6	0	95-100	90-100	85-100	75-100	25-40	3-15
	50-72	Very gravelly fine sandy loam, very gravelly silt loam, gravelly loam.	GM, GC, GM-GC	A-2, A-4, A-1	0-5	30-70	20-60	15-55	10-50	<30	NP-10

See footnote at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Brandon:											
[1]18:											
Brandon part	0-9	Silt loam	ML, CL, CL-ML	A-4	0	100	95-100	90-100	85-100	<30	NP-10
	9-50	Silty clay loam, silt loam.	CL, ML, CL-ML	A-4, A-6	0	95-100	90-100	85-100	75-100	25-40	3-15
	50-72	Very gravelly fine sandy loam, very gravelly silt loam, gravelly loam.	GM, GC, GM-GC	A-2, A-4, A-1	0-5	30-70	20-60	15-55	10-50	<30	NP-10
Saffell part	0-10	Gravelly fine sandy loam.	GM, SM	A-1, A-2, A-4	0-5	55-85	50-80	35-70	20-45	<20	NP-3
	10-41	Very gravelly fine sandy loam, very gravelly sandy clay loam.	GC, SC, SM-SC, GM-GC	A-2, A-1	0-15	35-85	25-70	20-55	15-35	20-40	4-18
	41-72	Very gravelly sandy loam, very gravelly loamy sand, very gravelly loam.	GC, SC, SM-SC, GM-GC	A-2, A-1	0-15	35-85	25-70	20-55	15-35	20-40	4-18
Calhoun:											
19	0-14	Silt loam	CL-ML, ML, CL	A-4	0	100	100	100	95-100	<31	NP-10
	14-37	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	95-100	30-45	11-24
	37-72	Silt loam	CL, CL-ML	A-6, A-4	0	100	100	100	90-100	25-40	5-20
Collins:											
20	0-6	Silt loam	ML, CL-ML	A-4	0	100	100	100	80-100	<30	NP-7
	6-72	Silt loam	ML, CL-ML	A-4	0	100	100	100	90-100	<30	NP-7
Commerce:											
[1]21	0-8	Silt loam	CL-ML, CL, ML	A-4	0	100	100	100	75-100	<30	NP-10
	8-30	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	85-100	32-45	11-23
	30-72	Stratified fine sandy loam to silty clay loam.	CL-ML, CL, ML	A-4, A-6, A-7	0	100	100	100	75-100	23-45	3-23
Crowley:											
22	0-15	Silt loam	ML, CL-ML, CL	A-4	0	100	100	95-100	80-100	<30	NP-10
	15-32	Silty clay, silty clay loam.	CH, CL	A-7	0	100	100	95-100	85-100	41-60	20-35
	32-72	Silty clay loam, silty clay.	CL, CH	A-6, A-7	0	100	100	95-100	85-100	38-60	18-35
Dexter:											
23	0-7	Silt loam	ML, SM, CL-ML, SM-SC	A-4	0	100	100	85-100	45-75	<25	NP-4
	7-40	Silty clay loam, clay loam, silt loam.	CL	A-6, A-4	0	100	100	90-100	70-90	28-40	8-18
	40-72	Sandy clay loam, fine sandy loam, loam.	SC, SM, CL, ML	A-4, A-6	0	100	100	75-95	35-60	<38	NP-16

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	
Dubbs:											
24	0-8	Very fine sandy loam.	ML, CL-ML, CL	A-4	0	100	100	100	85-100	20-30	3-10
	8-37	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	85-100	35-50	15-25
	37-72	Loam to loamy sand.	ML, SM	A-2, A-4	0	100	100	60-85	25-55	<25	NP-3
Dundee:											
25	0-7	Silt loam	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-98	20-35	4-11
	7-31	Loam, silty clay loam, silt loam.	CL, CL-ML	A-4, A-5, A-6, A-7	0	100	100	90-100	70-95	24-44	5-22
	31-72	Loam, fine sandy loam, silt loam, silty clay loam.	CL, CL-ML, ML	A-4	0	100	100	85-100	60-90	10-40	NP-18
Falaya:											
26	0-41	Silt loam	ML, CL-ML, CL	A-4	0	100	100	100	95-100	<30	NP-10
	41-72	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-5, A-6, A-7	0	100	100	100	95-100	25-43	3-16
Foley:											
27	0-10	Silt loam	ML, CL, CL-ML	A-4, A-5, A-6, A-7	0	100	100	95-100	70-100	25-45	3-20
	10-16	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	90-100	30-49	11-25
	16-54	Silty clay loam, silt loam.	CL, CH	A-6, A-7	0	100	100	95-100	90-100	40-60	18-32
	54-72	Silt loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-45	11-20
Fountain:											
28	0-17	Silt loam	CL-ML, ML	A-4	0	100	100	100	95-100	<27	NP-7
	17-60	Silty clay loam, silt loam.	CL	A-6	0	95-100	90-100	90-100	80-100	32-40	11-18
	60-72	Silt loam, sandy clay loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	95-100	90-100	90-100	80-100	25-36	5-14
Jackport:											
29	0-5	Silty clay	CL, CH	A-6, A-7	0	100	100	95-100	85-100	30-55	12-30
	5-16	Silty clay, clay	CH	A-7	0	100	100	95-100	90-100	51-85	25-55
	16-37	Clay	CH	A-7	0	100	100	95-100	90-100	65-85	35-55
	37-72	Silty clay, silty clay loam, silt loam.	CH, CL	A-7	0	100	100	95-100	90-100	45-75	20-45
Kobel:											
30	0-5	Silty clay	CH	A-7	0	100	100	95-100	90-95	55-75	35-50
	5-55	Clay, silty clay, silty clay loam.	CH, CL	A-7	0	100	100	95-100	90-95	45-75	25-50
	55-72	Sandy clay, silty clay, silty clay loam.	CH, CL	A-7	0	100	100	85-95	60-75	45-70	25-45

See footnote at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Kobel:											
[1]31	0-5	Silt loam	CL	A-6, A-7	0	100	100	90-100	70-90	35-45	15-25
	5-55	Clay, silty clay, silty clay loam.	CH, CL	A-7	0	100	100	95-100	90-95	45-75	25-50
	55-72	Sandy clay, silty clay, silty clay loam.	CH, CL	A-7	0	100	100	85-95	60-75	45-70	25-45
Loring:											
32, 33, 34	0-8	Silt loam	ML, CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	20-35	3-15
	8-27	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	95-100	90-100	35-45	15-25
	27-52	Silt loam, silty clay loam.	CL, ML	A-4, A-5, A-6, A-7	0	100	100	95-100	90-100	30-45	3-18
	52-72	Silt loam	CL, CL-ML, ML	A-4, A-6	0	100	100	95-100	90-100	25-40	3-15
Memphis:											
[1]35	0-10	Silt loam	ML, CL-ML, CL	A-4	0	100	100	100	90-100	<30	NP-10
	10-48	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	100	90-100	35-48	15-25
	48-72	Silt loam	ML, CL	A-4, A-6	0	100	100	100	90-100	30-40	6-15
Patterson:											
36	0-11	Fine sandy loam	SM	A-2, A-4	0	100	100	75-100	25-45	---	NP
	11-43	Fine sandy loam, sandy loam, very fine sandy loam.	SM, SM-SC	A-2, A-4	0	100	100	75-100	25-50	<25	NP-7
	43-72	Loamy fine sand, sandy clay loam.	SM	A-2, A-4	0	100	100	75-100	15-40	---	NP
Tuckerman:											
37	0-8	Fine sandy loam	ML, SM	A-2, A-4	0	100	100	85-95	30-65	<20	NP-3
	8-14	Fine sandy loam, loam.	ML, CL-ML, SM, SM-SC	A-4	0	100	100	85-95	40-65	<25	NP-5
	14-42	Sandy clay loam, loam.	CL, CL-ML, SC, SM-SC	A-4, A-6	0	100	100	85-95	40-70	20-35	5-15
	42-72	Fine sandy loam, loam, sandy loam.	ML, CL-ML, SM, SM-SC	A-4	0	100	100	85-95	40-65	<25	NP-5
Wardell:											
38	0-17	Fine sandy loam	SC, CL	A-6	0	100	100	75-100	45-85	25-35	10-20
	17-46	Clay loam, sandy clay loam, loam.	CL	A-6, A-7	0	100	100	80-100	50-85	35-45	20-30
	46-72	Fine sandy loam to sandy clay.	CL, CH, SC	A-7	0	100	100	75-95	45-60	30-60	10-45

[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

[The symbol < means less than; > means more than. Entries under "erosion factors--T" apply to the entire profile. Absence of an entry means data were not available or were not estimated]

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Risk of corrosion		Erosion factors	
							Uncoated steel	Concrete	K	T
	In	In/hr	In/in	pH	Mmhos/cm					
Amagon:										
10, [1]11	0-6	0.6-2.0	0.16-0.24	4.5-6.0	<2	Low	High	High	0.43	5
	6-25	0.2-0.6	0.16-0.24	4.5-6.5	<2	Low	High	High	0.43	
	25-44	0.06-0.2	0.16-0.24	4.5-6.5	<2	Moderate	High	High	0.37	
	44-72	0.06-0.6	0.15-0.24	5.1-8.4	<2	Low	High	High	0.43	
Beulah:										
12, 13	0-7	2.0-6.0	0.10-0.15	4.5-6.0	<2	Low	Low	Moderate	0.20	5
	7-39	2.0-6.0	0.10-0.20	4.5-6.0	<2	Low	Low	Moderate	0.20	
	39-72	>6.0	0.02-0.15	5.1-7.3	<2	Low	Low	Moderate	0.17	
Bonn:										
[1]14:										
Bonn part	0-4	0.2-0.6	0.15-0.23	4.5-7.3	<2	Low	High	Low	0.49	3
	4-38	<0.06	0.08-0.14	5.6-9.0	<2	Low	High	Low	0.49	
	38-72	<0.2	0.08-0.14	6.6-9.0	<2	Low	High	Low	0.49	
Foley part	0-10	0.6-2.0	0.13-0.24	4.5-7.3	<2	Low	High	Low	0.43	3
	10-16	0.2-0.6	0.18-0.24	5.1-7.3	<2	Moderate	High	Low	0.43	
	16-54	<0.06	0.10-0.14	5.1-9.0	<2	Moderate	High	Low	0.43	
	54-72	<0.06	0.10-0.14	6.6-9.0	<2	Low	High	Low	0.49	
Bosket:										
15, 16	0-18	2.0-6.0	0.10-0.15	5.1-6.5	<2	Low	Low	Moderate	0.24	4
	18-42	0.6-2.0	0.10-0.20	5.1-6.5	<2	Low	Low	Moderate	0.32	
	42-72	2.0-6.0	0.10-0.15	5.1-6.5	<2	Low	Low	Moderate	0.32	
Brandon:										
17	0-9	0.6-2.0	0.18-0.23	4.5-5.5	<2	Low	Moderate	High	0.37	3
	9-50	0.6-2.0	0.18-0.23	4.5-5.5	<2	Low	Moderate	High	0.28	
	50-72	2.0-20.0	0.05-0.12	4.5-5.5	<2	Low	Low	High	0.17	
[1]18:										
Brandon part	0-9	0.6-2.0	0.18-0.23	4.5-5.5	<2	Low	Moderate	High	0.37	3
	9-50	0.6-2.0	0.18-0.23	4.5-5.5	<2	Low	Moderate	High	0.28	
	50-72	2.0-20.0	0.05-0.12	4.5-5.5	<2	Low	Low	High	0.17	
Saffell part	0-10	2.0-6.0	0.05-0.10	4.5-5.5	<2	Low	Low	Moderate	0.20	4
	10-41	0.6-2.0	0.06-0.10	4.5-5.5	<2	Low	Low	Moderate	0.28	
	41-72	0.6-2.0	0.06-0.12	4.5-5.5	<2	Low	Low	Moderate	0.17	
Calhoun:										
19	0-14	0.2-0.6	0.21-0.23	4.5-6.0	<2	Low	High	Moderate	0.49	3
	14-37	0.06-0.2	0.20-0.22	4.5-5.5	<2	Moderate	High	Moderate	0.43	
	37-72	0.2-0.6	0.21-0.23	4.5-7.8	<2	Low	High	Moderate	0.43	
Collins:										
20	0-6	0.6-2.0	0.10-0.20	4.5-5.5	<2	Low	Moderate	Moderate	0.43	5
	6-72	0.6-2.0	0.20-0.24	4.5-5.5	<2	Low	Moderate	Moderate	0.43	
Commerce:										
[1]21	0-8	0.6-2.0	0.21-0.23	5.6-7.8	<2	Low	High	Low	0.37	5
	8-30	0.2-0.6	0.20-0.22	6.1-8.4	<2	Moderate	High	Low	0.32	
	30-72	0.2-2.0	0.20-0.23	6.6-8.4	<2	Low	High	Low	0.37	
Crowley:										
22	0-15	0.2-0.6	0.20-0.23	4.5-7.3	<2	Low	High	Moderate	0.43	4
	15-32	<0.06	0.19-0.21	4.5-6.5	<2	High	High	Moderate	0.32	
	32-72	0.06-0.2	0.20-0.22	5.6-8.4	<2	Moderate	High	Moderate	0.32	

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	Salinity	Shrink-swell potential	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete	Erosion factors: K	Erosion factors: T
	In	In/hr	In/in	pH	Mmhos/cm					
Dexter:										
23	0-7	0.6-2.0	0.15-0.24	5.1-6.5	<2	Low	Low	Moderate	0.37	5
	7-40	0.6-2.0	0.15-0.24	4.5-6.0	<2	Low	Moderate	Moderate	0.32	
	40-72	0.6-6.0	0.08-0.18	4.5-5.5	<2	Low	Low	Moderate	0.24	
Dubbs:										
24	0-8	0.6-2.0	0.20-0.22	4.5-6.0	<2	Low	Moderate	Moderate	0.37	5
	8-37	0.6-2.0	0.18-0.22	4.5-6.0	<2	Moderate	Moderate	Moderate	0.37	
	37-72	2.0-6.0	0.20-0.22	4.5-6.0	<2	Low	Moderate	Moderate	0.37	
Dundee:										
25	0-7	0.6-2.0	0.15-0.20	4.5-6.0	<2	Low	High	Moderate	0.37	5
	7-31	0.2-0.6	0.15-0.20	4.5-6.0	<2	Moderate	High	Moderate	0.37	
	31-72	0.6-2.0	0.15-0.20	4.5-7.3	<2	Low	High	Moderate	0.37	
Falaya:										
26	0-41	0.6-2.0	0.20-0.22	4.5-5.5	<2	Low	High	Moderate	0.43	5
	41-72	0.06-2.0	0.14-0.22	4.5-5.5	<2	Low	High	Moderate	0.43	
Foley:										
27	0-10	0.6-2.0	0.13-0.24	4.5-7.3	<2	Low	High	Low	0.43	3
	10-16	0.2-0.6	0.18-0.24	5.1-7.3	<2	Moderate	High	Low	0.43	
	16-54	<0.06	0.10-0.14	5.1-9.0	<2	Moderate	High	Low	0.43	
	54-72	<0.06	0.10-0.14	6.6-9.0	<2	Low	High	Low	0.49	
Fountain:										
28	0-17	0.2-0.6	0.20-0.23	5.6-7.8	<2	Low	High	Low	0.37	3
	17-60	0.2-0.6	0.20-0.22	6.6-7.8	<2	Moderate	High	Low	0.37	
	60-72	0.2-0.6	0.21-0.23	6.6-8.4	<2	Low	High	Low	0.37	
Jackport:										
29	0-5	0.2-0.6	0.18-0.22	4.5-6.0	<2	Moderate	High	High	0.43	5
	5-16	<0.06	0.12-0.18	4.5-5.5	<2	High	High	High	0.32	
	16-37	<0.06	0.12-0.18	4.5-5.5	<2	High	High	High	0.32	
	37-72	<0.06	0.12-0.18	4.5-7.8	<2	High	High	High	0.32	
Kobel:										
30	0-5	<0.06	0.14-0.18	5.1-7.3	<2	High	High	Moderate	0.37	5
	5-55	<0.06	0.12-0.22	6.1-8.4	<2	High	High	Low	0.37	
	55-72	0.06-0.2	0.14-0.22	6.6-8.4	<2	High	High	Low	0.37	
[1]31	0-5	0.6-2.0	0.16-0.24	5.1-7.3	<2	Low	High	Moderate	0.49	5
	5-55	<0.06	0.12-0.22	6.1-8.4	<2	High	High	Low	0.37	
	55-72	0.06-0.2	0.14-0.22	6.6-8.4	<2	High	High	Low	0.37	
Loring:										
32, 33, 34	0-8	0.6-2.0	0.20-0.23	5.1-6.0	<2	Low	Moderate	Moderate	0.49	4
	8-27	0.6-2.0	0.20-0.22	5.1-6.0	<2	Low	Moderate	Moderate	0.43	
	27-52	0.2-0.6	0.06-0.13	5.1-6.0	<2	Low	Moderate	Moderate	0.43	
	52-72	0.6-2.0	0.06-0.13	5.1-6.5	<2	Low	Moderate	Low	0.43	
Memphis:										
[1]35	0-10	0.6-2.0	0.20-0.23	4.5-6.0	<2	Low	Low	Moderate	0.37	5
	10-48	0.6-2.0	0.20-0.22	4.5-6.0	<2	Low	Moderate	Moderate	0.37	
	48-72	0.6-2.0	0.20-0.23	4.5-6.0	<2	Low	Low	Moderate	0.37	
Patterson:										
36	0-11	2.0-6.0	0.11-0.15	4.5-6.0	<2	Low	Moderate	Moderate	0.20	5
	11-43	2.0-6.0	0.12-0.16	4.5-5.5	<2	Low	Moderate	Moderate	0.20	
	43-72	>6.0	0.06-0.10	4.5-7.3	<2	Low	Moderate	Moderate	0.17	
Tuckerman:										
37	0-8	0.6-2.0	0.11-0.15	4.5-6.0	<2	Low	High	Moderate	0.24	5
	8-14	0.6-2.0	0.11-0.20	4.5-6.0	<2	Low	High	Moderate	0.24	
	14-42	0.2-0.6	0.12-0.20	4.5-6.0	<2	Low	High	Moderate	0.32	
	42-72	0.6-2.0	0.11-0.20	4.5-6.0	<2	Low	High	Moderate	0.24	

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	Salinity	Shrink-swell potential	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete	Erosion factors: K	Erosion factors: T
	In	In/hr	In/in	pH	Mmhos/cm					
Wardell:										
38	0-17	0.2-0.6	0.18-0.22	5.6-7.3	<2	Low	High	Moderate	0.24	5
	17-46	0.06-0.2	0.15-0.19	4.5-6.5	<2	Moderate	High	Moderate	0.32	
	46-72	0.06-0.2	0.08-0.14	5.1-6.5	<2	High	High	Moderate	0.24	

[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

[The definitions of "flooding" and "water table" in the Glossary explain terms such as "rare," "brief," "apparent," and "perched." The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Cemented pan	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Depth	Hardness
					Ft			In		In	
Amagon:											
10, [1]11	D	None to occasional.	Very brief to brief.	Dec-Apr	1.0-2.0	Perched	Dec-Apr	>60	---	---	---
Beulah:											
12, 13	B	None	---	---	>6.0	---	---	>60	---	---	---
Bonn:											
[1]14:											
Bonn part	D	None	---	---	0-2.0	Perched	Dec-Apr	>60	---	---	---
Foley part	D	None	---	---	0-1.0	Perched	Dec-Apr	>60	---	---	---
Bosket:											
15, 16	B	None	---	---	>6.0	---	---	>60	---	---	---
Brandon:											
17	B	None	---	---	4.0-6.0	---	---	>60	---	---	---
[1]18:											
Brandon part	B	None	---	---	4.0-6.0	---	---	>60	---	---	---
Saffell part	B	None	---	---	>6.0	---	---	>60	---	---	---
Calhoun:											
19	D	None	---	---	0-2.0	Perched	Dec-Apr	>60	---	---	---
Collins:											
20	C	Rare to occasional.	Brief to long.	Jan-Apr	2.0-5.0	Apparent	Jan-Apr	>60	---	---	---
Commerce:											
[1]21	C	Frequent	Brief to long.	Dec-Jun	1.5-4.0	Apparent	Dec-Apr	>60	---	---	---
Crowley:											
22	D	None	---	---	0.5-1.5	Perched	Dec-Apr	>60	---	---	---
Dexter:											
23	B	None	---	---	>6.0	---	---	>60	---	---	---
Dubbs:											
24	B	None	---	---	>6.0	---	---	>60	---	---	---
Dundee:											
25	C	None	---	---	1.5-3.5	Apparent	Jan-Apr	>60	---	---	---
Falaya:											
26	D	Occasional	Very brief to long.	Jan-Apr	1.0-2.0	Apparent	Jan-Apr	>60	---	---	---
Foley:											
27	D	None	---	---	0-1.0	Perched	Dec-Apr	>60	---	---	---
Fountain:											
28	D	None	---	---	0.0-1.5	Apparent	Dec-Apr	>60	---	---	---
Jackport:											
29	D	None	---	---	0-1.0	Perched	Dec-Apr	>60	---	---	---

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Cemented pan	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Depth	Hard-ness
					Ft			In		In	
Kobel:											
30, [1]31	D	Common	Brief to very long.	Oct-May	0-1.0	Perched	Dec-Apr	>60	---	---	---
Loring:											
32, 33, 34	C	None	---	---	2.0-3.0	Perched	Dec-Mar	>60	---	---	---
Memphis:											
[1]35	B	None	---	---	>6.0	---	---	>60	---	---	---
Patterson:											
36	C	None	---	---	0-1.0	Apparent	Dec-Apr	>60	---	---	---
Tuckerman:											
37	D	None	---	---	0-1.0	Perched	Dec-Apr	>60	---	---	---
Wardell:											
38	C	None	---	---	0-1.5	Perched	Nov-Apr	>60	---	---	---

[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.--PHYSICAL ANALYSES OF SELECTED SOILS

Soil name and sample number	Depth	Horizon	Particle-size distribution (percent less than 2.0 mm): Very coarse sand through medium sand (2.0-0.25 mm)	Fine sand (0.25)-0.10 mm)	Very fine sand (0.10-0.05 mm)	Total sand (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm
	In							
Crowley silt loam: S74-AR-021-1-(1-6)	0-6	Ap	2	1	4	7	77	16
	6-15	A2g	2	1	4	7	78	15
	15-22	B21tg	0	1	2	3	43	54
	22-32	B22tg	0	1	2	3	43	54
	32-40	B31tg	1	1	4	6	52	42
	40-72	B32tg	2	1	10	13	56	31
Falaya silt loam: S74-AR-021-11-(1-6)	0-6	Ap	0	1	1	2	86	12
	6-14	C1	0	0	1	1	85	14
	14-27	C2g	0	1	1	2	86	12
	27-41	C3g	0	1	2	3	88	9
	41-56	C4g	2	1	2	5	83	12
	56-72	Bxb	4	1	2	7	77	16
Wardell fine sandy loam: S74-AR-021-13-(1-6)	0-6	Ap	7	53	7	66	27	7
	6-9	A12	7	52	6	66	26	8
	9-17	B1g	9	52	6	66	27	7
	17-31	B21tg	10	42	5	57	21	22
	31-46	B22tg	10	42	5	57	18	25
	46-72	Cg	8	76	3	87	4	9

TABLE 19.--CHEMICAL ANALYSES OF SELECTED SOILS

Soil name and sample number	Depth	Horizon	Extractable bases: Ca	Mg	Na	K	Extractable acidity	Base saturation	Reaction (1:1 soil) water	Organic matter	Available phosphorus
	In		Meq/100 g	Meq/100 g	Meq/100 g	Meq/100 g	Meq/100 g	Pct	pH	Pct	P/m
Crowley silt loam: S74-AR-021-1-(1-6)	0-6	Ap	3.6	1.5	0.2	0.1	8.0	40	5.9	2.4	13
	6-15	A2g	2.1	0.4	0.3	0.1	7.8	27	5.3	0.7	6
	15-22	B21tg	4.0	2.5	2.1	0.5	28.0	25	5.2	1.1	8
	22-32	B22tg	5.7	3.8	2.9	0.5	24.3	35	5.0	0.9	46
	32-40	B31tg	7.1	5.4	3.6	0.6	13.3	56	5.0	0.4	57
	40-72	B32tg	-	-	-	-	-	-	7.8	0.3	43
Falaya silt loam: S74-AR-021-11-(1-6)	0-6	Ap	3.6	2.0	0.2	0.2	7.2	45	5.6	1.1	82
	6-14	C1	2.5	0.8	0.2	0.2	10.3	26	5.1	0.8	13
	14-27	C2g	2.4	0.7	0.2	0.1	7.2	32	5.1	0.4	6
	27-41	C3g	1.5	0.4	0.1	0.1	6.3	25	4.8	0.3	6
	41-56	C4g	1.3	1.0	0.3	0.1	8.5	24	4.9	0.3	5
	56-72	Bxb	1.5	2.4	0.6	0.2	9.8	32	5.4	0.2	3
Wardell fine sandy loam: S74-AR-021-13-(1-6)	0-6	Ap	3.1	1.3	0.2	0.2	3.1	61		1.2	52
	6-9	A12	3.0	0.5	0.2	0.1	4.6	45	5.3	1.0	40
	9-17	B1g	2.8	0.3	0.2	0.1	3.4	50	5.4	0.5	11
	17-31	B21tg	7.6	2.0	0.4	0.2	5.4	65	5.3	0.6	3
	31-46	B22tg	10.6	2.7	0.7	0.2	2.8	84	6.7	0.3	1
	46-72	Cg	6.5	1.9	0.5	0.2	1.9	83	7.0	0.1	22

TABLE 20.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Amagon	Fine-silty, mixed, thermic Typic Ochraqualfs
Beulah	Coarse-loamy, mixed, thermic Typic Dystrochrepts
Bonn	Fine-silty, mixed, thermic Glossic Natraqualfs
Bosket	Fine-loamy, mixed, thermic Mollic Hapludalfs
Brandon	Fine-silty, mixed, thermic Typic Hapludults
Calhoun	Fine-silty, mixed, thermic Typic Glossaqualfs
Collins	Coarse-silty, mixed, acid, thermic Aquic Udifluvents
Commerce	Fine-silty, mixed, nonacid, thermic Aeric Fluvaquents
Crowley	Fine, montmorillonitic, thermic Typic Albaqualfs
Dexter	Fine-silty, mixed, thermic Ultic Hapludalfs
Dubbs	Fine-silty, mixed, thermic Typic Hapludalfs
Dundee	Fine-silty, mixed, thermic Aeric Ochraqualfs
Falaya	Coarse-silty, mixed, acid, thermic Aeric Fluvaquents
Foley	Fine-silty, mixed, thermic Albic Glossic Natraqualfs
Fountain	Fine-silty, mixed, thermic Typic Glossaqualfs
Jackport	Very-fine, montmorillonitic, thermic Vertic Ochraqualfs
Kobel	Fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts
Loring	Fine-silty, mixed, thermic Typic Fragiudalfs
Memphis	Fine-silty, mixed, thermic Typic Hapludalfs
Patterson	Coarse-loamy, mixed, thermic Aeric Ochraqualfs
Saffell	Loamy-skeletal, siliceous, thermic Typic Hapludults
Tuckerman	Fine-loamy, mixed, thermic Typic Ochraqualfs
Wardell	Fine-loamy, mixed, thermic Mollic Ochraqualfs

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