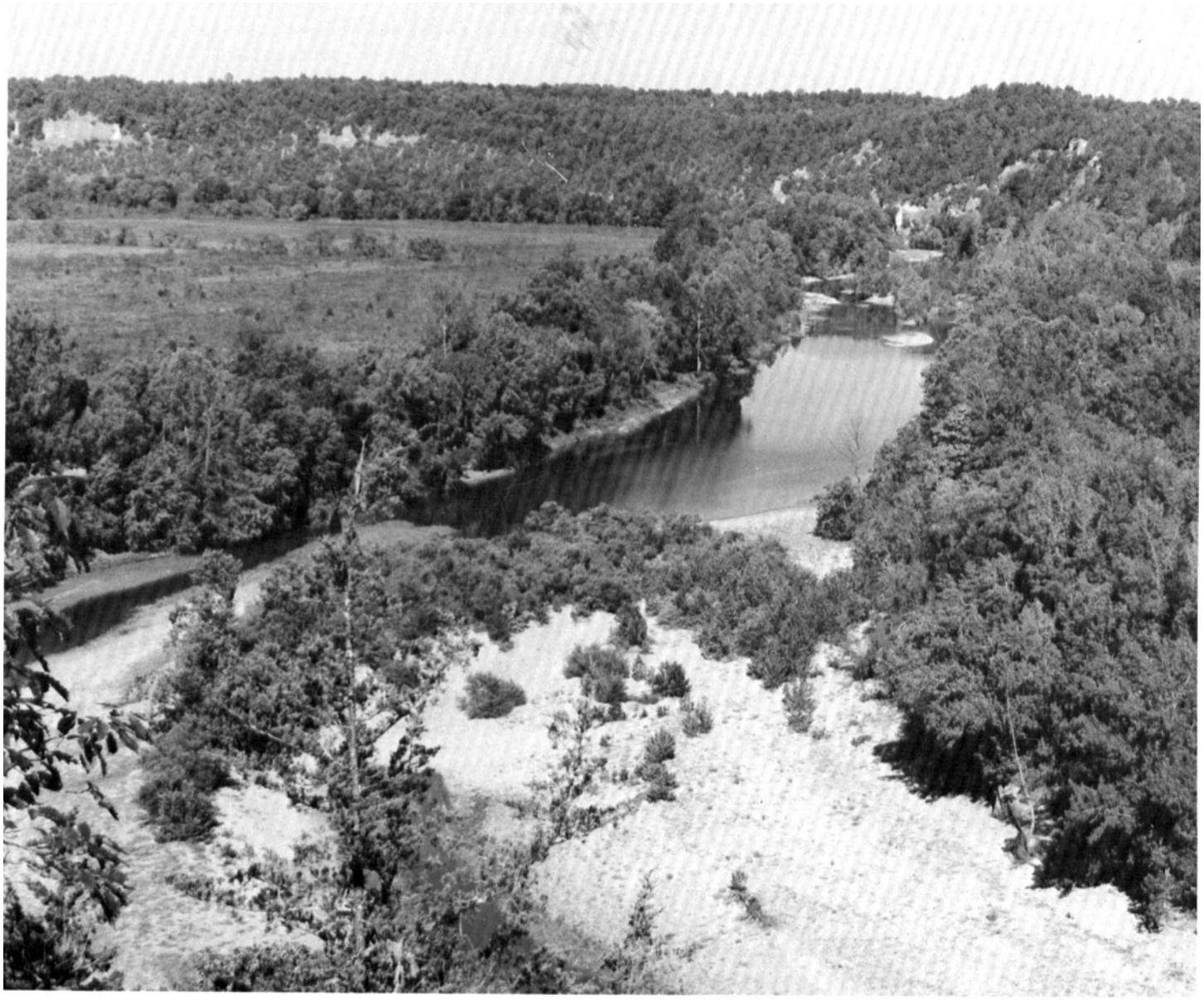
United States Department of Agriculture

Soil Conservation Service

In cooperation with United States Department of Agriculture, Forest Service; Arkansas Agricultural Experiment Station; and United States Department of the Interior, National Park Service

Soil Survey of Searcy County, Arkansas



How To Use This Soil Survey

General Soil Map

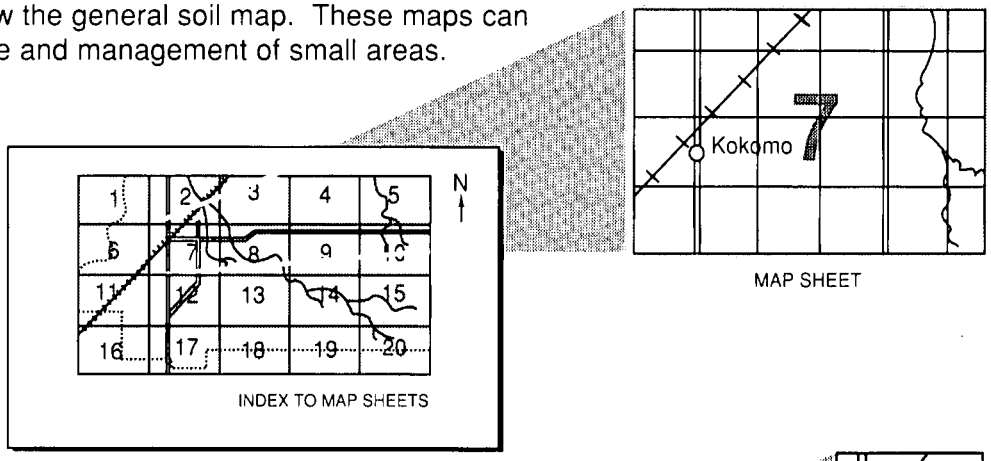
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

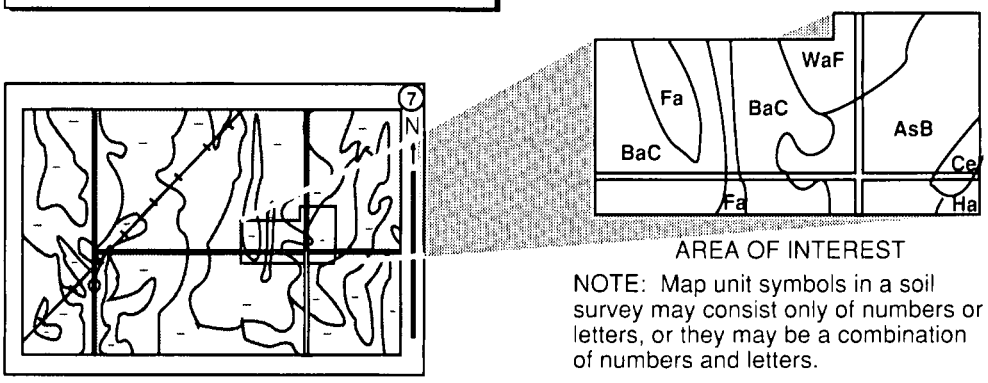
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

MAP SHEET

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET

AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1986. Soil names and descriptions were approved in 1987. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1987. This soil survey was made cooperatively by the United States Department of Agriculture, Soil Conservation Service and Forest Service; the Arkansas Agricultural Experiment Station; and the United States Department of the Interior, National Park Service. The survey is part of the technical assistance furnished to the Buffalo Conservation District.

Cover: An area of Riverwash, frequently flooded, along the Buffalo River.

Contents

Index to Map Units

Summary of Tables

Foreword

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

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

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

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

Ronnie D. Murphy
State Conservationist
Soil Conservation Service

Soil Survey of Searcy County, Arkansas

By Glen D. Laurent, J. Sidney Lowrance, and Richard T. McCright,
Soil Conservation Service

Fieldwork by Glen D. Laurent, Richard T. McCright, J. Sidney Lowrance, and David H. Fowlkes, Soil Conservation Service, and Suzanne A. Krieger and Emanuel Hudson, Forest Service

United States Department of Agriculture, Soil Conservation Service and Forest Service, in cooperation with
the Arkansas Agricultural Experiment Station and United States Department of the Interior, National Park Service

SEARCY COUNTY is in the north-central part of Arkansas (fig. 1). It extends about 25 miles from north to south and about 30 miles from east to west. It is bordered on the north by Boone and Marion Counties, on the west by Newton County, on the south by Pope and Van Buren Counties, and on the east by Stone and Baxter Counties. The total area of the county is 427,533 acres, or 668 square miles. In 1980, the population of the county was 8,847. Marshall, the county seat, had a population of 1,545.

The economy of the county is based mainly on livestock production, forestry, and tourism. The Buffalo National River area attracts a large number of tourists to the county.

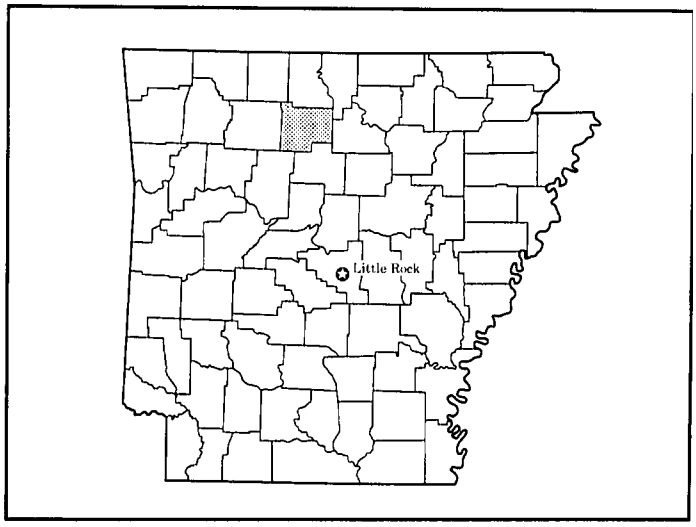


Figure 1.—Location of Searcy County in Arkansas.

General Nature of the County

This section briefly describes the farming, physiography and drainage, and climate of Searcy County.

Farming

The first settlers in Searcy County were mostly subsistence farmers. They cleared and farmed scattered small areas of land on the flood plains and the gently sloping uplands and mountaintops. The soils in these areas are deep and have few pebbles and stones. As roads were built and markets developed, the farmers began to produce cotton, fruit, and grain and raise livestock for cash. They also cut and sold the virgin hardwood timber.

This trend continued until about 1930. From the 1930's through the 1950's, numerous farms were abandoned. On most farms land use changed from cultivated crops to pasture or meadow. Most of the acreage on uplands that has been cleared is used for

pasture and forage crops. Most of the steep soils support low-grade trees.

The bottom land, mainly along the Buffalo River, the Middle Fork of the Little Red River, and Bear Creek, generally is used for pasture and forage crops. A few isolated areas are used for cultivated crops.

Most of the farm income in the county is derived from the sale of livestock, mainly beef cattle. The cattle industry consists mainly of cow-calf enterprises. Most of the calves are sold as feeders. Some are sold as stockers the following year. The cattle graze cool- and warm-season pasture plants. Minerals and protein are used as supplements. Generally, grain and hay are fed to the cattle only in winter.

Most of the cattle raised in the county are of good grade and are sold to midwestern feedlots. Income from the sale of dairy products, hogs, and poultry also is significant.

The sale of forest products is a source of farm income in the county. Most of the woodland is in areas of steep, stony, or shallow soils. Although these areas are poor sites for the commercial production of wood crops, the soils are best suited to woodland. Most privately owned woodland consists of low-grade upland hardwoods or mixed stands of oak and shortleaf pine. The southwestern and northeastern corners of the county are in the Ozark National Forest, which is managed for multiple uses, including timber production. Most of the hardwood timber sold in the county is used for furniture and other wood products, including railroad ties, pallets, handles, fence posts, and charcoal. The shallow soils on the Springfield Plateau, in the northern part of the county, produce cedar trees that are used for posts or for furniture and novelties.

According to the 1985 Arkansas Agricultural Statistics and the 1978 Census of Agriculture, the number of farms in the county increased from 594 in 1974 to 710 in 1985. The acreage of farmland increased from 170,747 to 197,531 acres. The average size of the farms decreased from 287 to 278 acres.

Physiography and Drainage

Searcy County is in two of the three physiographic areas of the Ozark Highlands. The northern part of the county is on the Springfield Plateau, which is intermediate in age and height, and the southern part is on the Boston Mountain Plateau, which is the youngest and highest of the three plateaus. The Salem Plateau, which is the lowest, oldest, and northernmost of the plateaus, is directly north of Searcy County.

The Springfield Plateau is strongly dissected by streams that form a dendritic pattern. It is characterized by steep, V-shaped valleys that are separated by gently sloping to rolling, long, narrow, winding ridges. The hillsides on the plateau have slopes of 12 to 50 percent. Elevation is about 1,100 to 1,400 feet above sea level. Clarksville and Noark soils formed on this plateau.

The Boston Mountain Plateau rises above the Springfield Plateau across the southern half of the county. This plateau is characterized by broad, gently sloping to rolling mountaintops and steep and very steep mountainsides. The mountaintops are capped with hard sandstone. The mountainsides consist of interbedded sandstone and shale. Slopes range from 12 to about 60 percent. Elevation is about 1,400 to 2,200 feet above sea level. Nella, Enders, Steprock, Mountainburg, Sidon, Nauvoo, and Linker soils formed on this plateau.

Calcareous shale and fossiliferous limestone are exposed on the moderately sloping to very steep, north-facing escarpment of the Boston Mountains. Eden, Newnata, and Summit soils formed in this area.

The stream valleys in the county are entrenched. They range from a few hundred feet to as much as one-half mile wide. Ceda, Kenn, Spadra, Razort, and Wideman soils formed in these valleys. The natural drainageways occur in a dendritic pattern in the upper reaches of several watersheds. Springs are common in some areas. They contribute substantially to summer and fall streamflow.

The northwestern part of the county is drained by Clear Creek. The north-central and western parts are drained by many intermittent and perennial streams that flow north and south and empty into the Buffalo River. These streams include Richland Creek, Cane Branch, Calf Creek, Bear Creek, and Big Creek. The southeastern part of the county is drained by the Middle Fork of the Little Red River.

Most of the water for domestic uses is supplied by wells. In some areas it is supplied by springs. Marshall, Leslie, Morning Star, Harriet, St. Joe, Pindal, and Gilbert have public water systems. Water for livestock is supplied mainly by farm ponds, springs, and creeks.

Climate

Prepared by the National Climatic Data Center, Asheville, North Carolina.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Gilbert, Arkansas, in the period 1951 to 1984. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 39 degrees F and the average daily minimum temperature is 25 degrees. The lowest temperature on record, which occurred at Gilbert on February 2, 1951, is -23 degrees.

In summer, the average temperature is 77 degrees and the average daily maximum temperature is 91 degrees. The highest recorded temperature, which occurred at Gilbert on July 14, 1954, is 114 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 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.

The total annual precipitation is about 42.5 inches. Of this, more than 23 inches, or about 55 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 18 inches. The heaviest 1-day rainfall during the period of record was 5.6 inches at Gilbert on January 11, 1982. Thunderstorms occur on about 56 days each year.

The average seasonal snowfall is 8 inches. The greatest snow depth at any one time during the period of record was 9 inches. On an average of 5 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 55 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 70 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the northeast. Average windspeed is highest, 9 miles per hour, in spring.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material from which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area are generally collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are

assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils. In the general soil map units, they are called soils of minor extent.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed, and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it 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 another but in a different pattern.

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

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

1. Noark-Clarksville

Deep, gently sloping to very steep, well drained and somewhat excessively drained, very cherty soils that formed in residuum of cherty limestone

These soils are in the northern part of the county. They are on ridgetops and hillsides on the Springfield Plateau.

This map unit makes up about 37 percent of the county. It is about 50 percent Noark soils, 39 percent Clarksville soils, and 11 percent soils of minor extent.

The well drained Noark soils are on gently sloping to steep ridgetops and hillsides. Typically, they have a surface layer of dark grayish brown very cherty silt loam and a subsurface layer of brown very cherty silt loam. The subsoil is strong brown very cherty silty clay loam, red very cherty clay, and red extremely cherty clay.

The somewhat excessively drained Clarksville soils are on steep and very steep hillsides. Typically, they have a surface layer of dark brown very cherty silt loam and a subsurface layer of pale brown very cherty silt loam. The subsoil is strong brown very cherty silt loam and strong brown extremely cherty silty clay loam.

Of minor extent in this map unit are the Arkana, Elsah, Moko, Razort, and Secesh soils and rock outcrops. The very cherty Arkana soils, the very stony Moko soils, and the rock outcrops are on the lower hillsides. Elsah, Razort, and Secesh soils are on flood plains.

This unit is used for pasture, hay, or woodland. Most of the acreage originally supported hardwoods or mixed hardwoods and pine. The slope, the hazard of erosion, and the high content of chert fragments are the main limitations affecting farming and most other uses.

The Noark soils are moderately suited or unsuited to cultivated crops, and the Clarksville soils are unsuited. The slope, the hazard of erosion, and the chert fragments on the surface are the main limitations. The Noark soils are moderately suited or poorly suited to improved pasture, depending on the slope, and the Clarksville soils are poorly suited or unsuited because of the slope and droughtiness. Both soils are moderately suited to woodland.

The Noark soils are moderately suited or poorly suited to most urban uses. The slope and moderate permeability in the subsoil are the main limitations. Special design and proper construction methods generally can help to alleviate these limitations. As the gradient increases, overcoming the slope becomes more difficult. The Clarksville soils are poorly suited to most urban uses, mainly because of the slope.

2. Estate-Lily-Udorthents

Deep, moderately deep, and shallow, gently sloping to steep, well drained, stony and loamy soils that formed in residuum of interbedded sandstone and limestone and residuum of sandstone

These soils are in the northern part of the county. They are on hilltops, hillsides, and foot slopes along the Buffalo River and other major drainageways.

This unit makes up about 4 percent of the county. It is about 42 percent Estate soils, 20 percent Lily soils,

18 percent Udorthents, and 20 percent soils of minor extent.

The deep Estate soils are on gently sloping to steep hillsides and foot slopes. Typically, they have a surface layer of dark brown stony sandy loam and a subsurface layer of yellowish brown stony sandy loam. The subsoil is strong brown gravelly sandy clay loam and yellowish red clay loam. It overlies hard sandstone bedrock.

The moderately deep Lily soils are on gently sloping hilltops and steep hillsides. Typically, they have a surface layer of grayish brown stony sandy loam and a subsurface layer of dark yellowish brown stony sandy loam. The subsoil is yellowish red stony sandy clay loam and strong brown gravelly clay loam. It overlies hard sandstone bedrock.

The shallow Udorthents are on gently sloping to steep hilltops and hillsides. They are sandy loam, fine sandy loam, loamy sand, or loamy fine sand over level-bedded sandstone bedrock.

Of minor extent in this map unit are the very cherty Clarksville and Noark soils on steep hillsides at the higher elevations; Arkana, Moko, and Portia soils in landscape positions similar to those of the major soils; and outcrops and escarpments of sandstone and limestone.

Most areas of this unit are wooded with mixed low-grade hardwoods and eastern redcedar. The slope, the stoniness, rock outcrops, and the hazard of erosion are the main limitations affecting farming and other uses. A few of the less sloping areas have been cleared of trees and stones and are used for pasture and hay or are idle.

These soils are not suited to cultivated crops. The slope, the stoniness, and a severe erosion hazard limit the use of these soils mainly to woodland, pasture, or habitat for wildlife. The Udorthents and the more sloping Estate and Lily soils are not suited to improved pasture, and the less sloping Estate and Lily soils are poorly suited. The Estate and Lily soils are moderately suited to woodland. The Udorthents are poorly suited to woodland, but they are better suited to this use than to other uses.

These soils are poorly suited to most urban uses. The depth to bedrock and the slope are the main limitations in areas of the Lily soils and the Udorthents. The shrink-swell potential and the slope are the main limitations in areas of the Estate soils. Special design and construction methods are needed to overcome these limitations. Overcoming the limitations becomes more difficult as the slope gradient increases. Overcoming the depth to bedrock is difficult or impractical.

3. Enders-Nella

Deep, gently sloping to steep, well drained, stony or gravelly, loamy soils that formed in residuum or colluvium of acid sandstone and shale or interbedded shale and sandstone

These soils are in the southwestern two-thirds of the county. They are on the crests, benches, foot slopes, and sides of the Boston Mountains.

This map unit makes up about 22 percent of the county. It is about 55 percent Enders soils, 20 percent Nella soils, and 25 percent soils of minor extent.

The Enders soils are on gently sloping upland crests and foot slopes and on strongly sloping to steep mountainsides. Typically, they have a surface layer of very dark grayish brown stony or gravelly loam. The subsoil is strong brown gravelly silty clay loam, yellowish red silty clay, red clay mottled with yellowish brown and gray, and mottled red and gray clay. Below this is soft, black, fissile shale bedrock.

The Nella soils are on gently sloping to moderately steep benches and steep mountainsides. Typically, they have a surface layer of dark brown stony or gravelly loam. The subsoil is yellowish brown cobbly loam, yellowish red cobbly loam, red clay loam, and red cobbly clay loam mottled with brown.

Of minor extent in this map unit are the Ceda, Kenn, Linker, Mountainburg, Steprock, and Spadra soils. Ceda and Kenn soils are along frequently flooded drainageways. Linker soils are on gently sloping to moderately steep mountaintops. Mountainburg soils are on gently sloping to moderately steep mountaintops and steep and very steep mountainsides. Steprock soils are on strongly sloping benches and steep and very steep mountainsides. Spadra soils are on terraces along drainageways. Also of minor extent are outcrops of sandstone, which form prominent bluffs in places.

Most areas of this unit are wooded with mixed hardwoods or are used for scattered pine plantations. Originally, the Nella soils supported a dense stand of hardwoods and the Enders soils an open stand of hardwoods interspersed with prairie plants in open areas. Cutting has removed most of the desirable trees and left a stand of undesirable species and young trees. Surface stoniness and the slope are the main limitations affecting farming and most other uses. These soils are not suited to cultivated crops. They are poorly suited or unsuited to pasture. They are moderately suited to woodland.

The Enders soils are poorly suited to most urban uses, and the Nella soils are moderately suited or poorly suited. The slope, surface stoniness, low

strength, and a high shrink-swell potential are the main limitations in areas of the Enders soils. The slope and surface stoniness are the main limitations in areas of the Nella soils. Special design and construction methods are needed to overcome these limitations. Overcoming the limitations becomes more difficult as the slope gradient increases.

4. Nella-Steprock-Mountainburg

Deep, moderately deep, and shallow, gently sloping to very steep, well drained, very stony, stony, or gravelly, loamy soils that formed in colluvium and residuum of sandstone and of some interbedded siltstone and shale

These soils are in the southern part of the county, in the Boston Mountains. The soils are on mountainsides that are dominantly steep and wooded. The mountainsides are characterized by bench and bluff topography, which consists of a series of narrow, gently sloping to moderately sloping benches lying parallel to the contour. Steep and very steep slopes are between the benches. Nearly vertical sandstone bluffs commonly are a minor but prominent feature of the landscape.

This map unit makes up about 16 percent of the county. It is about 42 percent Nella soils, 23 percent Steprock soils, 18 percent Mountainburg soils, and 17 percent soils of minor extent.

The deep Nella soils are on gently sloping to moderately steep benches, where colluvium accumulates, and on steep and very steep mountainsides. Typically, they have a surface layer of dark brown very stony, stony, or gravelly loam. The subsoil is yellowish brown cobbly loam, yellowish red cobbly loam, red clay loam, and red, mottled cobbly clay loam.

The moderately deep Steprock soils are on gently sloping and moderately sloping benches and steep and very steep mountainsides. Typically, they have a surface layer of dark brown very stony sandy loam. The subsoil is strong brown very flaggy sandy loam and yellowish red very flaggy sandy clay loam. It overlies soft, thinly bedded sandstone bedrock.

The shallow Mountainburg soils are on steep and very steep mountainsides. Typically, they have a surface layer of dark brown very stony, stony, or gravelly fine sandy loam. The subsoil is yellowish brown and strong brown very cobbly loam. It overlies hard, level-bedded sandstone bedrock.

Of minor extent in this unit are Enders soils in landscape positions similar to those of the major soils, Ceda and Kenn soils on flood plains, and Spadra soils on terraces in narrow valleys. Also of minor extent are some small areas of sandstone outcrops and nearly vertical bluffs.

The native vegetation in this map unit was mixed hardwoods. Some areas of the Mountainburg soils on southern exposures once supported an open stand of trees. A cover of native herbaceous plants and grasses was in small openings. The major soils are still dominantly wooded. Farms are few and scattered. The benches and ridgetops that have fairly smooth slopes generally have been cleared and are used mainly for pasture. A large area in the extreme southwest part of the county is part of the Ozark National Forest.

These soils generally are not suited to cultivated crops. Surface stoniness, the slope, and the depth to bedrock are the main limitations.

These soils generally are poorly suited or unsuited to pasture and generally are not suited to hay. The slope and stoniness are the main limitations in areas of the Nella and Steprock soils. The depth to bedrock, the slope, and stoniness are the main limitations in areas of the Mountainburg soils.

The Nella soils on north- and east-facing slopes are well suited to woodland, and those on south- and west-facing slopes are moderately suited. The Steprock soils on north- and east-facing slopes are moderately suited to woodland, and those on south- and west-facing slopes are poorly suited. The Mountainburg soils are poorly suited. The slope and surface stoniness are the main limitations.

The Nella soils are moderately suited or poorly suited to most urban uses. The slope and surface stoniness are the main limitations. The Steprock and Mountainburg soils generally are poorly suited to most urban uses. The slope, the depth to bedrock, and stoniness are the main limitations. Overcoming these limitations is difficult.

5. Noark-Nixa-Captina

Deep, nearly level to strongly sloping, well drained and moderately well drained, very cherty and loamy soils that formed in residuum of cherty limestone and loamy and cherty material over limestone

These soils are in the extreme northwest corner of the county. They are on broad upland flats, ridgetops, and hillsides on the Springfield Plateau.

This map unit makes up about 1 percent of the county. It is about 60 percent Noark soils, 20 percent Nixa soils, 9 percent Captina soils, and 11 percent soils of minor extent.

The well drained Noark soils typically have a surface layer of dark grayish brown very cherty silt loam and a subsurface layer of brown very cherty silt loam. The subsoil is strong brown very cherty silty clay loam and red very cherty and extremely cherty clay.

The moderately well drained Nixa soils typically have

a surface layer of dark grayish brown very cherty silt loam and a subsurface layer of yellowish brown very cherty silt loam. The subsoil is yellowish brown very cherty silt loam; yellowish brown, mottled very cherty silty clay loam; and red, mottled very cherty silty clay.

The moderately well drained Captina soils typically have a surface layer of dark brown silt loam. The subsoil is strong brown silty clay loam; yellowish red, mottled silty clay loam; and mottled yellowish red, light brownish gray, and strong brown silty clay loam.

Of minor extent in this map unit are the Clarksville and Peridge soils. The very cherty Clarksville soils are on steep side slopes. Peridge soils are in landscape positions similar to those of the major soils.

Most areas of this unit have been cleared of trees and are used for pasture or hay. Most of the acreage originally supported mixed upland hardwoods. The slope and the high content of chert fragments are the main limitations affecting farming and most other uses.

The Noark and Nixa soils are moderately suited, poorly suited, or unsuited to cultivated crops, and the Captina soils are moderately suited. The slope, the hazard of erosion, and the chert fragments on the surface are the main limitations. All three soils are well suited to woodland.

These soils are moderately suited to most urban uses. The slope and restricted permeability in the subsoil are the main limitations. These limitations generally can be overcome.

6. Newnata-Eden-Summit

Deep and moderately deep, gently sloping to very steep, well drained and moderately well drained, flaggy, stony, and loamy soils that formed in residuum of interbedded limestone and calcareous shale

These soils are primarily in the central part of the county. They are in gently sloping to steep areas in Cove Creek Valley and on the steep and very steep sides and foot slopes on the north face of the Boston Mountains escarpment.

This map unit makes up about 9 percent of the county. It is about 40 percent Newnata soils, 18 percent Eden soils, 10 percent Summit soils, and 32 percent soils of minor extent.

The deep, well drained Newnata soils are on gently sloping to moderately steep foot slopes in valleys and on steep mountainsides. Typically, they have a surface layer of very dark grayish brown silty clay loam or flaggy or stony silty clay loam. The subsoil is dark yellowish brown silty clay loam and yellowish brown clay. It is underlain by hard, gray limestone bedrock.

The moderately deep, well drained Eden soils are on gently sloping to very steep mountainsides. Typically, they have a surface layer of very dark grayish brown flaggy silty clay loam. The subsoil is dark brown flaggy silty clay, yellowish brown channery clay, and yellowish brown, mottled channery clay. Below this is soft, interbedded, calcareous shale that has thin strata of limestone.

The deep, moderately well drained Summit soils are on the gently sloping to steep lower hillsides and foot slopes. Typically, they have a surface layer and subsurface layer of very dark grayish brown silty clay loam. The subsoil is very dark gray and dark gray, mottled silty clay.

Of minor extent in this map unit are Samba soils in depressions and along drainageways, Enders and Nella soils on foot slopes, Moko soils on steep side slopes, outcrops of shale, and outcrops and escarpments of limestone.

This unit is used for pasture or woodland. Most of the gently sloping to moderately steep areas have been cleared and are used for pasture. Most of the steep areas support mixed upland hardwoods and redcedar. The slope, the depth to bedrock, and surface stoniness are the main limitations affecting farming and most other uses.

These soils are poorly suited or unsuited to cultivated crops, depending on the slope and surface stoniness. The Newnata and Summit soils are well suited, moderately suited, or poorly suited to pasture, depending on the slope. The Eden soils are poorly suited to improved pasture. The Newnata soils are moderately suited to woodland, and the Summit and Eden soils are poorly suited. The slope, the depth to bedrock, and alkalinity are the main limitations.

These soils are poorly suited to most urban uses. Low strength, the depth to bedrock, surface stoniness, restricted permeability, the slope, and a high shrink-swell potential are the main limitations. Some of these limitations generally can be overcome by using special design and proper construction methods. Overcoming the depth to bedrock is difficult or impractical.

7. Razort-Spadra-Healing

Deep, level to gently sloping, well drained, loamy soils that formed in alluvium

These soils are on terraces and flood plains along the Buffalo River, Richland Creek, Calf Creek, Bear Creek, and other small streams in the county.

This map unit makes up about 2 percent of the county. It is about 55 percent Razort soils, 23 percent Spadra soils, 16 percent Healing soils, and 6 percent soils of minor extent.

The frequently flooded Razort soils are on flood plains. Typically, they have a surface layer of very dark grayish brown loam. The subsoil is dark brown silt loam and clay loam. The substratum is dark yellowish brown sandy loam.

The rarely flooded Spadra soils are on stream terraces. Typically, they have a surface layer of dark brown loam. The subsoil is dark brown sandy clay loam and loam. The substratum is reddish brown loam.

The occasionally flooded Healing soils are on low stream terraces. Typically, they have a surface layer and subsurface layer of dark brown silt loam. The subsoil is dark yellowish brown and dark brown silty clay loam.

Of minor extent in this map unit are Secesh and Wideman soils, gravel bars, overflow channels, and riverwash.

This unit is mainly used for pasture and hay. Flooding and erosion are the main hazards affecting farming and most other uses.

The Spadra soils are only moderately suited to cultivated crops because of the hazard of erosion, the Healing soils are only moderately suited because of the occasional flooding, and the Razort soils are unsuited because of the frequent flooding. All three soils are well suited to pasture and hay and to woodland.

These soils are poorly suited to most urban uses. The flooding is the main hazard. Major flood-control systems are needed to overcome this hazard.

8. Linker-Nauvoo-Sidon

Moderatelly deep and deep, gently sloping to strongly sloping, well drained and moderately well drained, loamy and gravelly soils that formed in residuum of acid sandstone

These soils are mainly in the southwestern two-thirds of the county. They are on the tops of the Boston Mountains.

This map unit makes up about 9 percent of the county. It is about 36 percent Linker soils, 28 percent Nauvoo soils, 25 percent Sidon soils, and 11 percent soils of minor extent.

The moderately deep, well drained Linker soils typically have a surface layer of dark brown fine sandy loam or gravelly fine sandy loam. The subsoil is strong brown gravelly loam and yellowish red gravelly clay loam. Below this is hard, level-bedded sandstone bedrock.

The deep, well drained Nauvoo soils typically have a suface layer of dark brown fine sandy loam. The subsoil is yellowish red sandy clay loam, red clay loam, and yellowish red sandy clay loam. Below this is massive, weathered sandstone bedrock.

The deep, moderately well drained Sidon soils typically have a surface layer of dark yellowish brown loam. The subsoil is yellowish brown loam; mottled red, light gray, and yellowish brown loam; and red, mottled clay loam.

Of minor extent in this map unit are the Enders, Mountainburg, and Nella soils. Enders soils are on upland crests. Mountainburg and Nella soils are on strongly sloping mountaintops. Also of minor extent are outcrops of sandstone and areas that are very stony.

Most areas of this unit have been cleared of trees and are used for pasture or hay. Most of the acreage originally supported mixed upland hardwoods and pine. The slope, the depth to bedrock, and a severe hazard of erosion are the main limitations affecting farming and most other uses.

These soils are only moderately suited to cultivated crops because of the slope. They are well suited or moderately suited to pasture, depending on the slope. They are moderately suited to woodland.

These soils are moderately suited to most urban uses. The depth to bedrock is the main limitation in areas of the Linker soils. Low strength, wetness, and slow permeability are the main limitations in areas of the Sidon soils. The slope and low strength are the main limitations in areas of the Nauvoo soils. Most of these limitations can be overcome. Overcoming the depth to bedrock, however, is difficult or impractical.

Detailed Soil Map Units

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

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

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

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

Soils of one series can differ in texture of the surface layer or of the substratum. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Noark very cherty silt loam, 3 to 8 percent slopes, is a phase of the Noark series.

Some map units are made up of two or more major soils. These map units are called soil complexes. A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Arkana-Moko complex, 3 to 20 percent slopes, is an example.

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

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop, very steep, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

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

2CD—Arkana-Moko complex, 3 to 20 percent slopes. These well drained, deep to shallow, gently sloping to moderately steep, very cherty and very stony soils are on hillsides. Slopes are uneven and convex and include rock ledges. The two soils were mapped as a complex because they could not be consistently separated at the scale selected for mapping. Individual areas range from about 20 to a few hundred acres in size. They are about 60 percent a moderately deep or deep Arkana soil, 25 percent a shallow Moko soil, and 15 percent other soils and rock outcrop.

The typical sequence, depth, color, and texture of the layers of the Arkana soil are as follows—

Surface layer:

0 to 3 inches, very dark grayish brown very cherty silt loam

Subsurface layer:

3 to 14 inches, yellowish brown very cherty silt loam

Subsoil:

14 to 20 inches, reddish brown cherty clay
20 to 42 inches, red cherty clay

Bedrock:

42 to 44 inches, hard, level-bedded limestone

The typical sequence, depth, color, and texture of the layers of the Moko soil are as follows—

Surface layer:
0 to 4 inches, very dark gray very stony silt loam
4 to 17 inches, very dark grayish brown very stony silty clay loam

Bedrock:
17 to 20 inches, hard, level-bedded limestone

Included in this unit in mapping are areas of rock outcrop, areas of the somewhat excessively drained Clarksville soils, and areas of the well drained Noark soils.

Important soil properties—

Permeability: Arkana—moderate in the surface layer and subsurface layer, slow in the upper part of the subsoil, and very slow in the lower part; Moko—moderate throughout
Available water capacity: Arkana—low; Moko—very low
Organic matter content: Moderate
Natural fertility: Moderate
Soil reaction: Arkana—slightly acid or neutral in the surface layer and strongly acid to neutral in the subsoil; Moko—neutral or mildly alkaline throughout the profile
Surface runoff: Rapid
Depth to hard bedrock: Arkana—20 to 45 inches; Moko—8 to 20 inches
Root zone: Arkana—moderately deep or deep (can be readily penetrated by plant roots down to the clayey subsoil, which somewhat restricts further penetration); Moko—shallow
Shrink-swell potential: Arkana—high; Moko—low

Most areas are wooded with low-grade hardwoods and eastern redcedar or are pastured. The Arkana soil can produce about 78 cubic feet per acre per year of commercial wood products derived from shortleaf pine. The Moko soil can produce about 32 cubic feet per acre per year of commercial wood products derived from eastern redcedar. On the Arkana soil, seedling mortality is moderate because of the surface chert fragments. Suitable species on this soil include eastern redcedar and shortleaf pine. On the Moko soil, the equipment limitation and seedling mortality are moderate because of the surface stones and the very low available water capacity. The main suitable species on this soil is eastern redcedar.

The Arkana soil is moderately suited to pasture. Suitable forage plants include tall fescue, bermudagrass, lespedeza, and white clover. Limitations include the low available water capacity, the slope, and the very cherty surface layer. The Moko soil is not suited to pasture, mainly because of the depth to bedrock, the surface stoniness, and the very low available water capacity. It is best suited to woodland, habitat for wildlife, and recreational development. It should not be cleared. The hazard of erosion is very severe if the native vegetation is disturbed.

These soils are not suited to cultivated crops. The slope, the chert fragments and stones on the surface, a very severe erosion hazard, the low or very low available water capacity, and the moderately deep or shallow rooting depth are the main limitations.

The Arkana soil is poorly suited to most urban uses. The shrink-swell potential is a severe limitation on sites for dwellings and small commercial buildings. Possible corrective measures include reinforcing the footings and backfilling with sandy material. The slope is a severe limitation on sites for small commercial buildings. Designing the buildings so that they conform to the natural slope of the land and shaping the site can help to overcome this limitation. The Arkana soil has severe limitations as a site for local roads and streets because of low strength and the high shrink-swell potential. A possible method of minimizing these limitations includes providing a suitable subgrade. A better suited soil may be needed. The depth to bedrock and the very slow permeability are severe limitations on sites for septic tank absorption fields. A possible method of minimizing these limitations includes enlarging the absorption field. A better suited soil may be needed.

The Moko soil is poorly suited to most urban uses. It has severe limitations as a site for local roads and streets, dwellings, and septic tank absorption fields because of the shallowness to bedrock and large stones. Overcoming these limitations is difficult or impractical. Alternatives include selecting the deeper areas or a better suited soil. The slope is a severe limitation on sites for small commercial buildings. Designing the buildings so that they conform to the natural slope of the land can help to overcome this limitation.

The Arkana soil is in capability subclass VIe, and the Moko soil is in capability subclass VIs. The Arkana soil is in woodland suitability group 5F8, and the Moko soil is in group 2X2.

2EF—Arkana-Moko complex, 20 to 40 percent slopes. These well drained, deep to shallow, very cherty and very stony soils are on steep hillsides. Slopes are uneven and convex, commonly having a stepped appearance because of outcrops of horizontally bedded limestone bedrock. The two soils were mapped as a complex because they could not be consistently separated at the scale selected for mapping. Individual areas range from about 20 to a few hundred acres in

size. They are about 60 percent a moderately deep or deep Arkana soil, 35 percent a shallow Moko soil, and 5 percent other soils and rock outcrop.

The typical sequence, depth, color, and texture of the layers of the Arkana soil are as follows—

Surface layer:
0 to 3 inches, very dark grayish brown very cherty silt loam

Subsurface layer:
3 to 14 inches, yellowish brown very cherty silt loam

Subsoil:
14 to 20 inches, reddish brown cherty clay
20 to 42 inches, red cherty clay

Bedrock:
42 to 44 inches, hard, level-bedded limestone

The typical sequence, depth, color, and texture of the layers of the Moko soil are as follows—

Surface layer:
0 to 4 inches, very dark gray very stony silt loam
4 to 17 inches, very dark grayish brown very stony silty clay loam

Bedrock:
17 to 20 inches, hard, level-bedded limestone

Included in this unit in mapping are areas of rock outcrop, areas of the somewhat excessively drained Clarksville and well drained Noark soils, and areas where slopes are more than 35 percent.

Important soil properties—

Permeability: Arkana—moderate in the surface layer and subsurface layer, slow in the upper part of the subsoil, and very slow in the lower part; Moko—moderate throughout
Available water capacity: Arkana—low; Moko—very Low
Organic matter content: Moderate
Natural fertility: Moderate
Soil reaction: Arkana—slightly acid or neutral in the surface layer and strongly acid to neutral in the subsoil; Moko—neutral or mildly alkaline throughout the profile
Surface runoff: Rapid
Depth to hard bedrock: Arkana—20 to 45 inches; Moko—8 to 20 inches
Root zone: Arkana—moderately deep or deep (can be readily penetrated by plant roots down to the clayey subsoil, which somewhat restricts further penetration); Moko—shallow
Shrink-swell potential: Arkana—high; Moko—low

Most areas are wooded with low-grade hardwoods and eastern redcedar or are used as wildlife habitat. The Arkana soil can produce about 78 cubic feet per acre per year of commercial wood products derived from shortleaf pine. The Moko soil can produce about 32 cubic feet per acre per year of commercial wood products derived from eastern redcedar. On the Arkana soil, the equipment limitation, seedling mortality, and the erosion hazard are moderate because of the slope. Suitable species on this soil include eastern redcedar and shortleaf pine. On the Moko soil, the equipment limitation, seedling mortality, and the erosion hazard are moderate because of the slope, the surface stones, the very low available water capacity, and the shallowness to bedrock. The main suitable species on this soil is eastern redcedar.

These soils are not suited to pasture or cultivated crops because of the slope, the surface stones, the restricted depth to bedrock, and the low or very low available water capacity. They are best suited to woodland, habitat for wildlife, and recreational development. They should not be cleared. The hazard of erosion is very severe if the native vegetation is disturbed.

The Arkana soil is poorly suited to most urban uses. The shrink-swell potential and the slope are severe limitations on sites for dwellings and small commercial buildings. Possible corrective measures include reinforcing the footings and backfilling with sandy material. Designing the buildings so that they conform to the natural slope of the land and shaping the site can help to overcome the slope. The Arkana soil has severe limitations as a site for local roads and streets because of the slope, low strength, and the high shrink-swell potential. Providing a suitable subgrade helps to prevent the damage caused by low strength and by shrinking and swelling. A better suited soil may be needed. The slope, the depth to bedrock, and the very slow permeability are severe limitations on sites for septic tank absorption fields. Enlarging the absorption field helps to overcome the restricted permeability. A better suited soil may be needed.

The Moko soil is poorly suited to most urban uses. It has severe limitations as a site for local roads and streets, small commercial buildings, dwellings, and septic tank absorption fields because of the slope, the shallowness to bedrock, and large stones. Overcoming these limitations is difficult or impractical. Alternatives include selecting the deeper areas or a better suited soil.

The capability subclass is VIIs. The Arkana soil is in woodland suitability group 5R8, and the Moko soil is in group 2R2.

8C—Captina silt loam, 2 to 7 percent slopes. This deep, gently sloping, moderately well drained soil is on uplands in the Ozark Highlands. Individual areas range from 5 to 40 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 7 inches, dark brown silt loam

Subsoil:
7 to 21 inches, strong brown silty clay loam
21 to 34 inches, compact and brittle, yellowish red silty clay loam mottled with light brownish gray
34 to 72 inches, compact and brittle, mottled yellowish red, light brownish gray, and strong brown silty clay loam

Included with this soil in mapping are small areas of Nixa and Noark soils and small areas of poorly drained soils.

Important soil properties—

Permeability: Moderate in the surface layer and in the upper part of the subsoil, slow in the compact and brittle part of the subsoil
Available water capacity: Moderate
Organic matter content: Low
Natural fertility: Low
Soil reaction: Moderately acid to very strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil
Surface runoff: Medium
Erosion hazard: Severe
Tilth: Easily tilled under a variety of moisture conditions
Water table: Perched at a depth of about 2 to 3 feet in winter and early spring
Root zone: Typically, 18 to about 24 inches, at which depth the compact and brittle layer restricts root penetration
Shrink-swell potential: Low

Most areas are pastured. This soil is well suited to pasture. Suitable forage plants include bermudagrass, bahiagrass, tall fescue, and white clover. No significant limitations affect pasture management. Good management includes timely deferment of grazing, rotation grazing, control of brush and weeds, and proper stocking rates. These measures help to control erosion.

This soil is moderately suited to cultivated crops. Suitable crops include small grain and truck crops adapted to local climatic conditions. Erosion is a severe hazard. Under good management that includes adequate erosion control, clean-tilled crops can be grown in rotation with grasses. Terraces and contour farming, minimum tillage, proper management of crop residue, and cover crops reduce the runoff rate and help to control erosion. The conservation practices should be intensified as slope length and gradient increase.

This soil is well suited to woodland. It can produce about 97 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include shortleaf pine, northern red oak, and white oak. Windthrow is a moderate hazard because of the high water table and shallow rooting depth.

This soil is moderately suited to most urban uses. Wetness is a moderate limitation on sites for dwellings and small commercial buildings. This limitation can be partly overcome by shaping the site so that water flows away from the buildings and by installing tile drains near the footings. The slope is a moderate limitation on sites for small commercial buildings. Shaping the land and designing the buildings so that they conform to the natural slope of the land can help to overcome this limitation. Low strength and wetness are moderate limitations on sites for local roads and streets. Low strength can be partly overcome by providing suitable subgrade or base material and by applying special construction methods that improve the traffic-supporting capacity of the roads and streets. Wetness can be overcome by constructing the roads and streets on raised fill material and by installing a drainage system.

The slow permeability and the wetness are severe limitations on sites for septic tank absorption fields. The slow permeability can be partly overcome by enlarging the absorption field and digging a wide, deep trench below the distribution lines. Installing a drainage system around the absorption field, installing diversions that intercept water from the higher areas, or using a specially designed alternative system can help to overcome the wetness. Overcoming the limitations is difficult. A better suited soil may be necessary.

The capability subclass is IIIe, and the woodland suitability group is 7D8.

10—Ceda very cobbly loam, frequently flooded. This deep, well drained, level and nearly level soil is on flood plains that generally parallel streams. Flooding is expected more often than once every 2 years under usual conditions and generally occurs for very brief periods during winter or early spring. Individual areas are long and narrow and range from about 5 to 60 acres in size. Slopes are undulating and range from 0 to 3 percent.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, yellowish brown very cobbly loam

Substratum:
8 to 30 inches, yellowish brown very cobbly loam
30 to 70 inches, strong brown extremely cobbly loam

Included with this soil in mapping are small areas of Kenn and Spadra soils, gravel bars, and small areas of soils that have a gravelly or stony surface layer and are adjacent to stream channels. Kenn soils have a lower content of coarse fragments in the surface layer than the Ceda soil. Also, they are slightly higher in elevation. Spadra soils are on stream terraces adjacent to the flood plains.

Important soil properties—

Permeability: Rapid throughout
Available water capacity: Low
Organic matter content: Low
Natural fertility: Low
Soil reaction: Slightly acid or moderately acid throughout the profile
Surface runoff: Slow or medium
Tilth: Not easily tilled because of the cobbles and gravel
Water table: Below a depth of 6 feet
Root zone: Deep and easily penetrated by plant roots
Shrink-swell potential: Low

Most areas are used as woodland or pasture. This soil is not suited to cultivated crops because of the frequent flooding. Fast-moving floodwater can severely damage areas that do not have a plant cover.

This soil is moderately suited to pasture and hay. Suitable forage plants include bermudagrass, bahiagrass, lespedeza, and tall fescue. Good management includes proper stocking rates, timely deferment of grazing, and weed and brush control. Establishing improved pasture grasses is difficult because of the large amount of coarse fragments on the surface. The soil is well suited to warm-season grasses once the plants are established.

This soil is well suited to woodland. It can produce about 110 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable trees include loblolly pine, shortleaf pine, American sycamore, and sweetgum. Seedling mortality is moderate because of the flooding.

This soil is not suited to most urban uses. The flooding is a severe hazard on sites for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields. A major flood-control system is needed to overcome this hazard. A poor filtering capacity is a severe limitation on sites for septic tank absorption fields.

The capability subclass is VIIw, and the woodland suitability group is 8F8.

12—Ceda-Kenn complex, frequently flooded. These deep, well drained, level and nearly level soils are on flood plains that generally parallel streams. Flooding is expected more often than once every 2 years under usual weather conditions and generally occurs for very brief periods during winter or early spring. The two soils were mapped as a complex because they could not be consistently separated at the scale selected for mapping. Individual areas range from about 10 to 60 acres in size. They are about 50 percent a cobbly Ceda soil, 40 percent a loamy Kenn soil, and 10 percent other soils. Slopes are undulating and range from 0 to 3 percent.

The typical sequence, depth, color, and texture of the layers of the Ceda soil are as follows—

Surface layer:
0 to 8 inches, brown very cobbly loam

Substratum:
8 to 30 inches, yellowish brown very cobbly loam
30 to 70 inches, strong brown extremely cobbly loam

The typical sequence, depth, color, and texture of the layers of the Kenn soil are as follows—

Surface layer:
0 to 7 inches, dark brown gravelly fine sandy loam

Subsoil:
7 to 14 inches, brown gravelly fine sandy loam
14 to 28 inches, reddish brown gravelly sandy clay loam
28 to 38 inches, yellowish red gravelly sandy clay loam

Substratum:
38 to 45 inches, yellowish red extremely gravelly sandy clay loam
45 to 60 inches, brown extremely gravelly loam

Included in this unit in mapping are small areas of Spadra soils, gravel bars, and small areas of soils that have a very cobbly or stony surface layer and are adjacent to stream channels.

Important soil properties—

Permeability: Ceda—rapid throughout; Kenn—moderate throughout
Available water capacity: Ceda—low; Kenn—moderate

Organic matter content: Low
Natural fertility: Low
Soil reaction: Ceda—slightly acid or moderately acid throughout the profile; Kenn—slightly acid to strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil
Surface runoff: Slow or medium
Tilth: Ceda—not easily tilled because of the cobbles and gravel; Kenn—not easily tilled because of the gravel
Water table: Below a depth of 6 feet
Root zone: Deep and easily penetrated by plant roots
Shrink-swell potential: Ceda—low; Kenn—moderate

These soils are used mainly as woodland or pasture. They are not suited to cultivated crops because of the frequent flooding. Fast-moving floodwater can severely damage areas that do not have a plant cover.

These soils are moderately suited to pasture and hay. Suitable forage plants include bermudagrass, bahiagrass, lespedeza, and tall fescue. Good management includes proper stocking rates, timely deferment of grazing, and weed and brush control. Establishing improved pasture grasses is difficult because of the large amount of coarse fragments in the surface layer. The soils are well suited to warm-season grasses once the plants are established.

These soils are well suited to woodland. They can produce about 110 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable trees include loblolly pine, shortleaf pine, American sycamore, and sweetgum. Seedling mortality is moderate because of the flooding.

These soils are not suited to most urban uses. The flooding is a severe hazard on sites for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields. A major flood-control system is needed to overcome this hazard. A poor filtering capacity in the Ceda soil is a severe limitation on sites for septic tank absorption fields.

The Ceda soil is in capability subclass VIIw and in woodland suitability group 8F8. The Kenn soil is in capability subclass Vw and in woodland suitability group 8W8.

14F—Clarksville very cherty silt loam, 20 to 50 percent slopes. This deep, somewhat excessively drained, steep and very steep soil is on hillsides. Slopes are complex. Individual areas range from about 20 to a few thousand acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, dark brown very cherty silt loam

Subsurface layer:
4 to 10 inches, pale brown very cherty silt loam

Subsoil:
10 to 25 inches, strong brown very cherty silt loam
25 to 80 inches, strong brown extremely cherty silty clay loam

Included with this soil in mapping are small areas of Arkana, Moko, and Noark soils; very narrow areas of cherty soils on flood plains; small areas of rock outcrop; small areas of soils that have cherty limestone bedrock within 3 feet of the surface; and areas of soils that have slopes of more than 50 percent.

Important soil properties—

Permeability: Moderate
Available water capacity: Low
Organic matter content: Low
Natural fertility: Low
Soil reaction: Very strongly acid to moderately acid in the surface layer and strongly acid or very strongly acid in the subsoil
Surface runoff: Rapid
Water table: Below a depth of 6 feet
Shrink-swell potential: Low

Most areas are wooded. A few areas have been cleared and are used as pasture.

This soil is not suited to cultivated crops or improved pasture because of the slope, the rapid runoff, and a very severe hazard of erosion. It is moderately suited to woodland. It can produce about 90 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable trees include shortleaf pine and white oak. Erosion is a severe hazard. Seedling mortality is severe. The slope severely restricts the use of some equipment.

This soil is poorly suited to most urban uses. The slope is a severe limitation on sites for septic tank absorption fields, dwellings, small commercial buildings, and local roads and streets. Overcoming this limitation is difficult or impractical.

The capability subclass is VIIs, and the woodland suitability group is 6R9.

18—Elsah cherty silt loam, frequently flooded. This deep, somewhat excessively drained, level and nearly level soil is on flood plains that generally parallel streams. Flooding is expected more often than once every 2 years under usual weather conditions and generally occurs for very brief periods during winter or early spring. Individual areas are long and narrow and range from about 50 to 60 acres in size. Slopes are undulating and range from 0 to 3 percent.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark grayish brown cherty silt loam

Substratum:
8 to 24 inches, yellowish brown very cherty silt loam
24 to 30 inches, brown very cherty silt loam
30 to 60 inches, brown very cherty loam
60 to 80 inches, brown extremely cherty loam

Included with this soil in mapping are small areas of Secesh soils, gravel bars, and small areas of soils that have a very cobbly or stony surface layer and are adjacent to stream channels. Secesh soils have a lower content of coarse fragments in the surface layer than the Elsah soil and are slightly higher in elevation.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: Low
Organic matter content: Low
Natural fertility: Low
Soil reaction: Slightly acid or moderately acid throughout the profile
Surface runoff: Slow or medium
Tilth: Not easily tilled because of the gravel
Water table: Below a depth of 6 feet
Root zone: Deep and easily penetrated by plant roots
Shrink-swell potential: Low

Most areas are used as woodland or pasture. This soil is not suited to cultivated crops because of the frequent flooding. Fast-moving floodwater can severely damage areas that do not have a plant cover.

This soil is well suited to pasture and hay. Suitable forage plants include bermudagrass, bahiagrass, lespedeza, and tall fescue. Good management includes proper stocking rates, timely deferment of grazing, and weed and brush control. Establishing improved pasture grasses is difficult because of the large amount of coarse fragments in the surface layer. The soil is well suited to warm-season grasses once the plants are established.

This soil is well suited to woodland. It can produce about 70 cubic feet per acre per year of commercial wood products derived from sweetgum. Suitable trees include black walnut, green ash, and sweetgum. Seedling mortality is moderate because of the flooding.

This soil is not suited to most urban uses. The flooding is a severe hazard on sites for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields. A major flood-control system is needed to overcome this hazard. A poor filtering capacity is a severe limitation on sites for septic tank absorption fields.

The capability subclass is Vw, and the woodland suitability group is 5F8.

20C—Enders gravelly loam, 3 to 8 percent slopes. This deep, well drained, gently sloping soil is on upland crests, benches, and foot slopes. Slopes typically are smooth and convex. Individual areas range from 10 to 200 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, very dark grayish brown gravelly loam

Subsoil:
3 to 8 inches, strong brown gravelly silt loam
8 to 19 inches, yellowish red silty clay
19 to 30 inches, red clay mottled with yellowish brown
30 to 40 inches, red clay mottled with gray
40 to 54 inches, mottled red and gray clay

Bedrock:
54 to 58 inches, black, fissile shale that becomes harder with increasing depth

Included with this soil in mapping are some eroded spots, shale outcrops, areas of soils that are similar to the Enders soil but have a solum that is more than 60 inches thick, and small areas of Linker, Mountainburg, Nella, and Steprock soils. Also included are a few areas that have cobbles and stones on the surface.

Important soil properties—

Permeability: Moderate in the surface layer and very slow in the subsoil and substratum
Available water capacity: Moderate
Organic matter content: Moderate
Natural fertility: Low
Soil reaction: Strongly acid to extremely acid throughout the profile
Surface runoff: Medium or rapid
Shrink-swell potential: High
Root zone: Typically, 10 to 20 inches
Depth to soft bedrock: 40 to 60 inches

Most areas are wooded with low-grade hardwoods or are planted to pine. A few areas are used as pasture (fig. 2).

This soil is moderately suited to improved pasture. Suitable forage plants include bermudagrass, bahiagrass, tall fescue, lespedeza, and white clover. The hazard of erosion is severe if the pasture is overgrazed. Good management includes proper

Figure 2.—Farm pond in a pastured area of Enders gravelly loam, 3 to 8 percent slopes.

stocking rates, controlled grazing, and weed and brush control.

This soil is poorly suited to cultivated crops. Runoff is medium or rapid, and erosion is a very severe hazard if cultivated crops are grown. Under good management that includes minimum tillage, contour farming, and terraces, crops that leave a large amount of residue can be grown occasionally. The cropping system should include a close-growing cover crop most of the time.

This soil is moderately suited to woodland. It can produce about 88 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include loblolly pine, shortleaf pine, northern red oak, and white oak. Logging roads are subject to rutting during the wetter periods. Otherwise, no significant limitations affect woodland management. Logging activities should be scheduled for the dry periods.

This soil is poorly suited to most urban uses. The high shrink-swell potential is a severe limitation on sites for dwellings and small commercial buildings. Reinforcing the footings and backfilling with sandy material can help to overcome this limitation. The high shrink-swell potential and low strength are severe limitations on sites for local roads and streets. Providing suitable subgrade or base material can help to prevent damage to the roads and streets. The very slow permeability is a severe limitation on sites for septic tank absorption fields. A specially designed or alternative system may be necessary to overcome this limitation.

The capability subclass is IVe, and the woodland suitability group is 6A7.

20DE—Enders gravelly loam, 8 to 15 percent slopes. This deep, well drained, strongly sloping and moderately steep soil is on upland crests, benches, and foot slopes. Slopes are convex on the crests and concave on the foot slopes and mountainsides. Individual areas range from 10 to 150 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, very dark grayish brown gravelly loam

Subsoil:
3 to 8 inches, strong brown gravelly silt loam
8 to 19 inches, yellowish red silty clay
19 to 30 inches, red clay mottled with yellowish brown
30 to 40 inches, red clay mottled with gray
40 to 54 inches, mottled red and gray clay

Bedrock:
54 to 58 inches, black, fissile shale that becomes harder with increasing depth

Included with this soil in mapping are some eroded spots, shale outcrops, areas of soils that are similar to the Enders soil but have a solum that is more than 60 inches thick, and small areas of Linker, Mountainburg, Nella, and Steprock soils. Also included are a few areas that have cobbles and stones on the surface.

Important soil properties—

Permeability: Moderate in the surface layer and very slow in the subsoil and substratum
Available water capacity: Moderate
Organic matter content: Moderate
Natural fertility: Low
Soil reaction: Strongly acid to extremely acid throughout the profile
Surface runoff: Rapid
Shrink-swell potential: High
Root zone: Typically, 10 to 20 inches
Depth to soft bedrock: 40 to 60 inches

Most areas are wooded with low-grade hardwoods or are planted to pine. A few areas are cleared and used as pasture.

This soil is poorly suited to improved pasture. Suitable forage plants in cleared areas include bermudagrass, bahiagrass, tall fescue, lespedeza, and white clover. The hazard of erosion is severe. Good management includes proper stocking rates, controlled grazing, and weed and brush control.

This soil is not suited to cultivated crops. Runoff is rapid, and the erosion hazard is very severe. Also, the slope restricts the use of some farm equipment.

This soil is moderately suited to woodland. It can produce about 88 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include loblolly pine, shortleaf pine, northern red oak, and white oak. Logging roads are subject to rutting during the wetter periods. Otherwise, no significant limitations affect woodland management. Logging activities should be scheduled for dry periods.

This soil is poorly suited to most urban uses. The high shrink-swell potential is a severe limitation on sites for dwellings and small commercial buildings. Also, the slope is a severe limitation on sites for small commercial buildings. Reinforcing the footings and backfilling with sandy material can help to prevent the damage to buildings caused by shrinking and swelling. Land shaping and designing the buildings so that they conform to the natural slope of the land can help to overcome the slope. Low strength and the high shrink-swell potential are severe limitations on sites for local roads and streets. Providing suitable subgrade or base material can help to prevent damage to the roads and streets. The very slow permeability is a severe limitation on sites for septic tank absorption fields. A specially designed or alternative system may be necessary to overcome this limitation.

The capability subclass is VIe, and the woodland suitability is group 6A7.

22CD—Enders stony loam, 3 to 20 percent slopes. This deep, well drained, gently sloping to moderately steep soil is on mountaintops, benches, and foot slopes. Slopes typically are smooth and convex. Individual areas range from 20 to 200 acres in size.

Typically, this soil is covered by a thin layer of partially decomposed and decomposed leaves and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, very dark grayish brown stony loam

Subsoil:
3 to 8 inches, strong brown gravelly silt loam
8 to 19 inches, yellowish red silty clay
19 to 30 inches, red clay mottled with yellowish brown
30 to 40 inches, red clay mottled with gray
40 to 54 inches, mottled red and gray clay

Bedrock:
54 to 58 inches, black, fissile shale that becomes harder with increasing depth

Included with this soil in mapping are some eroded spots, shale outcrops, areas of soils that are similar to the Enders soil but have a solum that is more than 60 inches thick, and small areas of Mountainburg, Nella, and Steprock soils. Also included are a few areas that have a gravelly or cobbly surface.

Important soil properties—

Permeability: Moderate in the surface layer and very slow in the subsoil and substratum
Available water capacity: Moderate
Organic matter content: Moderate
Natural fertility: Low
Soil reaction: Strongly acid to extremely acid throughout the profile
Surface runoff: Medium or rapid
Shrink-swell potential: High
Root zone: Typically, 10 to 20 inches
Depth to soft bedrock: 40 to 60 inches

Most areas are wooded, mainly with low-grade hardwoods. A few areas are used as pasture.

This soil is poorly suited to improved pasture. Surface stones limit the use of some farm equipment. Where the pasture is established, suitable forage plants include bermudagrass, bahiagrass, tall fescue, lespedeza, and white clover. Good management includes proper stocking rates, controlled grazing, and weed and brush control.

This soil is not suited to cultivated crops because of the slope, the surface stones, and a very severe hazard of erosion.

This soil is moderately suited to woodland. It can produce about 88 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include loblolly pine, shortleaf pine, northern red oak, and white oak. The equipment limitation is moderate. The surface stones limit the use of some equipment. Logging roads are subject to rutting during wet periods. Logging activities should be scheduled for dry periods.

This soil is poorly suited to most urban uses. The high shrink-swell potential is a severe limitation on sites for dwellings and small commercial buildings. Also, the slope is a severe limitation on sites for small commercial buildings. Reinforcing the footings and backfilling with sandy material can help to prevent the damage to buildings caused by shrinking and swelling. Shaping the land and designing the buildings so that they conform to the natural slope of the land can help to overcome the slope. Low strength and the high shrink-swell potential are severe limitations on sites for local roads and streets. Providing suitable subgrade or base material can help to prevent damage to the roads and streets. The very slow permeability is a severe limitation on sites for septic tank absorption fields. A specially designed or alternative system may be necessary to minimize this limitation.

The capability subclass is VIs, and the woodland suitability symbol is 6X8.

22EF—Enders stony loam, 20 to 40 percent slopes. This deep, well drained, steep soil is on mountainsides. Slopes typically are smooth and concave. Individual areas range from 40 to 200 acres in size.

Typically, this soil is covered by a thin layer of partially decomposed and decomposed leaves and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, very dark grayish brown stony loam

Subsoil:
3 to 8 inches, strong brown gravelly silt loam
8 to 19 inches, yellowish red silty clay
19 to 30 inches, red clay mottled with yellowish brown
30 to 40 inches, red clay mottled with gray
40 to 54 inches, mottled red and gray clay

Bedrock:
54 to 58 inches, black, fissile shale that becomes harder with increasing depth

Included with this soil in mapping are some eroded spots, shale outcrops, areas of soils that are similar to the Enders soil but have a solum that is more than 60 inches thick, and small areas of Mountainburg, Nella, and Steprock soils. Also included are a few areas that have a gravelly or cobbly surface.

Important soil properties—

Permeability: Moderate in the surface layer and very slow in the subsoil and substratum
Available water capacity: Moderate
Organic matter content: Moderate
Natural fertility: Low
Soil reaction: Strongly acid to extremely acid throughout the profile
Surface runoff: Rapid
Shrink-swell potential: High
Root zone: Typically, 10 to 20 inches
Depth to soft bedrock: 40 to 60 inches

Most areas are wooded with low-grade hardwoods. A few areas are cleared and used as pasture.

This soil is not suited to cultivated crops or improved pasture. The surface stoniness and the slope are severe limitations.

This soil is moderately suited to woodland. It can produce about 78 cubic feet per acre per year of commercial wood products derived from shortleaf pine on south- and west-facing slopes and about 88 cubic feet per acre per year on north- and east-facing slopes. Suitable species include loblolly pine, shortleaf pine, northern red oak, and white oak. The slope is a moderate limitation. It restricts the use of equipment. Erosion is a moderate hazard. Seedling mortality is severe on south- and west-facing slopes and slight on north- and east-facing slopes. Logging roads are subject to rutting during wet periods. Logging activities should be scheduled for dry periods.

This soil is poorly suited to most urban uses. Slippage, the slope, and the high shrink-swell potential are severe limitations on sites for dwellings and small commercial buildings. The slope, low strength, and the high shrink-swell potential are severe limitations on sites for local roads and streets. Overcoming these limitations is difficult or impractical. The very slow permeability in the subsoil, slippage, and the slope are severe limitations on sites for septic tank absorption fields. Overcoming these limitations is difficult or impractical.

The capability subclass is VIIs. The woodland suitability group is 5R9 on south- and west-facing slopes and 6R8 on north- and east-facing slopes.

24CD—Enders-Nella stony loams, 3 to 20 percent slopes. These well drained, deep, gently sloping to moderately steep soils are on benches, side slopes, and foot slopes. The two soils were mapped as a complex because they could not be consistently separated at the scale selected for mapping. Individual areas range from about 20 to more than 1,000 acres in size. They are about 55 percent Enders soil, 35 percent Nella soil, and 10 percent other soils.

Typically, the Enders soil is covered by a thin layer of partially decomposed and decomposed leaves and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, very dark grayish brown stony loam

Subsoil:
3 to 8 inches, strong brown gravelly silt loam
8 to 19 inches, yellowish red silty clay
19 to 30 inches, red clay mottled with yellowish brown
30 to 40 inches, red clay mottled with gray
40 to 54 inches, mottled red and gray clay

Bedrock:
54 to 58 inches, black, fissile shale that becomes harder with increasing depth

Typically, the Nella soil is covered by a thin layer of partially decomposed and decomposed leaves and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, dark brown stony loam

Subsoil:
2 to 6 inches, yellowish brown cobbly loam
6 to 12 inches, yellowish red cobbly clay loam
12 to 24 inches, red clay loam
24 to 60 inches, red cobbly clay loam mottled with yellowish brown
60 to 72 inches, red cobbly clay loam mottled with strong brown

Included in this unit in mapping are small areas of rock outcrop, areas that have large boulders on the surface, and areas of Mountainburg and Steprock soils. Also included, on benches and side slopes, are soils that are similar to the Nella soil but have a yellowish brown subsoil. The shallow Mountainburg soils are near rock outcrops and escarpments. The moderately deep Steprock soils are on benches and side slopes.

Important soil properties—

Permeability: Enders—moderate in the surface layer and very slow in the subsoil and substratum; Nella—moderate
Available water capacity: Moderate
Organic matter content: Enders—moderate; Nella—low
Natural fertility: Low
Soil reaction: Enders—strongly acid to extremely acid throughout the profile; Nella—strongly acid or very strongly acid throughout the profile
Surface runoff: Rapid
Shrink-swell potential: Enders—high; Nella—low
Root zone: Enders—10 to 20 inches; Nella—more than 40 inches
Depth to bedrock: Enders—40 to more than 60 inches; Nella—more than 72 inches

Most areas are wooded, mainly with low-grade hardwoods. A few areas are used as pasture. The steeper areas are subject to landslides if the surface is disturbed.

The Nella soil is moderately suited to pasture but the Enders soil is poorly suited. Suitable forage plants include tall fescue, bermudagrass, lespedeza, bahiagrass, and white clover. The hazard of erosion is severe if the pasture is overgrazed. The surface stones limit the use of farm equipment. Good management includes proper stocking rates, controlled grazing, and weed and brush control.

These soils are not suited to cultivated crops. The main limitations are the slope and large stones on the surface.

The Enders soil is moderately suited to woodland. It can produce about 88 cubic feet per acre per year of commercial wood products derived from shortleaf pine. The Nella soil can produce about 110 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include shortleaf pine, loblolly pine, northern red oak, and white oak. The surface stones restrict the use of equipment. Logging roads on the Enders soil are subject to rutting during the wetter periods.

The Enders soil is poorly suited to most urban uses. The slope and the shrink-swell potential are severe limitations on sites for small commercial buildings. The shrink-swell potential is a severe limitation on sites for dwellings. Designing small commercial buildings so that they conform to the natural slope of the land and shaping the site can help to overcome the slope. Reinforcing the footings and backfilling with sandy material help to prevent the damage to buildings caused by shrinking and swelling. Low strength and the shrink-swell potential are severe limitations on sites for local roads and streets. Providing suitable subgrade or base material helps to prevent the damage caused by shrinking and swelling and by low strength. The very slow permeability is a severe limitation on sites for septic tank absorption fields. Overcoming this limitation is difficult. A specially designed or alternative system may be needed. The moderately permeable Nella soil is a better site for the absorption fields.

The Nella soil is moderately suited to most urban uses. The slope and large stones are moderate limitations on sites for dwellings and for local roads and streets. The slope is a severe limitation on sites for small commercial buildings. Designing dwellings and small commercial buildings so that they conform to the natural slope of the land, shaping the building site, and building roads and streets on the contour help to overcome the slope. The moderate permeability, the slope, and large stones are moderate limitations on sites for septic tank absorption fields. Possible alternatives include increasing the size of the field or otherwise modifying the field.

The capability subclass is VIs. The Enders soil is in woodland suitability group 6X8, and the Nella soil is in group 8X8.

24EF—Enders-Nella stony loams, 20 to 40 percent slopes. These deep, well drained, moderately steep and steep soils are on mountainsides. The two soils were mapped as a complex because they could not be consistently separated at the scale selected for mapping. Individual areas range from about 40 to more than 500 acres in size. They are about 55 percent Enders soil, 40 percent Nella soil, and 5 percent other soils.

Typically, the Enders soil is covered by a thin layer of partially decomposed and decomposed leaves and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, very dark grayish brown stony loam

Subsoil:
3 to 8 inches, strong brown gravelly silt loam
8 to 19 inches, yellowish red silty clay
19 to 30 inches, red clay mottled with yellowish brown
30 to 40 inches, red clay mottled with gray
40 to 54 inches, mottled red and gray clay

Bedrock:
54 to 58 inches, black, fissile shale that becomes harder with increasing depth

Typically, the Nella soil is covered by a thin layer of partially decomposed and decomposed leaves and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, dark brown stony loam

Subsoil:
2 to 6 inches, yellowish brown cobbly fine sandy loam
6 to 12 inches, yellowish red clay loam
12 to 24 inches, red clay loam
24 to 60 inches, red cobbly clay loam mottled with yellowish brown
60 to 72 inches, red cobbly clay loam mottled with strong brown

Included in this unit in mapping are small areas of bluffs and rock outcrop, areas that have large boulders on the surface, and areas of Mountainburg, Nella, and Steprock soils. Also included is a yellowish brown soil that is similar to the Nella soil and is on benches and

side slopes. The shallow Mountainburg and moderately deep Steprock soils are near rock outcrops and escarpments.

Important soil properties—

Permeability: Enders—moderate in the surface layer and very slow in the subsoil and substratum; Nella—moderate
Available water capacity: Moderate
Organic matter content: Enders—moderate; Nella—low
Natural fertility: Low
Soil reaction: Enders—strongly acid to extremely acid throughout the profile; Nella—strongly acid or very strongly acid throughout the profile
Surface runoff: Rapid
Shrink-swell potential: Enders—high; Nella—low
Root zone: Enders—10 to 20 inches; Nella—more than 40 inches
Depth to bedrock: Enders—40 to 60 inches; Nella—more than 72 inches

Most areas are wooded, mainly with low-grade hardwoods. A few areas are used as pasture. These soils are subject to landslides under natural conditions. This hazard is increased greatly if the surface is disturbed.

These soils are not suited to cultivated crops or improved pasture because of the slope and the surface stoniness.

The Enders soil is moderately suited to woodland. It can produce about 78 cubic feet per acre per year of commercial wood products derived from shortleaf pine on south- and west-facing slopes and about 88 cubic feet per acre per year on north- and east-facing slopes. Suitable species include shortleaf pine, loblolly pine, northern red oak, and white oak. The surface stones and the slope restrict the use of some equipment. The hazard of erosion is moderate because of the slope. Seedling mortality is severe on south- and west-facing slopes and slight on north- and east-facing slopes.

The Nella soil is moderately suited to well suited to woodland. It can produce about 88 cubic feet per acre per year of commercial wood products derived from shortleaf pine on south- and west-facing slopes and about 110 cubic feet per acre on north- and east-facing slopes. Suitable species include loblolly pine, shortleaf pine, northern red oak, and white oak. The surface stones and the slope restrict the use of some equipment. The hazard of erosion is moderate because of the slope. Seedling mortality is severe on south- and west- facing slopes and slight on north- and east-facing slopes.

These soils are poorly suited to most urban uses. The slope is a severe limitation on sites for dwellings, local roads and streets, small commercial buildings, and septic tank absorption fields. Slippage and the high shrink-swell potential are severe limitations if the Enders soil is used as a site for dwellings or small commercial buildings. The high shrink-swell potential, low strength, and slippage are severe limitations if the Enders soil is used as a site for local roads and streets. The very slow permeability and slippage are severe limitations if the Enders soil is used as a site for septic tank absorption fields. Overcoming these limitations is difficult or impractical. A better suited soil is needed.

The capability subclass is VIIs. The Enders soil is in woodland suitability group 5R9 on south- and west-facing slopes and 6R8 on north- and east-facing slopes. The Nella soil is in woodland suitability group 6R9 on south- and west-facing slopes and 8R8 on north- and east-facing slopes.

28CD—Estate-Lily-Udorthents complex, 3 to 15 percent slopes. These well drained, deep to shallow, gently sloping to moderately steep, loamy and stony soils are on hilltops and hillsides. The three soils were mapped as a complex because they could not be consistently separated at the scale selected for mapping. Individual areas range from about 10 to 400 acres in size. They are about 45 percent a deep Estate soil, 25 percent a moderately deep Lily soil, 20 percent shallow Udorthents, and 10 percent other soils and rock outcrop.

Typically, the Estate soil is covered by a thin layer of partially decomposed and decomposed leaves and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, dark brown stony sandy loam

Subsurface layer:
2 to 10 inches, yellowish brown stony sandy loam

Subsoil:
10 to 17 inches, strong brown gravelly sandy clay loam
17 to 41 inches, yellowish red clay loam

Bedrock:
41 to 45 inches, hard sandstone

Typically, the Lily soil is covered by a thin layer of partially decomposed and decomposed leaves, needles, and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 1 inch, grayish brown stony sandy loam

Subsurface layer:
1 to 7 inches, dark yellowish brown stony sandy loam

Subsoil:
7 to 20 inches, yellowish red stony sandy clay loam
20 to 26 inches, strong brown gravelly clay loam

Bedrock:
26 to 29 inches, hard sandstone

Udorthents are 6 to 20 inches deep over level-bedded, coarse grained, acid sandstone bedrock. Limestone outcrops are at the higher elevations. These soils are mainly sandy loam, fine sandy loam, loamy sand, loamy fine sand, or the cobbly, very cobbly, stony, or very stony analogs of those textures. The content of coarse fragments ranges from 0 to 50 percent, by volume.

Included in this unit in mapping are small areas of escarpments and outcrops of sandstone or limestone, areas of soils that have slopes of less than 8 percent, and small areas of Portia soils.

Important soil properties—

Permeability: Estate—slow; Lily—moderately rapid; Udorthents—rapid
Available water capacity: Estate—moderate; Lily—low; Udorthents—very low
Organic matter content: Low
Natural fertility: Low
Soil reaction: Estate—strongly acid to neutral in the surface layer, the subsurface layer, and the upper part of the subsoil and moderately acid to neutral in the rest of the subsoil; Lily—strongly acid to extremely acid throughout the profile; Udorthents—moderately acid to neutral throughout the profile
Surface runoff: Rapid
Root zone: Estate—deep and easily penetrated by plant roots; Lily—moderately deep and easily penetrated by plant roots; Udorthents—shallow
Depth to bedrock: Estate—40 to 60 inches; Lily—20 to 40 inches; Udorthents—6 to 20 inches

Most areas are wooded. A few areas are used as pasture.

The Estate and Lily soils are poorly suited to pasture, and the Udorthents are not suited. Where the pasture is established, the forage plants include tall fescue and native grasses. The hazard of erosion is severe if the pasture is overgrazed. Good management includes brush and weed control. The surface stones limit the use of farm equipment.

These soils are not suited to cultivated crops because of the stony surface layer, the slope, and a very severe erosion hazard.

The Estate and Lily soils are moderately suited to woodland. The Estate soil can produce about 88 cubic feet per acre per year of commercial wood products derived from shortleaf pine and the Lily soil about 97 cubic feet per acre. The Udorthents are not suited to commercial woodland and should not be cleared of their native vegetation. The surface stones restrict the use of equipment. Because of the depth to bedrock, windthrow is a moderate hazard on the Lily soil.

These soils are moderately suited, poorly suited, or unsuited to most urban uses. The slope and the shrink-swell potential are moderate limitations if the Estate soil is used as a site for dwellings. Also, the slope of this soil is a severe limitation on sites for small commercial buildings, low strength is a severe limitation on sites for local roads and streets, and the slow permeability is a severe limitation on sites for septic tank absorption fields. The Lily soil has moderate limitations as a site for dwellings and for local roads and streets because of the depth to bedrock and the slope, a severe limitation as a site for small commercial buildings because of the slope, and a severe limitation as a site for septic tank absorption fields because of the depth to bedrock. Overcoming these limitations is difficult. A specially designed or alternative system may be necessary to overcome the limitations on sites for septic tank absorption fields. Reinforcing the footings and backfilling with sandy material can help to prevent the damage to buildings caused by shrinking and swelling. Designing the buildings so that they conform to the natural slope of the land or shaping the site can help to overcome the slope. Building roads and streets on the contour and planning routes so that removal of bedrock is not needed can help to overcome the slope and the depth to bedrock. Adding suitable subgrade and base material can help to prevent the damage caused by low strength.

The Udorthents are not suited to urban uses. A better suited soil should be selected.

The Estate and Lily soils are in capability subclass VIs, and the Urdorthents are in capability subclass VIIs. The Estate soil is in woodland suitability group 6X8, and the Lily soil is in group 7X8. The Udorthents are not assigned to a woodland suitability group.

28EF—Estate-Lily-Udorthents complex, 15 to 35 percent slopes. These well drained, deep to shallow, moderately steep and steep, stony soils are on hillsides. The three soils were mapped as a complex because they could not be consistently separated at the scale selected for mapping. Individual areas range from about

10 to 500 acres in size. They are about 45 percent a deep Estate soil, 20 percent a moderately deep Lily soil, 20 percent shallow Udorthents, and 15 percent other soils and rock outcrop.

Typically, the Estate soil is covered by a thin layer of partially decomposed and decomposed leaves and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, dark brown stony sandy loam

Subsurface layer:
2 to 10 inches, yellowish brown stony sandy loam

Subsoil:
10 to 17 inches, strong brown gravelly sandy clay loam
17 to 41 inches, yellowish red clay loam

Bedrock:
41 to 45 inches, hard sandstone

Typically, the Lily soil is covered by a thin layer of partially decomposed and decomposed leaves, needles, and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 1 inch, grayish brown stony sandy loam

Subsurface layer:
1 to 7 inches, dark yellowish brown stony sandy loam

Subsoil:
7 to 20 inches, yellowish red stony sandy clay loam
20 to 26 inches, strong brown gravelly clay loam

Bedrock:
26 to 29 inches, hard sandstone

Udorthents are 6 to 20 inches deep over level-bedded coarse grained, acid sandstone bedrock. Limestone outcrops are at the higher elevations. These soils are mainly sandy loam, fine sandy loam, loamy sand, loamy fine sand, or the cobbly, very cobbly, stony, or very stony analogs of those textures. The content of coarse fragments ranges from 0 to 50 percent, by volume.

Included in this unit in mapping are massive, vertical escarpments of interbedded sandstone and limestone, small areas of sandstone or limestone outcrops, areas of soils that have slopes of more than 35 percent, and small areas of Clarksville soils.

Important soil properties—

Permeability: Estate—slow; Lily—moderately rapid; Udorthents—rapid
Available water capacity: Estate—moderate; Lily—low; Udorthents—very low
Organic matter content: Low
Natural fertility: Low
Soil reaction: Estate—strongly acid to neutral in the surface layer, the subsurface layer, and the upper part of the subsoil and moderately acid to neutral in the rest of the subsoil; Lily—strongly acid to extremely acid throughout the profile; Udorthents—moderately acid to neutral throughout the profile
Surface runoff: Rapid
Root zone: Estate—deep and easily penetrated by plant roots; Lily—moderately deep and easily penetrated by plant roots; Udorthents—shallow
Depth to bedrock: Estate—40 to 60 inches; Lily—20 to 40 inches; Udorthents—6 to 20 inches

Most areas are wooded. These soils are not suited to improved pasture or cultivated crops. The slope, the surface stoniness, the rock outcrops, and the escarpments are the main limitations.

The Estate and Lily soils are moderately suited to woodland. The Estate soil can produce about 88 cubic feet per acre per year of commercial wood products derived from shortleaf pine and the Lily soil about 97 cubic feet per acre per year. The Udorthents are not suited to commercial woodland and should not be cleared of their native vegetation. Suitable species on the Estate and Lily soils include shortleaf pine and northern red oak. The slope and the surface stones restrict the use of equipment. The hazard of erosion is moderate on the Lily soil. Because of the depth to bedrock, windthrow is a moderate hazard on the Lily soil.

These soils are poorly suited to most urban uses. The Estate soil has a severe limitation as a site for dwellings and small commercial buildings because of the slope and has severe limitations as a site for local roads and streets because of low strength and the slope. The Lily soil has a severe limitation as a site for dwellings, small commercial buildings, and local roads and streets because of the slope. The Estate soil has severe limitations as a site for septic tank absorption fields because of the slow permeability and the slope. The Lily soil has severe limitations as a site for septic tank absorption fields because of the depth to bedrock and the slope. Overcoming these limitations is difficult. Special design and construction methods may be needed.

The Udorthents are not suited to urban uses. A better suited soil should be selected.

The capability subclass is VIIs. The Estate soil is in woodland suitability group 6R8, and the Lily soil is in group 7R8. The Udorthents are not assigned to a woodland suitability group.

30—Healing silt loam, occasionally flooded. This deep, well drained, level and nearly level soil is on low stream terraces. Flooding is expected to occur less often than once every 2 years under usual weather conditions and generally occurs for very brief or brief periods during winter or early spring. Individual areas typically range from about 10 to 100 acres in size. Slopes typically range from 0 to 3 percent.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark brown silt loam

Subsurface layer:
6 to 14 inches, dark brown silt loam

Subsoil:
14 to 42 inches, dark yellowish brown silty clay loam
42 to 72 inches, dark brown silty clay loam

Included with this soil in mapping are small areas of sandy overwash, small areas that are frequently flooded, and small areas of Razort and Wideman soils.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Organic matter content: Moderate
Natural fertility: Moderate
Soil reaction: Moderately acid or slightly acid throughout the profile
Surface runoff: Slow or medium
Tilth: Easily tilled under a variety of moisture conditions
Root zone: Deep and easily penetrated by plant roots
Shrink-swell potential: Low

Most areas are used as pasture or hayland. This soil is well suited to pasture and hay. Suitable forage plants include bahiagrass, bermudagrass, tall fescue, and white clover. Good management includes proper stocking rates, controlled grazing, and weed and brush control. No significant limitations affect pasture management.

This soil is well suited to cultivated crops. Suitable crops include soybeans, truck crops, and small grain. Erosion is a moderate hazard if cultivated crops are grown. If the soil is well managed, clean-tilled crops that produce large amounts of crop residue can be grown safely year after year. The occasional flooding during the winter and early spring is the main hazard affecting crop production. Unless a plant cover is maintained, fast-moving floodwater can cause severe damage in a short time.

This soil is well suited to woodland. It can produce about 130 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include shortleaf pine, northern red oak, white oak, and black walnut. Seedling mortality is moderate.

This soil is poorly suited to most urban uses. The flooding is a severe hazard on sites for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields. Major flood-control measures are needed to overcome this hazard. A nearby better suited soil that is not subject to flooding should be considered for most urban uses. Low strength is a severe limitation on sites for local roads and streets.

The capability subclass is IIw, and the woodland suitability is group 9W8.

32C—Linker fine sandy loam, 3 to 8 percent slopes. This moderately deep, well drained, gently sloping soil is on mountaintops. Slopes are smooth and convex. Individual areas range from about 10 to 100 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark brown fine sandy loam

Subsoil:
6 to 13 inches, strong brown loam
13 to 31 inches, yellowish red clay loam

Bedrock:
31 to 34 inches, hard, level-bedded, acid sandstone

Included with this soil in mapping are small areas of soils that have a stony or gravelly surface layer and soils that are similar to the Linker soil but have hard bedrock at a depth of more than 40 inches. Also included are small areas of Sidon, Steprock, Mountainburg, and Nauvoo soils. The moderately well drained Sidon soils are in small concave areas on mountaintops. The well drained Steprock and Mountainburg soils are on mountaintops and benches. The deep Nauvoo soils are on mountaintops.

Important soil properties—

Permeability: Moderate
Available water capacity: Low
Organic matter content: Low

Natural fertility: Low
Soil reaction: Strongly acid to extremely acid throughout the profile
Surface runoff: Medium
Tilth: Easily tilled under a variety of moisture conditions
Root zone: Moderately deep and easily penetrated by plant roots
Depth to bedrock: 20 to 40 inches

This soil is well suited to improved pasture. Suitable forage plants include bermudagrass, lovegrass, lespedeza, tall fescue, and white clover. Good management includes proper stocking rates, rotation grazing, and brush and weed control.

This soil is moderately suited to cultivated crops. Suitable crops include corn, small grain, and truck crops that are adapted to local climatic conditions. If cultivated crops are grown, runoff is medium and erosion is a severe hazard. Under good management that includes contour farming, terraces, and minimum tillage, crops that leave a large amount of residue can be safely grown year after year in the less sloping areas. The conservation practices should be intensified as slope length and gradient increase.

This soil is moderately suited to woodland. It can produce about 88 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include shortleaf pine, loblolly pine, and eastern redcedar. Because of the depth to bedrock, windthrow is a moderate hazard.

This soil is moderately suited to most urban uses. The depth to bedrock is a moderate limitation on sites for dwellings and small commercial buildings. This limitation can be overcome by landscaping with additional fill material or by building above the bedrock. Also, areas of deeper soils can be selected as building sites. The slope is a moderate limitation on sites for small commercial buildings. Designing the buildings so that they conform to the natural slope of the land and shaping the site can help to overcome this limitation. The depth to bedrock is a moderate limitation on sites for local roads and streets. Planning grades and routes so that removal of the bedrock is not needed, ripping the bedrock in areas where it is soft enough, and blasting the bedrock when necessary can help to overcome this limitation. The depth to bedrock is a severe limitation on sites for septic tank absorption fields. Areas of deeper soils should be selected as sites for this use.

The capability subclass is IIIe, and the woodland suitability group is 6D8.

34C—Linker gravelly fine sandy loam, 3 to 8 percent slopes. This moderately deep, well drained, gently sloping soil is on mountaintops. Slopes are smooth and convex. Individual areas range from about 10 to 100 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark brown gravelly fine sandy loam

Subsoil:
6 to 13 inches, strong brown gravelly loam
13 to 31 inches, yellowish red gravelly clay loam

Bedrock:
31 to 34 inches, hard, level-bedded, acid sandstone

Included with this soil in mapping are small areas of soils that have a stony surface layer and soils that are similar to the Linker soil but have hard bedrock at a depth of more than 40 inches. Also included are small areas of Sidon, Steprock, and Mountainburg soils. The moderately well drained Sidon soils are in small concave areas on mountaintops. The well drained Steprock and Mountainburg soils are on mountaintops and benches.

Important soil properties—

Permeability: Moderate
Available water capacity: Low
Organic matter content: Low
Natural fertility: Low
Soil reaction: Strongly acid to extremely acid throughout the profile
Surface runoff: Medium
Erosion hazard: Severe
Tilth: Easily tilled under a variety of moisture conditions, but gravel on the surface hinders some tillage operations
Root zone: Moderately deep and easily penetrated by plant roots
Depth to bedrock: 20 to 40 inches

This soil is well suited to improved pasture. Suitable forage plants include bermudagrass, lovegrass, lespedeza, tall fescue, and white clover. Good management includes proper stocking rates, rotation grazing, and brush and weed control.

This soil is moderately suited to cultivated crops. Suitable crops include corn, small grain, and truck crops that are adapted to local climatic conditions. If cultivated crops are grown, runoff is medium and erosion is a severe hazard. Under good management that includes contour farming, terraces, and minimum tillage, crops that leave a large amount of residue can be safely grown year after year in the less sloping areas. The conservation practices should be intensified as slope length and gradient increase.

This soil is moderately suited to woodland. It can

produce about 88 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include shortleaf pine, loblolly pine, and eastern redcedar. Because of the depth to bedrock, windthrow is a moderate hazard.

This soil is moderately suited to most urban uses. The depth to bedrock is a moderate limitation on sites for dwellings and small commercial buildings. This limitation can be overcome by landscaping with additional fill material or by building above the bedrock. Also, areas of deeper soils can be selected as building sites. The slope is a moderate limitation on sites for small commercial buildings. Designing the buildings so that they conform to the natural slope of the land and shaping the site can help to overcome this limitation. The depth to bedrock is a moderate limitation on sites for local roads and streets. Planning grades and routes so that removal of the bedrock is not needed, ripping the bedrock in areas where it is soft enough, and blasting the bedrock when necessary can help to overcome this limitation. The depth to bedrock is a severe limitation on sites for septic tank absorption fields. Areas of deeper soils should be selected as sites for this use.

The capability subclass is IIIe, and the woodland suitability group is 6D8.

34D—Linker gravelly fine sandy loam, 8 to 12 percent slopes. This moderately deep, well drained, strongly sloping soil is on mountaintops. Slopes are smooth and convex. Individual areas range from about 10 to 100 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark brown gravelly fine sandy loam

Subsoil:
6 to 13 inches, strong brown gravelly loam
13 to 31 inches, yellowish red gravelly clay loam

Bedrock:
31 to 34 inches, hard, level-bedded, acid sandstone

Included with this soil in mapping are small areas of soils that have a stony surface layer and soils that are similar to the Linker soil but have hard bedrock at a depth of more than 40 inches. Also included are small areas of Steprock and Mountainburg soils on mountaintops and benches.

Important soil properties—

Permeability: Moderate
Available water capacity: Low
Organic matter content: Low
Natural fertility: Low
Soil reaction: Strongly acid to extremely acid throughout the profile
Surface runoff: Rapid
Tilth: Easily tilled under a variety of moisture conditions, but gravel on the surface hinders some tillage operations
Root zone: Moderately deep and easily penetrated by plant roots
Depth to bedrock: 20 to 40 inches

This soil is moderately suited to improved pasture. Suitable forage plants include bermudagrass, lovegrass, lespedeza, tall fescue, and white clover. Good management includes proper stocking rates, rotation grazing, and brush and weed control.

This soil is poorly suited to cultivated crops. Suitable crops include corn, small grain, and truck crops that are adapted to local climatic conditions. If cultivated crops are grown, runoff is rapid and erosion is a severe hazard. Under good management that includes contour farming, terraces, and minimum tillage, crops that leave a large amount of residue can be safely grown year after year in the less sloping areas. The conservation practices should be intensified as slope length and gradient increase.

This soil is moderately suited to woodland. It can produce about 88 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include shortleaf pine, loblolly pine, and eastern redcedar. Because of the depth to bedrock, windthrow is a moderate hazard.

This soil is moderately suited to most urban uses. The depth to bedrock and the slope are moderate limitations on sites for dwellings. The depth to bedrock can be overcome by landscaping with additional fill material or by building above the bedrock. Also, areas of deeper soils can be selected as building sites. The slope is a severe limitation on sites for small comercial buildings. Designing the buildings so that they conform to the natural slope of the land and shaping the site can help to overcome this limitation. The depth to bedrock and the slope are moderate limitations on sites for local roads and streets. Possible methods of overcoming the depth to bedrock include planning grades and routes so that removal of the bedrock is not needed, ripping the bedrock in areas where it is soft enough, and blasting the bedrock when necessary. The depth to bedrock is a severe limitation on sites for septic tank absorption fields. Areas of deeper soils should be selected as sites for this use.

The capability subclass is IVe, and the woodland suitability group is 6D8.

36C—Linker-Mountainburg complex, 3 to 8 percent slopes. These well drained, moderately deep and shallow, gently sloping, gravelly and stony soils are on broad mountaintops. The two soils were mapped as a complex because they could not be consistently separated at the scale selected for mapping. Individual areas range from about 10 to 100 acres in size. They are about 50 percent a moderately deep Linker soil, 40 percent a shallow Mountainburg soil, and 10 percent other soils.

The typical sequence, depth, color, and texture of the layers in the Linker soil are as follows—

Surface layer:
0 to 6 inches, dark brown gravelly fine sandy loam

Subsoil:
6 to 13 inches, strong brown gravelly loam
13 to 31 inches, yellowish red gravelly clay loam

Bedrock:
31 to 34 inches, hard, level-bedded, acid sandstone

The typical sequence, depth, color, and texture of the layers in the Mountainburg soil are as follows—

Surface layer:
0 to 3 inches, dark brown stony fine sandy loam

Subsoil:
3 to 8 inches, yellowish brown very cobbly loam
8 to 16 inches, strong brown very cobbly loam

Bedrock:
16 to 18 inches, hard, level-bedded, acid sandstone

Included in this unit in mapping are small areas of soils that do not have a gravelly or stony surface layer and small areas of Enders, Nauvoo, Sidon, and Steprock soils. Also included are outcrops of sandstone.

Important soil properties—

Permeability: Linker—moderate; Mountainburg—moderately rapid
Available water capacity: Linker—low; Mountainburg—very low
Organic matter content: Low
Natural fertility: Low
Soil reaction: Linker—strongly acid to extremely acid throughout the profile; Mountainburg—very strongly acid to moderately acid in the surface layer and strongly acid or very strongly acid in the subsoil
Surface runoff: Medium
Depth to bedrock: Linker—20 to 40 inches; Mountainburg—12 to 20 inches

Most areas are used as pasture or woodland. The Linker soil is moderately suited to pasture, but the Mountainburg soil is poorly suited. Where the pasture is established, the forage plants include tall fescue, bermudagrass, lovegrass, and native grasses. Good management includes proper stocking rates, rotation grazing, and brush and weed control.

The Linker soil is poorly suited to cultivated crops, and the Mountainburg soil is not suited. If cultivated crops are grown on the Linker soil, runoff is medium and erosion is a severe hazard. Under good management that includes contour farming, terraces, and minimum tillage, crops that leave a large amount of residue can be safely grown year after year in the less sloping areas. The conservation practices should be intensified as slope length and gradient increase. The Mountainburg soil is droughty and has large stones that limit the use of farm equipment.

The Linker soil is moderately suited to woodland. It can produce about 88 cubic feet per acre per year of commercial wood products derived from shortleaf pine. The Mountainburg soil can produce about 68 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include shortleaf pine, loblolly pine, and eastern redcedar. Because of the depth to bedrock, windthrow is a moderate hazard on the Linker soil and a severe hazard on the Mountainburg soil. In areas of the Mountainburg soil, seedling mortality is moderate because of the very low available water capacity and the large stones restrict the use of equipment.

The Linker soil is moderately suited to most urban uses. It has a moderate limitation as a site for dwellings and small commercial buildings because of the depth to bedrock. This limitation can be overcome by landscaping with additional fill material or by building above the bedrock. Also, areas of deeper soils can be selected as building sites. The slope is a moderate limitation on sites for small commercial buildings. Designing the buildings so that they conform to the natural slope of the land and shaping the site help to overcome this limitation. The depth to bedrock is a moderate limitation on sites for local roads and streets. Possible methods of overcoming this limitation include planning grades and blasting the bedrock when necessary. The depth to bedrock is a severe limitation on sites for septic tank absorption fields. Areas of deeper soils should be selected as sites for this use.

The Mountainburg soil is poorly suited to urban uses. It has severe limitations as a site for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields because of the depth to bedrock and large stones. Overcoming these limitations is difficult. A better suited soil may be needed.

The Linker soil is in capability subclass IIIe, and the Mountainburg soil is in capability subclass VIs. The

Linker soil is in woodland suitability group 6D8, and the Mountainburg soil is in group 5X3.

36DE—Linker-Mountainburg complex, 8 to 20 percent slopes. These well drained, moderately deep and shallow, strongly sloping and moderately steep, gravelly and stony soils are on broad mountaintops and ridgetops. The two soils were mapped as a complex because they could not be consistently separated at the scale selected for mapping. Individual areas range from about 10 to 600 acres in size. They are about 50 percent a moderately deep Linker soil, 40 percent a shallow Mountainburg soil, and 10 percent other soils.

Typically, the Linker soil is covered by a thin layer of partially decomposed and decomposed leaves, needles, and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark brown gravelly fine sandy loam

Subsoil:
6 to 13 inches, strong brown gravelly loam
13 to 31 inches, yellowish red gravelly clay loam

Bedrock:
31 to 34 inches, hard, level-bedded, acid sandstone

Typically, the Mountainburg soil is covered by a thin layer of partially decomposed and decomposed leaves, needles, and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, dark brown stony fine sandy loam

Subsoil:
3 to 8 inches, yellowish brown very cobbly loam
8 to 16 inches, strong brown very cobbly loam

Bedrock:
16 to 18 inches, hard, level-bedded, acid sandstone

Included in this unit in mapping are small areas of soils that do not have a gravelly or stony surface layer and small areas of Enders, Nella, and Steprock soils. Also included are small areas of rock outcrop.

Important soil properties—

Permeability: Linker—moderate; Mountainburg—moderately rapid
Available water capacity: Linker—low; Mountainburg—very low
Organic matter content: Low
Natural fertility: Low
Soil reaction: Linker—strongly acid to extremely acid throughout the profile; Mountainburg—very strongly acid to moderately acid in the surface layer and strongly acid or very strongly acid in the subsoil
Surface runoff: Rapid
Depth to bedrock: Linker—20 to 40 inches; Mountainburg—12 to 20 inches

Most areas are wooded. A few areas are cleared and used as pasture. The Linker soil is moderately suited to pasture, but the Mountainburg soil is poorly suited. Where the pasture is established, the forage plants include tall fescue, bermudagrass, lovegrass, and native grasses. Good management includes proper stocking rates, rotation grazing, and brush and weed control.

These soils are not suited to cultivated crops.

The Linker soil is moderately suited to woodland. It can produce about 88 cubic feet per acre per year of commercial wood products derived from shortleaf pine. The Mountainburg soil can produce about 68 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include shortleaf pine, loblolly pine, and eastern redcedar. Because of the depth to bedrock, windthrow is a moderate hazard on the Linker soil and a severe hazard on the Mountainburg soil. In areas of the Mountainburg soil, seedling mortality is moderate because of the very low available water capacity and the surface stones limit the use of equipment.

The Linker soil is moderately suited or poorly suited to most urban uses. It has moderate limitations as a site for dwellings and local roads and streets because of the depth to bedrock and the slope. The depth to bedrock can be overcome by landscaping with additional fill material or by building above the bedrock. Also, areas of deeper soils can be selected as building sites. The slope is a severe limitation on sites for small commercial buildings. Designing the buildings so that they conform to the natural slope of the land and shaping the site help to overcome this limitation. The depth to bedrock is a severe limitation on sites for septic tank absorption fields. Possible alternatives include selecting areas of deeper soils.

The Mountainburg soil has severe limitations as a site for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields because of the depth to bedrock and large stones. The slope is a severe limitation on sites for small commercial buildings. Overcoming these limitations is difficult. The buildings should be designed so that they conform to the natural slope of the land. A better suited soil may be needed.

The Linker soil is in capability subclass VIe, and the Mountainburg soil is in capability subclass VIs. The Linker soil is in woodland suitability group 6D8, and the Mountainburg soil is in group 5X3.

38EF—Moko-Rock outcrop complex, 15 to 50 percent slopes. This unit consists of a shallow Moko soil and limestone rock outcrops. The Moko soil is well drained and moderately steep to very steep. Typically, it is in concave areas above and below rock ledges and outcrops on hilltops and hillsides. The Moko soil and Rock outcrop were mapped as a complex because they could not be separated at the scale selected for mapping. Individual areas range from 5 to 100 acres in size. They are about 55 percent a shallow Moko soil, 35 percent Rock outcrop, and 10 percent other soils.

The typical sequence, depth, color, and texture of the layers of the Moko soil are as follows—

Surface layer:
0 to 4 inches, very dark gray very stony silt loam
4 to 17 inches, very dark grayish brown very stony silty clay loam

Bedrock:
17 to 20 inches, hard, level-bedded limestone

Included in this unit in mapping are small areas of Arkana, Clarksville, and Noark soils, areas that have slopes of more than 50 percent, and vertical bluffs of interbedded limestone and sandstone.

Important properties of the Moko soil—

Permeability: Moderate
Available water capacity: Very low
Organic matter content: Moderate
Natural fertility: Moderate
Soil reaction: Neutral or mildly alkaline throughout the profile
Surface runoff: Very rapid
Root zone: Very shallow or shallow
Depth to hard bedrock: 8 to 20 inches

This unit is not suited to cultivated crops or pasture because of the depth to bedrock, the surface stoniness, the slope, the very low available water capacity, and the rock outcrop. It is best suited to woodland, habitat for wildlife, and recreational development. It should not be cleared. The hazard of erosion is very severe if the native vegetation is disturbed.

The Moko soil can produce about 32 cubic feet per acre per year of commercial wood products derived from eastern redcedar. The main suitable species is eastern redcedar. The hazard of erosion is moderate because of the slope. The equipment limitation is moderate because of the Rock outcrop, the stones on the surface, and the slope. Seedling mortality is moderate because of the shallow rooting depth and the coarse fragments in the surface layer. Because of the depth to bedrock, windthrow is a severe hazard.

The Moko soil is poorly suited to most urban uses. The depth to bedrock, the slope, the large stones, and the Rock outcrop are severe limitations on sites for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields. Overcoming these limitations is diffcult or impractical.

The Moko soil is in capability subclass VIIs and in woodland suitability group 2R3. The Rock outcrop is in capability subclass VIII. It is not assigned to a woodland suitability group.

39G—Moko-Rock outcrop-Eden complex, 40 to 60 percent slopes. This unit consists of Rock outcrop and moderately deep or shallow, well drained, very steep, flaggy and very stony soils on mountainsides. The soils and the Rock outcrop were mapped as a complex because they could not be consistently separated at the scale selected for mapping. Individual areas range from about 20 to more than 1,000 acres in size. They are about 45 percent a shallow Moko soil, 25 percent Rock outcrop, 20 percent a moderately deep Eden soil, and 10 percent other soils.

Typically, the Moko soil is covered by a thin layer of partially decomposed and decomposed leaves, needles, and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, very dark gray very stony silty clay loam

Subsurface layer:
4 to 17 inches, very dark grayish brown very stony silty clay loam

Bedrock:
17 to 20 inches, hard, level-bedded limestone

Typically, the Eden soil is covered by a thin layer of partially decomposed and decomposed leaves, needles, and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, very dark grayish brown flaggy silty clay loam

Subsoil:
5 to 10 inches, dark brown flaggy silty clay
10 to 24 inches, yellowish brown channery clay
24 to 36 inches, yellowish brown channery clay mottled with strong brown

Bedrock:
36 to 45 inches, soft, interbedded, calcareous shale and limestone

Included in this unit in mapping are areas of the shallow Mountainburg and moderately deep Steprock soils. These soils are on the uppermost parts of the mapped areas, near sandstone rock outcrops and escarpments.

Important properties of the Moko and Eden soils—

Permeability: Moko—moderate; Eden—slow
Available water capacity: Moko—very low; Eden—low
Organic matter content: Moko—moderate; Eden—low
Natural fertility: Moderate
Soil reaction: Moko—neutral or mildly alkaline throughout the profile; Eden—moderately acid to moderately alkaline throughout the profile
Surface runoff: Very rapid
Shrink-swell potential: Moko—low; Eden—moderate
Root zone: Moko—shallow; Eden—moderately deep
Depth to bedrock: Moko—8 to 20 inches; Eden—20 to 40 inches

Most areas are wooded. Shagbark hickory, hackberry, and eastern redcedar are the dominant species. The Moko and Eden soils are subject to landslides under natural conditions. This hazard is increased greatly if the surface is disturbed.

The Moko and Eden soils are not suited to pasture or cultivated crops. The slope and the surface stones severely limit the use of farm equipment.

The Moko and Eden soils are poorly suited to commercial woodland. The Moko soil can produce about 32 cubic feet per acre per year of commercial wood products derived from eastern redcedar and the Eden soil about 37 cubic feet per acre. Eastern redcedar is suitable for planting. The equipment limitation is severe because of the slope. Seedling mortality is moderate because of the clayey surface layer in the Eden soil and the surface stones and very low available water capacity in the Moko soil. Because of the slope, erosion is a severe hazard on the Moko soil and a moderate hazard on the Eden soil. Because of the depth to bedrock, windthrow is a severe hazard on the Moko soil and a moderate hazard on the Eden soil.

The Moko and Eden soils are poorly suited to most urban uses. The Moko soil has severe limitations as a site for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields because of the slope, the depth to bedrock, and large stones. The Eden soil has a severe limitation as a site for dwellings and small commercial buildings because of the slope, severe limitations as a site for local roads and streets because of the slope and low strength, and severe limitations as a site for septic tank absorption fields because of the depth to bedrock and the slope. Overcoming these limitations is difficult or impractical. A specially designed or alternative waste disposal system may be needed.

The Moko soil is in capability subclass VIIs and in woodland suitability group 2R3. The Rock outcrop is in capability subclass VIII. It is not assigned to a woodland suitability group. The Eden soil is in capability subclass VIIe and in woodland suitability group 2R3.

42C—Mountainburg gravelly fine sandy loam, 3 to 8 percent slopes. This shallow, well drained, gently sloping soil is on mountaintops and ridges. Individual areas range from about 5 to 50 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, dark brown gravelly fine sandy loam

Subsoil:
3 to 8 inches, yellowish brown very cobbly loam
8 to 16 inches, strong brown very cobbly loam

Bedrock:
16 to 18 inches, hard, level-bedded, acid sandstone

Included with this soil in mapping are small areas of Enders, Sidon, Linker, and Steprock soils. Also included are a few small areas of rock outcrop and areas that have a stony surface.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: Very low
Organic matter content: Low
Natural fertility: Low
Soil reaction: Moderately acid to very strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil
Surface runoff: Medium or rapid
Root zone: Less than 20 inches but easily penetrated by plant roots
Depth to bedrock: 12 to 20 inches

Most areas are wooded with low-grade hardwoods and shortleaf pine. Some areas are used as pasture.

This soil is poorly suited to pasture. Suitable forage plants include little bluestem, big bluestem, native grasses, bermudagrass, and tall fescue.

This soil is poorly suited to cultivated crops. It is droughty, and the hazard of erosion is very severe. Because of gravel on the surface, seedbed preparation is difficult.

This soil is poorly suited to woodland. It can produce about 68 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include shortleaf pine, loblolly pine, and eastern

redcedar. Management concerns include moderate seedling mortality resulting from the very low available water capacity and a severe windthrow hazard resulting from the depth to bedrock.

This soil is poorly suited to most urban uses. The depth to bedrock is a severe limitation on sites for dwellings and small commercial buildings. This limitation can be overcome by landscaping with additional fill material or by building above the bedrock. Also, areas of deeper soils can be selected as building sites. The depth to bedrock is a severe limitation on sites for local roads and streets. Planning grades and routes so that removal of the bedrock is not needed, ripping the bedrock in areas where it is soft enough, and blasting the bedrock when necessary help to overcome this limitation. The depth to bedrock is a severe limitation on sites for septic tank absorption fields. Areas of deeper soils should be selected as sites for this use.

The capability subclass is IVe, and the woodland suitability group is 5D3.

45C—Nauvoo fine sandy loam, 2 to 7 percent slopes. This deep, well drained, gently sloping soil is on mountaintops and benches. Individual areas range from about 20 to 200 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark brown fine sandy loam

Subsoil:
8 to 16 inches, yellowish red sandy clay loam
16 to 23 inches, yellowish red clay loam
23 to 40 inches, red clay loam mottled with light brown
40 to 50 inches, yellowish red sandy clay loam mottled with light brown

Bedrock:
50 to 56 inches, massive, weathered, level-bedded sandstone

Included with this soil in mapping are small areas of Linker, Sidon, and Mountainburg soils. Linker soils are less than 40 inches deep over hard bedrock. Sidon soils have a fragipan. Mountainburg soils are less than 20 inches deep over hard bedrock. Also included are a few small areas where the surface layer is gravelly and areas where slopes are more than 7 percent.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Organic matter content: Low
Natural fertility: Low
Soil reaction: Strongly acid or very strongly acid throughout the profile
Surface runoff: Medium or rapid
Depth to soft bedrock: 40 to 60 inches

Most areas are used as pasture or hayland. This soil is well suited to pasture and hay. Suitable forage plants include bermudagrass, bahiagrass, tall fescue, and white clover. No significant limitations affect the use of this soil for pasture. Good management includes timely deferment of grazing, rotation grazing, brush and weed control, and proper stocking rates. These measures help to control erosion.

This soil is moderately suited to cultivated crops. Suitable crops include soybeans, grain sorghum, and winter small grain. The soil also is suitable for truck crops adapted to local climatic conditions. Runoff is medium or rapid, and the hazard of erosion is severe. Under good management that includes adequate erosion control, clean-tilled crops can be safely grown in the less sloping areas. Terraces, contour farming, minimum tillage, proper management of crop residue, and cover crops reduce the runoff rate and help to control erosion.

This soil is well suited to woodland. It can produce about 130 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include loblolly pine, shortleaf pine, and sweetgum. No significant limitations affect woodland management.

This soil is moderately suited to most urban uses. There are no significant limitations on sites for dwellings. The slope is a moderate limitation on sites for small commercial buildings. Possible corrective measures include designing the buildings so that they conform to the natural slope of the land and shaping the land. Low strength is a moderate limitation on sites for local roads and streets. Providing suitable subgrade and base material can help to overcome this limitation. The depth to bedrock and the moderate permeability are moderate limitations on sites for septic tank absorption fields. Enlarging the absorption field helps to overcome the moderate permeability.

The capability subclass is IIIe, and the woodland suitability group is 9A7.

46C—Nella gravelly loam, 3 to 8 percent slopes. This deep, well drained, gently sloping soil is in colluvial areas on benches, mountainsides, and foot slopes. Individual areas typically range from 10 to 200 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, dark brown gravelly loam

Subsoil:
2 to 6 inches, yellowish brown gravelly loam
6 to 12 inches, yellowish red gravelly clay loam
12 to 24 inches, red clay loam
24 to 60 inches, red cobbly clay loam mottled with yellowish brown
60 to 72 inches, red cobbly clay loam mottled with strong brown

Included with this soil in mapping are small areas that have stones on the surface and areas of Enders, Linker, Mountainburg, and Steprock soils. The deep Enders soils are in landscape positions similar to those of the Nella soil. The moderately deep Linker soils are on ridgetops and benches. The shallow Mountainburg and moderately deep Steprock soils are near rock outcrops and ledges in most of the mapped areas.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Organic matter content: Low
Natural fertility: Low
Soil reaction: Strongly acid or very strongly acid throughout the profile
Surface runoff: Medium
Root zone: Deep and easily penetrated by roots

Most areas are pastured. This soil is well suited to pasture. Suitable forage plants include bermudagrass, bahiagrass, tall fescue, and white clover. Management concerns include proper stocking rates, controlled grazing, measures that maintain the fertility level, and brush and weed control.

This soil is moderately suited to cultivated crops. Runoff is medium, and the hazard of erosion is severe. Measures that reduce the runoff rate and help to control erosion include contour farming, minimum tillage, terraces, and cover crops.

This soil is well suited to woodland. It can produce about 110 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include loblolly pine, shortleaf pine, northern red oak, and white oak. No significant limitations affect woodland management.

This soil is well suited to most urban uses. There are no limitations on sites for dwellings and local roads and streets. The slope is a moderate limitation on sites for small commercial buildings. Designing the buildings so that they conform to the natural slope of the land or shaping the site helps to overcome this limitation. The moderate permeability is a moderate limitation on sites for septic tank absorption fields. Increasing the size of the absorption field helps to overcome this limitation.

The capability subclass is IIIe, and the woodland suitability group is 8A7.

46DE—Nella gravelly loam, 8 to 15 percent slopes. This deep, well drained, strongly sloping and moderately steep soil is in colluvial areas on benches, mountainsides, and foot slopes. Individual areas typically range from 5 to 150 acres in size.

Typically, this soil is covered by a thin layer of partially decomposed and decomposed leaves and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, dark brown gravelly loam

Subsoil:
2 to 6 inches, yellowish brown gravelly loam
6 to 12 inches, yellowish red clay loam
12 to 24 inches, red clay loam
24 to 60 inches, red cobbly clay loam mottled with yellowish brown
60 to 72 inches, red cobbly clay loam mottled with strong brown

Included with this soil in mapping are small areas that have stones on the surface and areas of Enders, Mountainburg, and Steprock soils. The deep Enders soils are in landscape positions similar to those of the Nella soil. The shallow Mountainburg and moderately deep Steprock soils are near rock outcrops and ledges in most of the mapped areas.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Organic matter content: Low
Natural fertility: Low
Soil reaction: Strongly acid or very strongly acid throughout the profile
Surface runoff: Rapid
Root zone: Deep and easily penetrated by roots

Most areas are pastured. This soil is moderately suited to pasture. Suitable forage plants include bermudagrass, bahiagrass, tall fescue, and white clover. Good management includes proper stocking rates, controlled grazing, measures that maintain the fertility level, and brush and weed control.

This soil is poorly suited to cultivated crops. Suitable crops include grain sorghum, winter small grain, and

truck crops adapted to local climatic conditions. Erosion is a very severe hazard. Terraces, contour farming, minimum tillage, proper management of crop residue, and cover crops reduce the runoff rate and help to control erosion. The conservation practices should be intensified as slope length and gradient increase.

This soil is well suited to woodland. It can produce about 110 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include loblolly pine, shortleaf pine, northern red oak, and white oak. No significant limitations affect woodland management.

This soil is moderately suited to most urban uses. The slope is a moderate limitation on sites for dwellings and a severe limitation on sites for small commercial buildings. Designing the buildings so that they conform to the natural slope of the land or shaping the site can overcome this limitation. The slope is a moderate limitation on sites for local roads and streets. Constructing the roads and streets on the contour and land shaping and grading minimize this limitation. The moderate permeability and the slope are moderate limitations on sites for septic tank absorption fields. Shaping the site, installing the field lines on the contour, and increasing the size of the absorption field can minimize these limitations. Also, the fields can be installed in the less sloping included areas.

The capability subclass is IVe, and the woodland suitability group is 8A7.

48CD—Nella stony loam, 3 to 15 percent slopes. This deep, well drained, strongly sloping and moderately steep soil is in colluvial areas on benches, mountainsides, and foot slopes. Individual areas typically range from 5 to 300 acres in size.

Typically, this soil is covered by a thin layer of partially decomposed and decomposed leaves and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:

0 to 2 inches, dark brown stony loam

Subsoil:

2 to 6 inches, yellowish brown cobbly loam
6 to 12 inches, yellowish red clay loam
12 to 24 inches, red clay loam
24 to 60 inches, red cobbly clay loam mottled with yellowish brown
60 to 72 inches, red cobbly clay loam mottled with strong brown

Included with this soil in mapping are small areas of rock outcrop, areas that have a gravelly surface, and areas of Enders, Mountainburg, and Steprock soils. The deep Enders soils are in landscape positions similar to those of the Nella soil. The shallow Mountainburg and moderately deep Steprock soils are near rock outcrops and ledges in most of the mapped areas.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Organic matter content: Low
Natural fertility: Low
Soil reaction: Strongly acid or very strongly acid throughout the profile
Surface runoff: Rapid
Root zone: Deep and easily penetrated by roots

Most areas are pastured. This soil is moderately suited to improved pasture. The surface stones are the main limitation. Where the stones have been removed to facilitate the use of farm equipment, a moderate amount of forage is produced from native grasses and improved pasture. Suitable forage species include bermudagrass, bahiagrass, tall fescue, white clover, and native grasses. The hazard of erosion is very severe if the pasture is overgrazed. Good management includes proper stocking rates, controlled grazing, measures that maintain the fertility level, fire prevention, and brush and weed control.

This soil is not suited to cultivated crops. Runoff is rapid, and the erosion hazard is very severe. The surface stones severely limit the use of farm equipment.

This soil is well suited to woodland. It can produce about 110 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include loblolly pine, shortleaf pine, northern red oak, and white oak. The surface stones moderately limit the use of some equipment.

This soil is moderately suited to most urban uses. The slope is a moderate limitation on sites for dwellings and a severe limitation on sites for small commercial buildings. Designing the buildings so that they conform to the natural slope of the land or shaping the site can help to overcome this limitation. The slope is a moderate limitation on sites for local roads and streets. Constructing the roads and streets on the contour and land shaping and grading help to overcome this limitation. The number of large stones is a moderate limitation on sites for dwellings, small commercial buildings, and local roads and streets. The stones should be removed during construction. Excavation and disposition of the stones may be difficult and add to the cost of construction.

The slope, the moderate permeability, and the large stones are moderate limitations on sites for septic tank absorption fields. The slope can be partly overcome by

shaping the site or by installing the field lines on the contour. Also, the fields can be installed in the less sloping included areas. The stones and the moderate permeability can be partly overcome by enlarging the absorption field or by digging a wide, deep trench below the distribution lines and backfilling with material that has fewer stones.

The capability subclass is VIs, and the woodland suitability group is 8X8.

49CD—Nella-Steprock complex, 3 to 20 percent slopes. These deep and moderately deep, well drained, stony and very stony, gently sloping to moderately steep soils are on benches and mountainsides. The Nella soil typically is in colluvial areas on moderately steep mountainsides and in the less sloping concave areas on benches. The Steprock soil typically is on the upper side slopes, on mountainsides, and in convex areas on benches. The two soils were mapped as a complex because they could not be consistently separated at the scale selected for mapping. Individual areas range from about 40 to 500 acres in size. They are about 60 percent a deep Nella soil, 30 percent a moderately deep Steprock soil, and 10 percent other soils.

Typically, the Nella soil is covered by a thin layer of partially decomposed and decomposed leaves and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, dark brown stony loam

Subsoil:
2 to 6 inches, yellowish brown cobbly loam
6 to 12 inches, yellowish red clay loam
12 to 24 inches, red clay loam
24 to 60 inches, red cobbly clay loam mottled with yellowish brown
60 to 72 inches, red cobbly clay loam mottled with strong brown

Typically, the Steprock soil is covered by a thin layer of partially decomposed and decomposed leaves and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, dark brown very stony sandy loam

Subsoil:
4 to 10 inches, strong brown very flaggy sandy loam
10 to 22 inches, yellowish red very flaggy sandy clay loam

Bedrock:
22 to 53 inches, soft, weathered, platy, level-bedded sandstone with yellowish red clay loam between the plates

Included in this unit in mapping are small areas of bluffs and rock outcrop, areas that have large boulders on the surface, and areas of Enders and Mountainburg soils. The deep, well drained Enders soils are in landscape positions similar to those of the Nella soil. The shallow Mountainburg soils are near sandstone outcrops and escarpments.

Important soil properties—

Permeability: Moderate
Available water capacity: Nella—moderate; Steprock—very low
Organic matter content: Low
Soil reaction: Strongly acid or very strongly acid throughout the profile
Depth to bedrock: Nella—more than 60 inches; Steprock—20 to 40 inches
Root zone: Nella—more than 40 inches; Steprock—20 to 40 inches, but somewhat restricted by fractured sandstone in places
Shrink-swell potential: Low

Most areas are wooded, mainly with low-grade hardwoods. A few areas are pastured. These soils are poorly suited to pasture. Where the pasture is established, the forage plants include tall fescue and native grasses. The hazard of erosion is severe if the pasture is overgrazed. The surface stones limit the use of farm equipment. Good management includes proper stocking rates, controlled grazing, and weed and brush control.

These soils are not suited to cultivated crops. The main limitations are the stones on the surface and the slope.

The Nella soil is well suited to woodland. It can produce about 110 cubic feet per acre per year of commercial wood products derived from shortleaf pine. The Steprock soil can produce about 84 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable trees to plant include shortleaf pine, loblolly pine, white oak, and northern red oak. The surface stones restrict the use of equipment. Because of the depth to bedrock, windthrow is a moderate hazard on the Steprock soil.

These soils are moderately suited or poorly suited to most urban uses. The slope and large stones are moderate limitations on sites for dwellings and for local roads and streets. The slope is a severe limitation on sites for small commercial buildings. Designing the buildings so that they conform to the natural slope of

the land and building the roads and streets on the contour help to overcome the slope. The large stones should be removed. The slope, the large stones, and the moderate permeability are moderate limitations if the Nella soil is used as a site for septic tank absorption fields. These limitations can be minimized by using a specially designed or alternative system or by increasing the size of the absorption field. A better suited soil may be needed. The Steprock soil has a severe limitation as a site for septic tank absorption fields because of the depth to bedrock. Overcoming this limitation is difficult or impractical. A better suited soil may be needed.

The capability subclass is VIs. The Nella soil is in woodland suitability group 8X8, and the Steprock soil is in group 6X8.

50EF—Nella-Steprock-Mountainburg complex, 20 to 40 percent slopes. These deep to shallow, well drained, very stony, steep soils are on side slopes. The Nella soil typically is in colluvial areas on steep mountainsides and in the less sloping concave areas on benches. The Steprock soil typically is on the upper side slopes, on hillsides, and in convex areas on benches. The Mountainburg soil is near sandstone outcrops and in convex areas above sandstone bluffs. The three soils were mapped as a complex because they could not be consistently separated at the scale selected for mapping. Individual areas range from 30 to more than 500 acres in size. They are about 45 percent a deep Nella soil, 25 percent a moderately deep Steprock soil, 20 percent a shallow Mountainburg soil, and 10 percent other soils.

Typically, the Nella soil is covered by a thin layer of partially decomposed and decomposed leaves and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, dark brown very stony loam

Subsoil:
2 to 6 inches, yellowish brown cobbly loam
6 to 12 inches, yellowish red clay loam
12 to 24 inches, red clay loam
24 to 60 inches, red cobbly clay loam mottled with yellowish brown
60 to 72 inches, red cobbly clay loam mottled with strong brown

Typically, the Steprock soil is covered by a thin layer of partly decomposed and decomposed leaves and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, dark brown very stony sandy loam

Subsoil:
4 to 10 inches, strong brown very flaggy sandy loam
10 to 22 inches, yellowish red very flaggy sandy clay loam

Bedrock:
22 to 53 inches, soft, weathered, platy, level-bedded sandstone with yellowish red clay loam between the plates

Typically, the Mountainburg soil is covered by a thin layer of partly decomposed and decomposed leaves and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, dark brown very stony fine sandy loam

Subsoil:
3 to 8 inches, yellowish brown very cobbly loam
8 to 16 inches, strong brown very cobbly loam

Bedrock:
16 to 18 inches, hard, level-bedded, acid sandstone

Included in this unit in mapping are prominent sandstone bluffs, rock outcrops, soils that have large boulders on the surface, and Enders soils.

Important soil properties—

Permeability: Nella and Steprock—moderate; Mountainburg—moderately rapid
Available water capacity: Nella—moderate; Steprock and Mountainburg—very low
Organic matter content: Low
Soil reaction: Nella and Steprock—strongly acid or very strongly acid throughout the profile; Mountainburg—moderately acid or strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil
Depth to bedrock: Nella—more than 60 inches; Steprock—20 to 40 inches; Mountainburg—12 to 20 inches
Root zone: Nella—more than 40 inches; Steprock—20 to 40 inches, but somewhat restricted by fractured sandstone in places; Mountainburg—less than 20 inches
Shrink-swell potential: Low

Most areas are wooded, mainly with low-grade hardwoods. These soils are not suited to cultivated crops or improved pasture. The slope and the surface stones severely restrict the use of farm equipment. Runoff is rapid, and the erosion hazard is very severe.

The Nella soil is moderately suited or well suited to woodland. It can produce about 88 cubic feet per acre per year of commercial wood products derived from shortleaf pine on south- and west-facing slopes and about 110 cubic feet per acre on north- and east-facing slopes. The Steprock soil can produce about 78 cubic feet per acre per year of commercial wood products derived from shortleaf pine on south- and west-facing slopes and about 84 cubic feet per acre on north- and east-facing slopes. The Mountainburg soil can produce about 57 cubic feet per acre per year of commercial wood products derived from shortleaf pine on south- and west-facing slopes and about 78 cubic feet per acre on north- and east-facing slopes. Suitable species include shortleaf pine, loblolly pine, and eastern redcedar. The equipment limitation is moderate because of the slope and the surface stones. Seedling mortality is severe on south- and west-facing slopes and moderate on north- and east-facing slopes. Because of the depth to bedrock, windthrow is a moderate hazard on the Steprock soil and a severe hazard on the Mountainburg soil.

These soils are poorly suited to most urban uses. The slope is a severe limitation on sites for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields. The Steprock and Mountainburg soils have a severe limitation as sites for septic tank absorption fields because of the depth to bedrock. The Mountainburg soil has severe limitations as a site for dwellings, small commercial buildings, and local roads and streets because of the depth to bedrock and large stones. Overcoming these limitations is difficult or impractical. The deep Nella soil in the less sloping concave areas on benches is better suited to urban uses than the other soils in this unit.

The capability subclass is VIIs. The Nella soil is in woodland suitability group 6R9 on south- and west-facing slopes and 8R8 on north- and east-facing slopes. The Steprock soil is in woodland suitability group 5R9 on south- and west-facing slopes and 6R8 on north- and east-facing slopes. The Mountainburg soil is in woodland suitability group 4R3 on south- and west-facing slopes and 5R2 on north- and east-facing slopes.

50G—Nella-Steprock-Mountainburg complex, 40 to 60 percent slopes. These deep to shallow, well drained, very stony, very steep soils are on side slopes. The Nella soil typically is in colluvial areas on very steep mountainsides and in the less sloping concave areas on benches. The Steprock soil typically is on the upper side slopes and in convex areas on benches. The Mountainburg soil is near sandstone outcrops and in convex areas above sandstone bluffs. The three soils were mapped as a complex because they could not be consistently separated at the scale selected for mapping. Individual areas range from 40 to several thousand acres in size. They are about 50 percent a deep Nella soil, 25 percent a moderately deep Steprock soil, 15 percent a shallow Mountainburg soil, and 10 percent other soils.

Typically, the Nella soil is covered by a thin layer of partially decomposed and decomposed leaves and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, dark brown very stony loam

Subsoil:
2 to 6 inches, yellowish brown cobbly loam
6 to 12 inches, yellowish red clay loam
12 to 24 inches, red clay loam
24 to 60 inches, red cobbly clay loam mottled with yellowish brown
60 to 72 inches, red cobbly clay loam mottled with strong brown

Typically, the Steprock soil is covered by a thin layer of partly decomposed and decomposed leaves and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, dark brown very stony sandy loam

Subsoil:
4 to 10 inches, strong brown very flaggy sandy loam
10 to 22 inches, yellowish red very flaggy sandy clay loam

Bedrock:
22 to 53 inches, soft, weathered, platy, level-bedded sandstone with yellowish red clay loam between the plates

Typically, the Mountainburg soil is covered by a thin layer of partly decomposed and decomposed leaves and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, dark brown very stony fine sandy loam

Subsurface layer:
3 to 8 inches, yellowish brown very cobbly loam

Subsoil:
8 to 16 inches, strong brown very cobbly loam

Bedrock:
16 to 18 inches, hard, level-bedded acid sandstone

Included in this unit in mapping are prominent sandstone bluffs, rock outcrops, soils that have large boulders on the surface, and Enders soils.

Important soil properties—

Permeability: Nella and Steprock—moderate; Mountainburg—moderately rapid
Available water capacity: Nella—moderate; Steprock and Mountainburg—very low
Soil reaction: Nella and Steprock—strongly acid or very strongly acid throughout the profile; Mountainburg—moderately acid or strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil
Depth to bedrock: Nella—more than 60 inches; Steprock—20 to 40 inches; Mountainburg—12 to 20 inches
Root zone: Nella—more than 40 inches; Steprock—20 to 40 inches, but somewhat restricted by fractured sandstone in places; Mountainburg—less than 20 inches
Shrink-swell potential: Low

Most areas are wooded, mainly with low-grade hardwoods. These soils are not suited to pasture or cultivated crops. Runoff is very rapid, and the erosion hazard is very severe. The slope and the surface stones severely limit the use of farm equipment.

The Nella soil is moderately suited or well suited to woodland. It can produce about 88 cubic feet per acre per year of commercial wood products derived from shortleaf pine on south- and west-facing slopes and about 110 cubic feet per acre on north- and east-facing slopes. The Steprock soil can produce about 68 cubic feet per acre per year of commercial wood products derived from shortleaf pine on south- and west-facing slopes and about 84 cubic feet per acre on north- and east-facing slopes. The Mountainburg soil can produce about 57 cubic feet per acre per year of commercial wood products derived from shortleaf pine on south- and east-facing slopes and 78 cubic feet per acre per year on north- and west-facing slopes. Suitable species include shortleaf pine, loblolly pine, northern red oak, and white oak. The slope severely restricts the use of equipment. Erosion is a severe hazard because of the slope. Seedling mortality is severe on south- and west-facing slopes and moderate on north- and east-facing slopes. Because of the depth to bedrock, windthrow is a moderate hazard on the Steprock soil and a severe hazard on the Mountainburg soil.

These soils are poorly suited to most urban uses. The slope is a severe limitation on sites for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields. The depth to bedrock is a severe limitation if the Steprock and Mountainburg soils are used as sites for septic tank absorption fields. The Mountainburg soil has severe limitations as a site for dwellings, small commercial buildings, and local roads and streets because of the depth to bedrock and large stones. Overcoming the limitations that affect urban uses is difficult or impractical. The deep Nella soil in the less sloping concave areas on benches is better suited to these uses than the other soils in this unit.

The capability subclass is VIIs. The Nella soil is in woodland suitability group 6R9 on south- and west-facing slopes and 8R9 on north- and east-facing slopes. The Steprock soil is in woodland suitability group 5R9 on south- and west-facing slopes and 6R9 on north- and east-facing slopes. The Mountainburg soil is in woodland suitability group 4R3 on south- and east-facing slopes and 5R3 on north- and west-facing slopes.

54C2—Newnata-Summit silty clay loams, 3 to 8 percent slopes, eroded. These deep, well drained, gently sloping soils are on foot slopes. The two soils were mapped as a complex because they could not be consistently separated at the scale selected for mapping. Individual areas range from about 20 to more than 1,000 acres in size. They are about 55 percent Newnata soil, 35 percent Summit soil, and 10 percent other soils.

The typical sequence, depth, color, and texture of the layers of the Newnata soil are as follows—

Surface layer:
0 to 4 inches, very dark grayish brown silty clay loam

Subsoil:
4 to 18 inches, dark yellowish brown silty clay loam
18 to 30 inches, dark yellowish brown clay
30 to 48 inches, yellowish brown clay

Bedrock:
48 to 50 inches, gray, hard limestone

The typical sequence, depth, color, and texture of the layers of the Summit soil are as follows—

Surface layer:
0 to 5 inches, very dark grayish brown silty clay loam

Subsurface layer:
5 to 14 inches, very dark grayish brown silty clay

Subsoil:
14 to 59 inches, very dark gray silty clay mottled with dark brown 59 to 81 inches, dark gray silty clay mottled with dark yellowish brown

Included in this unit in mapping are small, shallow gullies; outcrops of shale; and small areas of Eden, Enders, and Samba soils.

Important soil properties—

Permeability: Slow
Available water capacity: Moderate
Organic matter content: Newnata—moderate; Summit—low
Natural fertility: Moderate
Soil reaction: Newnata—strongly acid to slightly acid in the surface layer and strongly acid to mildly alkaline in the subsoil; Summit—strongly acid to neutral in the surface layer and the upper part of the subsoil and moderately acid to moderately alkaline in the lower part
Surface runoff: Rapid
Landslide hazard: Severe
Shrink-swell potential: High
Root zone: Deep but not easily penetrated in the clayey subsoil
Depth to bedrock: Newnata—40 to 60 inches; Summit—more than 60 inches

Most areas are cleared and used as pasture. A few areas are wooded with mixed hardwoods. Shagbark hickory and eastern redcedar are the dominant trees. Most areas are eroded. Several inches of topsoil have been lost as a result of cultivation or overgrazing. Most areas have shallow gullies that have healed. These soils are subject to landslides under natural conditions. This hazard is increased greatly if the surface is disturbed.

These soils are moderately suited to improved pasture. Suitable forage plants include tall fescue and bermudagrass. The hazard of erosion is severe if the pasture is overgrazed. The use of farm equipment is limited during wet periods. Good management includes proper stocking rates, controlled grazing, and weed and brush control.

These soils are poorly suited to cultivated crops. Suitable crops include grain sorghum, winter small grain, and truck crops adapted to local climatic conditions. Erosion is a very severe hazard. Terraces, contour farming, minimum tillage, proper management of crop residue, and cover crops reduce the runoff rate and help to control erosion. The conservation practices should be intensified as slope length and gradient increase.

The Newnata soil is moderately suited to woodland. It can produce about 86 cubic feet per acre per year of commercial wood products derived from shortleaf pine. The Summit soil can produce about 48 cubic feet per acre per year of commercial wood products derived from eastern redcedar. Suitable species include shortleaf pine, northern red oak, white oak, and eastern redcedar. Seedling mortality and the hazard of erosion are moderate on the Summit soil. Logging roads on these soils are subject to rutting during wet periods. Scheduling logging activities for dry periods can help to prevent the formation of ruts.

These soils are poorly suited to most urban uses. They have a severe limitation as sites for dwellings and small commercial buildings because of the high shrink-swell potential. Low strength and the high shrink-swell potential are severe limitations on sites for local roads and streets. Overcoming these limitations is difficult. Reinforcing footings and backfilling with sandy material help to prevent the damage to buildings caused by shrinking and swelling. Building roads and streets on suitable subgrade or base material can help to prevent the damage caused by low strength.

These soils are severely limitated as sites for septic tank absorption fields because of the slow permeability. Also, the wetness of the Summit soil is a severe limitation. Overcoming these limitations is difficult. A specially designed or alternative system may be needed.

The Newnata soil is in capability subclass IIIe and in woodland suitability group 6R8. The Summit soil is in capability subclass IVe and in woodland suitability group 3C8.

54D2—Newnata-Summit complex, 8 to 15 percent slopes, eroded. These deep, well drained, strongly sloping and moderately steep soils are on foot slopes and mountainsides. The two soils were mapped as a complex because they could not be consistently separated at the scale selected for mapping. Individual areas range from about 20 to more than 1,000 acres in size. They are about 55 percent Newnata soil, 35 percent Summit soil, and 10 percent other soils and rock outcrop.

The typical sequence, depth, color, and texture of the layers of the Newnata soil are as follows—

Surface layer:
0 to 4 inches, very dark grayish brown flaggy silty clay loam

Subsoil:
4 to 18 inches, dark yellowish brown flaggy silty clay loam
18 to 30 inches, dark yellowish brown clay
30 to 48 inches, yellowish brown clay

Bedrock:
48 to 50 inches, gray, hard limestone

The typical sequence, depth, color, and texture of the layers of the Summit soil are as follows—

Surface layer:
0 to 5 inches, very dark grayish brown silty clay loam

Subsurface layer:
5 to 14 inches, very dark yellowish brown silty clay

Subsoil:
14 to 59 inches, very dark gray silty clay mottled with dark brown
59 to 81 inches, dark gray silty clay mottled with dark yellowish brown

Included in this unit in mapping are small, shallow gullies; outcrops of limestone and shale; and small areas of Eden, Enders, and Moko soils.

Important soil properties—

Permeability: Slow
Available water capacity: Moderate
Organic matter content: Newnata—moderate; Summit—low
Natural fertility: Moderate
Soil reaction: Newnata—strongly acid to slightly acid in the surface layer and strongly acid to mildly alkaline in the subsoil; Summit—very strongly acid to neutral in the surface layer and the upper part of the subsoil and moderately acid to moderately alkaline in the lower part
Surface runoff: Rapid
Landslide hazard: Severe
Shrink-swell potential: High
Root zone: Deep but not easily penetrated in the clayey subsoil
Depth to hard bedrock: Newnata—40 to 60 inches; Summit—more than 60 inches

Most areas are cleared and used as pasture. A few areas are wooded with mixed hardwoods. Shagbark hickory and eastern redcedar are the dominant trees. Most areas are eroded. Several inches of topsoil have been lost as a result of cultivation or overgrazing. Most areas show evidence of gullies. These soils are subject to landslides under natural conditions. This hazard is increased greatly if the surface is disturbed.

These soils are moderately suited to improved pasture. Suitable forage plants include tall fescue and bermudagrass. The hazard of erosion is severe if the pasture is overgrazed. The surface stones limit the use of some farm equipment. Good management includes proper stocking rates, controlled grazing, and weed and brush control.

These soils are not suited to cultivated crops. The main limitations are the flaggy surface layer in the Newnata soil and the slope of both soils.

The Newnata soil is moderately suited to woodland. It can produce about 86 cubic feet per acre per year of commercial wood products derived from shortleaf pine. The Summit soil can produce about 43 cubic feet per acre per year of commercial wood products derived from eastern redcedar. Suitable species include northern red oak, white oak, and eastern redcedar. Seedling motality is moderate on the Summit soil. Logging roads on these soils are subject to rutting during wet periods. Scheduling logging activities for dry periods can help to prevent the formation of ruts.

These soils are poorly suited to most urban uses. They have severe limitations as sites for dwellings and small commercial buildings because of slippage and the high shrink-swell potential. The slope is a severe limitation on sites for small commercial buildings. Low strength, the high shrink-swell potential, and slippage are severe limitations on sites for local roads and streets. Overcoming these limitations is difficult. Reinforcing the footings and backfilling with sandy material can help to prevent the damage to buildings caused by shrinking and swelling. Small commercial buildings should be designed so that they conform to the natural slope of the land. Building roads and streets on suitable subgrade or base material can help to prevent the damage caused by low strength.

These soils have severe limitations as sites for septic tank absorption fields because of the slow permeability and slippage. The Summit soil also has a severe limitation because of wetness. Overcoming these limitations is difficult. A specially designed or alternative system may be needed.

The Newnata soil is in capability subclass VIs and in woodland suitability group 6A7. The Summit soil is in capability subclass VIe and in woodland suitability group 3C8.

54E2—Newnata-Summit complex, 15 to 25 percent slopes, eroded. These deep, well drained, moderately steep and steep soils are on mountainsides. The two soils were mapped as a complex because they could not be consistently separated at the scale selected for mapping. Individual areas range from about 100 to more than 1,000 acres in size. They are about 55 percent Newnata soil, 35 percent Summit soil, and 10

percent other soils and rock outcrop.

Typically, the Newnata soil is covered by a thin layer of partially decomposed and decomposed leaves, needles, and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, very dark grayish brown flaggy silty clay loam

Subsoil:
4 to 18 inches, very dark yellowish brown silty clay loam
18 to 30 inches, dark yellowish brown clay
30 to 48 inches, yellowish brown clay

Bedrock:
48 to 50 inches, gray, hard limestone

Typically, the Summit soil is covered by a thin layer of partially decomposed and decomposed leaves, needles, and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, very dark grayish brown silty clay loam

Subsurface layer:
5 to 14 inches, very dark grayish brown silty clay

Subsoil:
14 to 59 inches, very dark gray silty clay mottled with dark brown
59 to 81 inches, dark gray silty clay mottled with dark yellowish brown

Included in this unit in mapping are small gullies, outcrops of limestone and shale, and small areas of Eden, Enders, and Moko soils.

Important soil properties—

Permeability: Slow
Available water capacity: Moderate
Organic matter content: Newnata—moderate; Summit—low
Natural fertility: Moderate
Soil reaction: Newnata—strongly acid to slightly acid in the surface layer and strongly acid to mildly alkaline in the subsoil; Summit—strongly acid to neutral in the surface layer and the upper part of the subsoil and moderately acid to moderately alkaline in the lower part
Surface runoff: Rapid
Landslide hazard: Very severe
Shrink-swell potential: High
Root zone: Deep but not easily penetrated in the clayey subsoil
Depth to bedrock: Newnata—40 to 60 inches; Summit—more than 60 inches

Most areas are wooded with mixed hardwoods. Shagbark hickory and eastern redcedar are the dominant trees. These soils are eroded in most places. Several inches of topsoil have been lost as a result of land use in the past. The soils are subject to landslides under natural conditions. This hazard is greatly increased if the surface is disturbed.

These soils are not suited to cultivated crops or improved pasture. The slope of both soils and the flaggy surface layer in the Newnata soil severely restrict the use of farm equipment.

The Newnata soil is moderately suited to woodland. It can produce about 88 cubic feet per acre per year of commercial wood products derived from shortleaf pine. The Summit soil can produce about 43 cubic feet per acre per year of commercial wood products derived from eastern redcedar. Suitable species include northern red oak, white oak, and eastern redcedar. Seedling mortality, the equipment limitation, and the hazard of erosion are moderate. Logging roads are subject to rutting during wet periods. Scheduling logging activities for dry periods can help to prevent the formation of ruts.

These soils are poorly suited to most urban uses. They have severe limitations as sites for dwellings and small commercial buildings because of slippage in areas of the Summit soil and the slope and the high shrink-swell potential of both soils. The slope, low strength, and the high shrink-swell potential are severe limitations on sites for local roads and streets. Overcoming these limitations is difficult. Reinforcing the footings and backfilling with sandy material can help to prevent the damage to buildings caused by shrinking and swelling. Small commercial buildings and dwellings should be designed so that they conform to the natural slope of the land. Building roads and streets on the contour and providing suitable subgrade or base material can help to overcome the slope, low strength, and the high shrink-swell potential. Riprapping unprotected slopes or using retaining walls can help to control slippage.

These soils have severe limitations as sites for septic tank absorption fields because of the slow permeability and the slope. The Summit soil also has a severe limitation because of wetness. Overcoming these limitations is difficult. A specially designed or alternative system may be needed.

The Newnata soil is in capability subclass VIIs and in woodland suitability group 6R8. The Summit soil is in

capability subclass VIe and in woodland suitability group 3R8.

56CD—Newnata-Eden-Moko complex, 3 to 20 percent slopes. These deep to shallow, well drained, gently sloping to moderately steep, flaggy, stony, and very stony soils are on foot slopes and mountainsides. The three soils were mapped as a complex because they could not be consistently separated at the scale selected for mapping. Individual areas range from about 20 to more than 1,000 acres in size. They are about 50 percent a deep Newnata soil, 25 percent a moderately deep Eden soil, 15 percent a shallow Moko soil, and 10 percent other soils and rock outcrop.

Typically, the Newnata soil is covered by a thin layer of partially decomposed and decomposed leaves, needles, and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, very dark grayish brown stony silty clay loam

Subsoil:
4 to 18 inches, dark yellowish brown silty clay loam
18 to 30 inches, dark yellowish brown clay
30 to 48 inches, yellowish brown clay

Bedrock:
48 to 50 inches, gray, hard limestone

Typically, the Eden soil is covered by a thin layer of partially decomposed and decomposed leaves, needles, and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, very dark grayish brown flaggy silty clay loam

Subsoil:
5 to 10 inches, dark brown flaggy silty clay
10 to 24 inches, yellowish brown channery clay
24 to 36 inches, yellowish brown channery clay mottled with strong brown

Bedrock:
36 to 45 inches, soft, interbedded, calcareous shale and limestone

Typically, the Moko soil is covered by a thin layer of partially decomposed and decomposed leaves, needles, and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, very dark gray very stony silty clay loam

Subsurface layer:
4 to 17 inches, very dark grayish brown very stony silty clay loam

Bedrock:
17 to 20 inches, hard, level-bedded limestone

Included in this unit in mapping are small eroded areas, outcrops of limestone and shale, and small areas of Enders and Summit soils.

Important soil properties—

Permeability: Newnata and Eden—slow; Moko—moderate
Available water capacity: Newnata—moderate; Eden—low; Moko—very Low
Organic matter content: Newnata and Moko—moderate; Eden—low
Soil reaction: Newnata—strongly acid to slightly acid in the surface layer and strongly acid to mildly alkaline in the subsoil; Eden—moderately acid to moderately alkaline throughout the profile; Moko—neutral or mildly alkaline throughout the profile
Surface runoff: Rapid
Shrink-swell potential: Newnata—high; Eden—moderate; Moko—low
Root zone: Newnata—deep but not easily penetrated in the clayey subsoil; Eden—moderately deep; Moko—shallow
Depth to bedrock: Newnata—40 to 60 inches; Eden—20 to 40 inches; Moko—8 to 20 inches

Most areas are wooded with mixed hardwoods. Shagbark hickory and eastern redcedar are the dominant trees. A few small areas have been cleared and are used as pasture. These soils are subject to landslides under natural conditions. This hazard is increased greatly if the surface is disturbed.

The Newnata and Eden soils are poorly suited to improved pasture, and the Moko soil is not suited. Suitable forage plants include tall fescue and bermudagrass. The hazard of erosion is severe if the pasture is overgrazed. The surface stones limit the use of farm equipment. Good management includes proper stocking rates, controlled grazing, and weed and brush control.

These soils are not suited to cultivated crops. The main limitations are the stony, very stony, or flaggy surface layer and the slope.

The Newnata soil is moderately suited to woodland. It can produce 88 cubic feet per acre per year of commercial wood products derived from shortleaf pine.

The Eden and Moko soils can produce 43 cubic feet per acre per year of commercial wood products derived from eastern redcedar. Suitable species on the Newnata soil include shortleaf pine, northern red oak, white oak, and eastern redcedar. Eastern redcedar is suitable on the Eden and Moko soils. On the Newnata soil, the equipment limitation is moderate because of the surface stoniness. On the Eden soil, the equipment limitation and seedling mortality are moderate because of the clayey surface layer. On the Moko soil, the equipment limitation is severe because of the surface stoniness and seedling mortality is moderate because of the very low available water capacity. Because of the depth to bedrock, windthrow is a moderate hazard on the Eden soil and a severe hazard on the Moko soil.

These soils are poorly suited to most urban uses. The Newnata soil has a severe limitation as a site for dwellings and small commercial buildings because of the high shrink-swell potential. Also, the slope of this soil is a severe limitation on sites for small commercial buildings, and low strength and the high shrink-swell potential are severe limitations on sites for local roads and streets. The Eden soil has moderate limitations as a site for dwellings because of the moderate shrink-swell potential, the slope, and large stones. Also, the slope of this soil is a severe limitation on sites for small commercial buildings, and low strength is a severe limitation on sites for local roads and streets. Overcoming these limitations is difficult. Reinforcing the footings and backfilling with sandy material can help to prevent the damage to buildings caused by shrinking and swelling. Small commercial buildings should be designed so that they conform to the natural slope of the land. Building roads and streets on the contour and providing suitable subgrade or base material can help to overcome the slope and low strength.

The Newnata soil has a severe limitation as a site for septic tank absorption fields because of the slow permeability, and the Eden soil has a severe limitation because of the depth to bedrock. Overcoming these limitations is difficult. A specially designed or alternative system or a better suited soil may be needed.

The Moko soil is severely limited as a site for local roads and streets, dwellings, small commercial buildings, and septic tank absorption fields because of the shallowness to bedrock and large stones. Overcoming these limitations is difficult or impractical. The slope is a severe limitation on sites for small commercial buildings. Designing the buildings so that they conform to the natural slope of the land can help to overcome this limitation.

The Newnata soil is in capability subclass VIs and in woodland suitability group 6X8. The Eden soil is in capability subclass VIe and in woodland suitability group 2C2. The Moko soil is in capability subclass VIIs and in woodland suitability group 2X3.

56EF—Newnata-Eden-Moko complex, 20 to 40 percent slopes. These deep to shallow, well drained, moderately steep and steep, flaggy, stony, and very stony soils are on mountainsides. The three soils were mapped as a complex because they could not be consistently separated at the scale selected for mapping. Individual areas range from about 100 to more than 1,000 acres in size. They are about 45 percent a deep Newnata soil, 30 percent a moderately deep Eden soil, 15 percent a shallow Moko soil, and 10 percent other soils and rock outcrop.

Typically, the Newnata soil is covered by a thin layer of partially decomposed and decomposed leaves, needles, and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, very dark grayish brown stony silty clay loam

Subsoil:
4 to 18 inches, dark yellowish brown silty clay loam
18 to 30 inches, dark yellowish brown clay
30 to 48 inches, yellowish brown clay

Bedrock:
48 to 50 inches, gray, hard limestone

Typically, the Eden soil is covered by a thin layer of partially decomposed and decomposed leaves, needles, and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, very dark grayish brown flaggy silty clay loam

Subsoil:
5 to 10 inches, dark brown flaggy silty clay
10 to 24 inches, yellowish brown channery clay
24 to 36 inches, yellowish brown channery clay mottled with strong brown

Bedrock:
36 to 45 inches, soft, interbedded, calcareous shale and limestone

Typically, the Moko soil is covered by a thin layer of partially decomposed and decomposed leaves, needles, and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, very dark gray very stony silty clay loam

Subsurface layer:
4 to 17 inches, very dark grayish brown very stony silty clay loam

Bedrock:
17 to 20 inches, hard, level-bedded limestone

Included in this unit in mapping are small eroded areas, outcrops of limestone and shale, and small areas of Enders and Nella soils.

Important soil properties—

Permeability: Newnata and Eden—slow; Moko—moderate
Available water capacity: Newnata—moderate; Eden—low; Moko—very low
Organic matter content: Newnata and Moko—moderate; Eden—low
Natural fertility: Moderate
Soil reaction: Newnata—strongly acid to slightly acid in the surface layer and strongly acid to mildly alkaline in the subsoil; Eden—moderately acid to moderately alkaline throughout the profile; Moko—neutral or mildly alkaline throughout the profile
Surface runoff: Rapid
Erosion hazard: Severe
Shrink-swell potential: Newnata—high; Eden—moderate; Moko—low
Root zone: Newnata—deep but not easily penetrated in the clayey subsoil; Eden—moderately deep; Moko—shallow
Depth to bedrock: Newnata—40 to 60 inches; Eden—20 to 40 inches; Moko—8 to 20 inches

Most areas are wooded with mixed hardwoods. Shagbark hickory and eastern redcedar are the dominant trees. These soils are subject to landslides under natural conditions. This hazard is greatly increased if the surface is disturbed.

These soils are not suited to cultivated crops or improved pasture. The slope and the flaggy, stony, or very stony surface layer severely restrict the use of farm equipment.

The Newnata soil is moderately suited to woodland. It can produce about 88 cubic feet per acre per year of commercial wood products derived from shortleaf pine. The Eden soil can produce about 37 cubic feet per acre per year of commercial wood products derived from eastern redcedar and the Moko soil about 32 cubic feet per acre. Suitable species on the Newnata soil include shortleaf pine, northern red oak, white oak, and eastern redcedar. Eastern redcedar is suitable on the Eden and Moko soils. On the Newnata soil, the hazard of erosion and the equipment limitation are moderate because of the slope and the surface stoniness. On the Eden soil, the equipment limitation is moderate because of the slope and seedling mortality is moderate because of the clayey surface layer. On the Moko soil, the equipment limitation, the erosion hazard, and seedling mortality are moderate because of the slope, the surface stones, and the very low available water capacity. Because of the depth to bedrock, windthrow is a moderate hazard on the Eden soil and a severe hazard on the Moko soil.

These soils are poorly suited to most urban uses. The Newnata soil has severe limitations as a site for dwellings and small commercial buildings because of the slope and the high shrink-swell potential and has severe limitations as a site for local roads and streets because of the slope, low strength, and the high shrink-swell potential. The Eden soil has a severe limitation as a site for dwellings and small commercial buildings because of the slope and has severe limitations as a site for local roads and streets because of the slope and low strength. Overcoming these limitations is difficult or impractical.

The Newnata soil has severe limitations as a site for septic tank absorption fields because of the slow permeability and the slope, and the Eden soil has severe limitations because of the depth to bedrock and the slope. Overcoming these limitations is difficult. A specially designed or alternative system may be needed.

The Moko soil has severe limitations as a site for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields because of the slope, the depth to bedrock, and large stones. Overcoming these limitations is difficult or impractical.

The Newnata soil is in capability subclass VIIs and in woodland suitability group 6R8. The Eden soil is in capability subclass VIIe and in woodland suitability group 2R2. The Moko soil is in capability subclass VIIs and in woodland suitability group 2R3.

58C—Nixa very cherty silt loam, 5 to 12 percent slopes. This deep, moderately well drained, gently sloping and strongly sloping soil is on narrow ridgetops. Individual areas range from about 10 to 100 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark grayish brown very cherty silt loam

Subsurface layer:
6 to 14 inches, yellowish brown very cherty silt loam

Subsoil:
14 to 23 inches, yellowish brown very cherty silt loam
23 to 37 inches, a fragipan of yellowish brown, mottled, firm, brittle very cherty silty clay loam
37 to 72 inches, red, mottled very cherty silty clay

Included with this soil in mapping are small areas of Noark soils; areas of soils that have less than 35 percent chert, by volume, in the surface layer; and small areas of soils that have slopes of less than 5 percent or more than 12 percent. Also included are small areas of soils that are similar to the Nixa soil but have chert or limestone bedrock within a depth of 60 inches.

Important soil properties—

Permeability: Very slow
Available water capacity: Low
Organic matter content: Low
Natural fertility: Low
Soil reaction: Strongly acid or very strongly acid throughout the profile
Surface runoff: Rapid
Tilth: Not easily tilled because of the high content of chert fragments
Root zone: Shallow or moderately deep because of the fragipan
Depth to bedrock: More than 60 inches

Most areas are used as pasture or hayland. This soil is moderately suited to pasture and hay. Suitable forage plants include bermudagrass, bahiagrass, tall fescue, and white clover. The slope and chert fragments on the surface are the main limitations affecting management of pasture and hayland. Good management includes timely deferment of grazing, rotation grazing, control of brush and weeds, and proper stocking rates. These measures help to control erosion.

This soil is poorly suited to cultivated crops. Suitable crops include grain sorghum, winter small grain, and truck crops adapted to local climatic conditions. A severe erosion hazard, the rapid runoff, the slope, the low available water capacity, and the chert fragments on the surface are limitations if cultivated crops are grown. Terraces, contour farming, minimum tillage, proper management of crop residue, and cover crops reduce the runoff rate and help to control erosion. The conservation practices should be intensified as slope length and gradient increase.

This soil is moderately suited to woodland. It can produce about 88 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include shortleaf pine, loblolly pine, and eastern redcedar. Seedling mortality is moderate because of the low available water capacity. Windthrow is a moderate hazard because of the shallow rooting depth.

This soil is moderately suited or poorly suited to most urban uses. The slope is a moderate limitation on sites for dwellings and for local roads and streets. It is a severe limitation on sites for small commercial buildings. It can be overcome by designing the buildings so that they conform to the natural slope of the land or by shaping the site. The very slow permeability is a severe limitation on sites for septic tank absorption fields. Possible alternatives include enlarging the absorption field and using another system of waste disposal.

The capability subclass is IVs, and the woodland suitability group is 6D8.

62C—Noark very cherty silt loam, 3 to 8 percent slopes. This deep, well drained, gently sloping soil is on ridges. Slopes are smooth and convex. Individual areas range from 10 to 450 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, dark grayish brown very cherty silt loam

Subsurface layer:
2 to 11 inches, brown very cherty silt loam

Subsoil:
11 to 16 inches, strong brown very cherty silty clay loam
16 to 35 inches, red very cherty clay
35 to 72 inches, red extremely cherty clay

Included with this soil in mapping are small areas of soils that are similar to the Noark soil but have chert or limestone bedrock within a depth of 60 inches. Also included are small areas of Nixa and Clarksville soils.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Organic matter content: Low
Natural fertility: Low
Soil reaction: Slightly acid to very strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil
Surface runoff: Rapid
Tilth: Not easily tilled because of the high content of chert fragments
Root zone: Deep

This soil is moderately suited to cultivated crops. Suitable crops include corn and small grain. Erosion is

a severe hazard. Under good management that includes adequate erosion control, clean-tilled crops can be grown in rotation with grasses. Terraces, contour farming, minimum tillage, proper management of crop residue, and cover crops reduce the runoff rate and help to control erosion. The conservation practices should be intensified as slope length and gradient increase.

Most areas are used as woodland or pasture. This soil is moderately suited to pasture. Suitable forage plants include tall fescue, white clover, and bermudagrass. The chert fragments on the surface hinder management of pasture and hayland. Good management includes proper stocking rates and weed control.

This soil is moderately suited to woodland. It can produce about 88 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable trees include shortleaf pine, northern red oak, and white oak. Seedling mortality is moderate because of the very cherty surface layer.

This soil is moderately suited to most urban uses. No significant limitations affect sites for dwellings or for local roads. The slope is a moderate limitation on sites for small commercial buildings. Designing the buildings so that they conform to the natural slope of the land or shaping the site helps to overcome this limitation. The moderate permeability is a moderate limitation on sites for septic tank absorption fields. Possible alternatives include increasing the size of the absorption field and using another system of waste disposal.

The capability subclass is IIIe, and the woodland suitability group is 6F8.

62DE—Noark very cherty silt loam, 8 to 20 percent slopes. This deep, well drained, strongly sloping and moderately steep soil is on hillsides. Slopes are smooth and convex. Individual areas range from 10 to 1,000 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, dark grayish brown very cherty silt loam

Subsurface layer:
2 to 11 inches, brown very cherty silt loam

Subsoil:
11 to 16 inches, strong brown very cherty silty clay loam
16 to 35 inches, red very cherty clay
35 to 72 inches, red extremely cherty clay

Included with this soil in mapping are small areas of Arkana, Clarksville, and Moko soils; very narrow areas of cobbly soils on flood plains; small areas of rock outcrop; and small areas of soils that are similar to the Noark soil but have chert or limestone bedrock within a depth of 60 inches.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Organic matter content: Low
Natural fertility: Low
Soil reaction: Slightly acid to very strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil
Surface runoff: Rapid
Erosion hazard: Very severe
Root zone: Deep

Most areas are used as woodland. A few areas have been cleared and are used as pasture. This soil is not suited to cultivated crops because of the slope, the chert fragments, and the very severe erosion hazard.

This soil is moderately suited to pasture. Suitable forage plants include tall fescue, white clover, and bermudagrass. The slope and the chert fragments are the main limitations affecting management of pasture and hayland. Good management includes proper stocking rates and weed and brush control.

This soil is moderately suited to woodland. It can produce about 88 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include shortleaf pine, northern red oak, and white oak. Seedling mortality is moderate because of the very cherty surface layer.

This soil is moderately suited to most urban uses. The slope is a moderate limitation on sites for dwellings and for local roads and streets. It is a severe limitation on sites for small comercial buildings. Designing the buildings so that they comform to the natural slope of the land or shaping the site helps to overcome this limitation. The slope and the moderate permeability are moderate limitations on sites for septic tank absorption fields. Possible alternatives include designing the absorption field so that it conforms to the natural slope of the land, increasing the size of the field, and using another system of waste disposal.

The capability subclass is VIe, and the woodland suitability group is 6F8.

62EF—Noark very cherty silt loam, 20 to 40 percent slopes. This deep, well drained, steep soil is on hillsides. Slopes are smooth and convex. Individual areas range from 20 to 1,000 acres in size.

Typically, this soil is covered by a thin layer of

partially decomposed and decomposed pine needles, leaves, and twigs. Under this material, the typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, dark grayish brown very cherty silt loam

Subsurface layer:
2 to 11 inches, brown very cherty silt loam

Subsoil:
11 to 16 inches, strong brown very cherty silty clay loam
16 to 35 inches, red very cherty clay
35 to 72 inches, red extremely cherty clay

Included with this soil in mapping are small areas of Arkana, Clarksville, and Moko soils; very narrow areas of cobbly soils on flood plains; small areas of rock outcrop; small areas of soils that are similar to the Noark soil but have chert or limestone bedrock within a depth of 60 inches; and small areas of soils that have slopes of more than 35 percent.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Organic matter content: Low
Natural fertility: Low
Soil reaction: Slightly acid to very strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil
Surface runoff: Rapid
Erosion hazard: Very severe
Root zone: Deep

Most areas are used as woodland. A few areas have been cleared and are used as pasture. This soil is not suited to cultivated crops and is poorly suited to pasture because of the slope, the chert fragments, the rapid runoff, and the very severe hazard of erosion.

This soil is moderately suited to woodland. It can produce about 88 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include northern red oak, shortleaf pine, and white oak. The hazard of erosion is moderate. Seedling mortality is moderate because of the very cherty surface layer. The slope restricts the use of some equipment.

This soil is poorly suited to most urban uses. The slope is a severe limitation on sites for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields. Overcoming this limitation is difficult. Selecting the less sloping areas and using specially designed structures are possible alternatives.

The capability subclass is VIIe, and the woodland suitability group is 6R8.

66C—Peridge silt loam, 1 to 5 percent slopes. This deep, well drained, nearly level and gently sloping soil is on high terraces. Slopes are smooth and convex. Individual areas range from about 10 to 40 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 4 inches, brown silt loam

Subsurface layer:
4 to 17 inches, strong brown silt loam

Subsoil:
17 to 23 inches, yellowish red silty clay loam
23 to 37 inches, red silty clay loam
37 to 62 inches, yellowish red, mottled silty clay loam
62 to 84 inches, mottled red, yellowish red, yellowish brown, and pale brown silty clay

Included with this soil in mapping are eroded areas where the surface layer and subsoil have been mixed by plowing, a few small areas of soils that have a surface layer of fine sandy loam, and areas of soils that are similar to the Peridge soil but have bedrock within a depth of 60 inches. Also included are small areas of Noark soils.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Organic matter content: Low
Natural fertility: Low
Soil reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Severe
Tilth: Good throughout a wide range in moisture content
Root zone: Deep and easily penetrated by plant roots

Most areas are pastured. This soil is well suited to pasture. Suitable forage plants include tall fescue, lespedeza, white clover, and bermudagrass. No significant limitations affect pasture management. Good management includes timely deferment of grazing, rotation grazing, control of brush and weeds, and proper stocking rates. These measures help to control erosion.

This soil is moderately suited to cultivated crops. Suitable crops include corn and small grain. Erosion is

a severe hazard. Under good management that includes adequate erosion control, clean-tilled crops can be grown in rotation with grasses. Terraces, contour farming, minimum tillage, proper management of crop residue, and cover crops reduce the runoff rate and help to control erosion. The conservation practices should be intensified as slope length and gradient increase.

This soil is well suited to woodland. It can produce about 110 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include shortleaf pine, northern red oak, hickory, and white oak. No significant limitations affect woodland management.

This soil is well suited to most urban uses. No significant limitations affect sites for dwellings or small commercial buildings. Low strength is a severe limitation on sites for local roads and streets. Providing suitable subgrade or base material helps to overcome this limitation. The moderate permeability is a moderate limitation on sites for septic tank absorption fields. Possible alternatives include increasing the size of the absorption field and using another system of waste disposal.

The capability subclass is IIIe, and the woodland suitability group is 8A7.

68C—Portia fine sandy loam, 3 to 8 percent slopes. This deep, well drained, gently sloping soil is on foot slopes. Slopes are smooth and convex. Individual areas range from about 10 to 100 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, dark brown fine sandy loam

Subsoil:
5 to 14 inches, strong brown fine sandy loam
14 to 26 inches, yellowish red sandy clay loam
26 to 38 inches, red sandy clay loam mottled with strong brown
38 to 72 inches, red sandy clay loam

Included with this soil in mapping are small areas of soils that are similar to the Portia soil but have a stony or gravelly surface layer; small areas of Estate soils, Lily soils, and Udorthents; small areas of eroded soils; and some shallow gullies.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Organic matter content: Low
Natural fertility: Low
Soil reaction: Strongly acid or moderately acid in the surface layer and strongly acid or very strongly acid in the subsoil
Surface runoff: Medium
Tilth: Easily tilled under a variety of moisture conditions
Root zone: Deep and easily penetrated by plant roots
Depth to bedrock: 60 to more than 80 inches

Most areas are pastured. This soil is well suited to pasture. Suitable forage plants include bermudagrass, bahiagrass, tall fescue, and white clover. Good management includes timely deferment of grazing, rotation grazing, control of brush and weeds, and proper stocking rates. These measures help to control erosion.

This soil is moderately suited to cultivated crops. Suitable crops include soybeans, grain sorghum, winter small grain, and truck crops adapted to local climatic conditions. Erosion is a severe hazard. Under good management that includes adequate erosion control, clean-tilled crops can be grown in rotation with grasses. Terraces, contour farming, minimum tillage, proper management of crop residue, and cover crops reduce the runoff rate and help to control erosion. The conservation practices should be intensified as slope length and gradient increase.

This soil is well suited to woodland. It can produce about 110 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include shortleaf pine, loblolly pine, northern red oak, and white oak. No significant limitations affect woodland management.

This soil is moderately suited to most urban uses. No significant limitations affect sites for dwellings or for local roads and streets. The slope is a moderate limitation on sites for small commercial buildings. Designing the buildings so that they conform to the natural slope of the land or shaping the site helps to overcome this limitation. The moderate permeability is a moderate limitation on sites for septic tank absorption fields. Possible alternatives include increasing the size of the field and using another system of waste disposal.

The capability subclass is IIIe, and the woodland suitability group is 8A7.

68D—Portia fine sandy loam, 8 to 12 percent slopes. This deep, well drained, strongly sloping soil is on foot slopes. Slopes are smooth and convex. Individual areas range from about 10 to 100 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, dark brown fine sandy loam

Subsoil:
5 to 14 inches, strong brown fine sandy loam
14 to 26 inches, yellowish red sandy clay loam
26 to 38 inches, red sandy clay loam mottled with strong brown
38 to 72 inches, red sandy clay loam

Included with this soil in mapping are small areas of soils that are similar to the Portia soil but have a stony or gravelly surface layer; small areas of Estate soils, Lily soils, and Udorthents; small areas of eroded soils; and some shallow gullies.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Organic matter content: Low
Natural fertility: Low
Soil reaction: Strongly acid or moderately acid in the surface layer and strongly acid or very strongly acid in the subsoil
Surface runoff: Rapid
Erosion hazard: Very severe
Tilth: Easily tilled under a variety of moisture conditions
Root zone: Deep and easily penetrated by plant roots
Depth to bedrock: 60 to more than 80 inches

Most areas are pastured. This soil is well suited to pasture. Suitable forage plants include bermudagrass, bahiagrass, tall fescue, and white clover. No significant limitations affect pasture management. Good management includes timely deferment of grazing, rotation grazing, control of brush and weeds, and proper stocking rates. These measures help to control erosion.

This soil is poorly suited to cultivated crops. Suitable crops include grain sorghum, winter small grain, and truck crops adapted to local climatic conditions. Erosion is a very severe hazard. Terraces, contour farming, minimum tillage, proper management of crop residue, and cover crops reduce the runoff rate and help to control erosion. The conservation practices should be intensified as slope length and gradient increase.

This soil is well suited to woodland. It can produce about 110 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include shortleaf pine, loblolly pine, northern red oak, and white oak. No significant limitations affect woodland management.

This soil is moderately suited or poorly suited to most urban uses. The slope is a moderate limitation on sites for dwellings and local roads and streets. It is a severe limitation on sites for small commercial buildings. Designing the buildings so that they conform to the natural slope of the land or shaping the site helps to overcome this limitation. The moderate permeability and the slope are moderate limitations on sites for septic tank absorption fields. Possible alternatives include increasing the size of the field and using another system of waste disposal.

The capability subclass is IVe, and the woodland suitability group is 8A7.

70—Razort loam, frequently flooded. This deep, well drained, level and nearly level soil is on flood plains that parallel streams. Flooding is expected to occur more often than once every 2 years under usual weather conditions and generally occurs for very brief or brief periods during winter or early spring. Individual areas typically range from about 5 to 100 acres in size. Slopes typically range from 0 to 3 percent.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, very dark grayish brown loam

Subsoil:
8 to 18 inches, dark brown silt loam
18 to 54 inches, dark brown clay loam

Substratum:
54 to 68 inches, dark yellowish brown sandy loam

Included with this soil in mapping are small areas of sandy or gravelly overwash along streambanks. The overwash is several feet thick. Also included are areas away from streams where sandy overwash is a few inches to about 18 inches thick; some areas of soils that are similar to the Razort soil but are occasionally flooded; and small areas of Elsah, Healing, Secesh, and Wideman soils.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Organic matter content: Moderate
Natural fertility: Moderate
Soil reaction: Neutral or slightly acid in the surface layer and moderately acid or slightly acid in the subsoil
Surface runoff: Slow or medium
Erosion hazard: Severe during floods
Tilth: Easily tilled under a variety of moisture conditions
Root zone: Deep and easily penetrated by plant roots
Shrink-swell potential: Low

Most areas are used as pasture or hayland. This soil is well suited to pasture and hay. Suitable forage plants

include bahiagrass, bermudagrass, tall fescue, and white clover. Good management includes proper stocking rates, controlled grazing, and weed and brush control. No significant limitations affect pasture management.

This soil is unsuited to cultivated crops. The frequent flooding during winter and early spring is the main hazard affecting crop production. Fast-moving floodwater can severely damage areas that do not have a plant cover.

This soil can produce about 130 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include shortleaf pine, northern red oak, white oak, and black walnut. Seedling mortality is moderate because of the flooding.

This soil is poorly suited to most urban uses. The frequent flooding is a severe hazard on sites for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields. A major flood-control system is needed to overcome this hazard. A better suited soil that is not subject to flooding should be considered for most urban uses.

The capability subclass is Vw, and the woodland suitability group is 9W8.

72—Riverwash, frequently flooded. This map unit is along the larger drainageways in the county, mainly the Buffalo River and its tributaries.

Riverwash consists of gravelly, sandy, and cobbly sediment on streambanks and in stream channels. This sediment forms islands in many places. Some areas are partially vegetated with willow, sycamore, and sweetgum and to a lesser extent with river birch, water willow, and smartweed. Other areas support little or no vegetation. Because the available water capacity is very low, droughtiness is a severe limitation affecting shallow-rooted plants.

Areas of this unit are constantly being changed and reworked by frequent flooding. These areas are best suited to wildlife habitat and recreational development.

This unit is in capability class VIII. It has not been assigned to a woodland suitability group.

73—Rock outcrop, very steep. This map unit is along the larger drainageways in the county, mainly the Buffalo River and Bear Creek. It consists of very steep or vertical bluffs of dominantly limestone bedrock. Most areas are bare, but some included areas are partially vegetated with eastern redcedar, ash, juniper, and a few hardwoods. This unit is best suited to wildlife habitat and recreational development.

This unit is in capability class VIII. It has not been assigned to a woodland suitability group.

74B—Samba silty clay loam, 0 to 2 percent slopes. This deep, poorly drained, level and nearly level soil is on depressional stream terraces. It is subject to rare flooding under unusual weather conditions. Individual areas range from about 20 to more than 200 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, black silty clay loam

Subsurface layer:
8 to 15 inches, very dark grayish brown silty clay loam

Subsoil:
15 to 34 inches, grayish brown clay mottled with yellowish brown
34 to 48 inches, light brownish gray clay mottled with yellowish brown
48 to 72 inches, light brownish gray silty clay mottled with yellowish brown

Included with this soil in mapping are small areas of Summit soils and soils that have a surface layer of silt loam or silty clay.

Important soil properties—

Permeability: Very slow
Available water capacity: High
Organic matter content: Moderate
Natural fertility: Moderate
Soil reaction: Slightly acid to moderately acid in the surface layer and strongly acid to neutral in the subsoil
Surface runoff: Slow
Shrink-swell potential: High
Root zone: Deep
Depth to bedrock: More than 50 inches
Water table: Within 12 inches of the surface from December through April

Most areas are pastured. This soil is well suited to pasture. Suitable forage plants include tall fescue, white clover, bermudagrass, and lespedeza. Good management includes weed and brush control, measures that maintain the fertility level, and proper stocking rates.

This soil is moderately suited to cultivated crops. Suitable crops include soybeans and small grain. Runoff is slow, and wetness is a severe limitation. Farming activities are delayed for several days after a rain unless a surface drainage system is installed. Under good management that includes a drainage

system, clean-tilled crops that produce large amounts of crop residue can be safely grown year after year.

This soil is moderately suited to woodland. It can produce about 60 cubic feet per acre per year of commercial wood products derived from water oak. Suitable species include water oak, sweetgum, and willow oak. Seedling mortality and the equipment limitation are moderate. Logging roads are subject to rutting during wet periods. Scheduling logging activities for dry periods can help prevent the formation of ruts. Because of the wetness, windthrow is a severe hazard.

This soil is poorly suited to most urban uses. The rare flooding, the high shrink-swell potential, and the wetness are severe limitations on sites for dwellings and small commercial buildings. Low strength, the wetness, and the high shrink-swell potential are severe limitations on sites for local roads and streets. Overcoming these limitations is difficult. A major flood-control system is needed. Reinforcing the footings and backfilling with sandy material can help to prevent the damage to buildings caused by shrinking and swelling. Building roads and streets on suitable subgrade or base material can help to prevent the damage caused by low strength. The soil has severe limitations as a site for septic tank absorption fields because of the slow permeability and the wetness. Overcoming these limitations is difficult. A specially designed or alternative system may be needed.

The capability subclass is IIIw, and the woodland suitability group is 4W9.

76—Secesh silt loam, frequently flooded. This deep, well drained, level and nearly level soil is on flood plains and low terraces that parallel streams. Flooding is expected to occur more often than once every 2 years under usual weather conditions and generally occurs for very brief periods during winter or early spring. Individual areas are long and narrow and range from about 5 to 60 acres in size. Slopes are undulating and range from 0 to 3 percent.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark brown silt loam

Underlying layers:
6 to 16 inches, dark yellowish brown silt loam
16 to 38 inches, dark yellowish brown cherty silty clay loam
38 to 48 inches, strong brown cherty silty clay loam
48 to 72 inches, yellowish red very cherty silty clay loam

Included with this soil in mapping are small areas of Elsah soils, gravel bars, and small areas of soils that have a very cobbly or stony surface layer and are adjacent to stream channels. Elsah soils have a higher content of coarse fragments in the surface layer than the Secesh soil and are slightly lower in elevation.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Organic matter content: Low
Natural fertility: Low
Soil reaction: Slightly acid or moderately acid in the surface layer and moderately acid or strongly acid in the subsoil
Surface runoff: Slow or medium
Erosion hazard: Slight during periods when the soil is not flooded
Tilth: Easily tilled under a variety of moisture conditions
Root zone: Deep and easily penetrated by plant roots
Shrink-swell potential: Low

Most areas are used as woodland or pasture. This soil is not suited to cultivated crops because of the frequent flooding. Fast-moving floodwater can severely damage areas that do not have a plant cover.

This soil is moderately suited to pasture and hay. Suitable forage plants include bermudagrass, bahiagrass, lespedeza, and tall fescue. Good management includes proper stocking rates, timely deferment of grazing, and weed and brush control. The soil is well suited to warm-season grasses once the plants are established.

This soil can produce about 110 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable trees include shortleaf pine, American sycamore, and black walnut. Seedling mortality is moderate because of the flooding.

This soil is not suited to most urban uses. The flooding is a severe hazard on sites for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields. A major flood-control system is needed to overcome this hazard.

The capability subclass is IVw, and the woodland suitability group is 8W8.

78C—Sidon loam, 2 to 6 percent slopes. This deep, gently sloping, moderately well drained soil is on mountaintops. Individual areas range from 10 to 100 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark yellowish brown loam

Subsoil:
6 to 22 inches, yellowish brown loam

22 to 39 inches, mottled red, light gray, and yellowish brown, firm and brittle loam
39 to 72 inches, red, mottled, firm and brittle clay loam

Included with this soil in mapping are small areas of Linker, Mountainburg, and Nauvoo soils and small areas of poorly drained soils.

Important soil properties—

Permeability: Moderate in the surface layer and in the upper part of the subsoil, slow in the firm part of the subsoil
Available water capacity: Moderate
Organic matter content: Low
Natural fertility: Low
Soil reaction: Strongly acid or very strongly acid throughout the profile
Surface runoff: Medium
Tilth: Easily tilled under a variety of moisture conditions
Water table: Perched above the firm part of the subsoil in winter and early spring.
Root zone: Typically, 0 to about 25 inches, at which depth the firm and brittle subsoil restricts root penetration
Shrink-swell potential: Low

Most areas are pastured. This soil is well suited to pasture. Suitable forage plants include bermudagrass, bahiagrass, tall fescue, and white clover. No significant limitations affect pasture management. Good management includes timely deferment of grazing, rotation grazing, control of brush and weeds, and proper stocking rates. These measures help to control erosion.

This soil is moderately suited to cultivated crops. Suitable crops include small grain and truck crops adapted to local climatic conditions. Erosion is a severe hazard. Under good management that includes adequate erosion control, clean-tilled crops can be grown in rotation with grasses. Terraces, contour farming, minimum tillage, proper management of crop residue, and cover crops reduce the runoff rate and help to control erosion. The conservation practices should be intensified as slope length and gradient increase.

This soil is well suited to woodland. It can produce about 110 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include shortleaf pine, loblolly pine, northern red oak, and white oak. Windthrow is a moderate hazard because of the shallow rooting depth.

This soil is moderately suited to most urban uses. Wetness is a moderate limitation on sites for dwellings and small commercial buildings. This limitation can be partly overcome by shaping the site so that water flows away from the buildings and by installing tile drains near the footings. The slope is a moderate limitation on sites for small commercial buildings. Shaping the land and designing the buildings so that they conform to the natural slope of the land can help to overcome this limitation. Low strength and wetness are moderate limitations on sites for local roads and streets. Low strength can be partly overcome by providing suitable subgrade or base material and by applying special construction methods that improve the traffic-supporting capacity of the roads and streets. Wetness can be overcome by constructing the roads and streets on raised fill material and by installing a drainage system.

The slow permeability and the wetness are severe limitations on sites for septic tank absorption fields. The slow permeability can be partly overcome by enlarging the absorption field and digging a wide, deep trench below the distribution lines. Installing a drainage system around the absorption field and installing diversions that intercept water from the higher areas can help to overcome the wetness. Overcoming the limitations is difficult. A better suited soil or a specially designed or alternative system may be necessary.

The capability subclass is IIIe, and the woodland suitability group is 7D8.

80B—Spadra loam, 1 to 5 percent slopes. This deep, well drained, nearly level and gently sloping soil is on stream terraces. It is subject to rare flooding under unusual weather conditions. Individual areas range from about 5 to 40 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark brown loam

Subsoil:
6 to 28 inches, dark brown sandy clay loam
28 to 46 inches, dark brown loam

Substratum:
46 to 65 inches, reddish brown loam

Included with this soil in mapping are small areas of Kenn soils, small areas of poorly drained soils, and areas of soils that have a gravelly surface layer.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Organic matter content: Low
Natural fertility: Moderate
Soil reaction: Moderately acid to very strongly acid throughout the profile

Surface runoff: Medium
Tilth: Easily tilled under a variety of moisture conditions
Root zone: Deep and easily penetrated by plant roots

Most areas are pastured. This soil is well suited to pasture. Suitable forage plants include bahiagrass, Bermudagrass, tall fescue, and white clover. No significant limitations affect pasture management. Good management includes timely deferment of grazing, rotation grazing, control of brush and weeds, and proper stocking rates. These measures help to control erosion.

This soil is moderately suited to cultivated crops. Suitable crops include soybeans, grain sorghum, winter small grain, and truck crops adapted to local climatic conditions. Erosion is a severe hazard. Under good management that includes adequate erosion control, clean-tilled crops can be grown in rotation with grasses. Terraces, contour farming, minimum tillage, proper management of crop residue, and cover crops reduce the runoff rate and help to control erosion. The conservation practices should be intensified as slope length and gradient increase.

This soil is well suited to woodland. It can produce about 130 cubic feet per acre per year of commercial wood products derived from shortleaf pine. Suitable species include shortleaf pine, loblolly pine, black walnut, and southern red oak. No significant limitations affect woodland management.

This soil is poorly suited to most urban uses. The rare flooding is a severe hazard on sites for dwellings and small commercial buildings. The rare flooding and low strength are moderate limitations on sites for local roads and streets. The moderate permeability and the rare flooding are moderate limitations on sites for septic tank absorption fields. The restricted permeability can be partly overcome by increasing the size of the absorption field or by otherwise modifying the absorption field. A major flood-control system is needed.

The capability subclass is IIIe, and the woodland suitability group is 9A7.

82C2—Summit silty clay loam, 3 to 8 percent slopes, eroded. This deep, well drained, gently sloping soil is on foot slopes. Individual areas range from about 20 to more than 200 acres in size.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 5 inches, very dark grayish brown silty clay loam

Subsurface layer:
5 to 14 inches, very dark yellowish brown silty clay

Subsoil:
14 to 59 inches, very dark gray silty clay mottled with dark brown
59 to 81 inches, dark gray silty clay mottled with dark yellowish brown

Included with this soil in mapping are small areas of Eden, Newnata, and Samba soils.

Important soil properties—

Permeability: Slow
Available water capacity: Moderate
Organic matter content: Low
Natural fertility: Moderate
Soil reaction: Strongly acid to neutral in the surface layer and the upper part of the subsoil and moderately acid to moderately alkaline in the lower part of the subsoil
Surface runoff: Medium
Landslide hazard: Severe
Shrink-swell potential: High
Root zone: Deep
Depth to bedrock: More than 60 inches

Most areas are used as pasture or are wooded with mixed hardwoods. Shagbark hickory and eastern redcedar are the dominant trees. This soil is eroded. Several inches of topsoil have been lost in places as a result of past cultural practices. Most areas have shallow gullies that have healed. The soil is subject to landslides under natural conditions. This hazard is increased greatly if the surface is disturbed.

This soil is moderately suited to improved pasture. Suitable forage plants include tall fescue and bermudagrass. The hazard of erosion is severe if the pasture is overgrazed. The use of farm equipment is limited during wet periods. Good management includes proper stocking rates, controlled grazing, and weed and brush control.

This soil is poorly suited to cultivated crops. Suitable crops include grain sorghum, winter small grain, and truck crops adapted to local climatic conditions. Erosion is a very severe hazard. Terraces, contour farming, minimum tillage, proper management of crop residue, and cover crops reduce the runoff rate and help to control erosion. The conservation practices should be intensified as slope length and gradient increase.

This soil is poorly suited to woodland. It can produce about 43 cubic feet per acre per year of commercial wood products derived from eastern redcedar. Suitable species include northern red oak, white oak, and eastern redcedar. Seedling mortality is moderate. Logging roads are subject to rutting during wet periods. Scheduling logging activities for dry periods can help to prevent the formation of ruts.

This soil is poorly suited to most urban uses. The high shrink-swell potential is a severe limitation on sites for dwellings and small commercial buildings. Low strength and the high shrink-swell potential are severe limitations on sites for local roads and streets. Overcoming these limitations is difficult. Reinforcing the footings and backfilling with sandy material can help to prevent the damage to buildings caused by shrinking and swelling. Building roads and streets on suitable subgrade or base material can help to prevent the damage caused by low strength. The soil has severe limitations as a site for septic tank absorption fields because of the slow permeability and the wetness. Overcoming these limitations is difficult. A specially designed or alternative system may be needed.

The capability subclass is IVe, and the woodland suitability group is 3C8.

84—Wideman loamy fine sand, frequently flooded. This deep, excessively drained, level and nearly level soil is on flood plains and natural levees along streams. It is frequently flooded for very brief periods in winter and spring during most years. Individual areas are long and narrow and range from 5 to 30 acres in size. Slopes are smooth and undulating and range from 0 to 3 percent.

The typical sequence, depth, color, and texture of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, brown loamy fine sand

Substratum:
6 to 13 inches, light yellowish brown loamy sand
13 to 17 inches, dark yellowish brown sandy loam
17 to 22 inches, light yellowish brown loamy sand
22 to 25 inches, very pale brown loamy sand
25 to 38 inches, light yellowish brown loamy fine sand
38 to 51 inches, very pale brown loamy sand
51 to 56 inches, dark grayish brown fine sandy loam
56 to 72 inches, very pale brown loamy sand

Included with this soil in mapping are small areas of Healing and Razort soils, areas of soils that have fine sandy loam overwash, narrow overflow channels, and gravel bars. The well drained Healing soils are on low terraces along the Buffalo River. They have a surface layer of silt loam or loam. The well drained Razort soils are on frequently flooded natural levees and flood plains at the slightly higher elevations.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: Low
Organic matter content: Low
Natural fertility: Low
Soil reaction: Strongly acid or moderately acid in the surface layer and strongly acid to slightly acid in the substratum
Surface runoff: Slow
Tilth: Good
Root zone: Deep

This soil is moderately suited to pasture. Suitable forage plants include bermudagrass, lespedeza, tall fescue, and white clover. Good management includes proper stocking rates, controlled grazing, and weed and brush control.

This soil is not suited to cultivated crops because of the flooding. Fast-moving floodwater can severely damage areas that do not have a good plant cover.

This soil is moderately suited to woodland. It can produce 103 cubic feet per acre per year of commercial wood products derived from eastern cottonwood. Suitable species include shortleaf pine, loblolly pine, sweetgum, and eastern cottonwood. Because of the sandy surface layer, seedling mortality is severe.

This soil is poorly suited to most urban uses. The frequent flooding is a severe hazard on sites for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields. A major flood-control system is necessary to overcome this hazard. The included soils that are at the higher elevations and are not subject to flooding or nearby areas of other soils should be considered for most urban uses.

The capability subclass is Vw, and the woodland suitability group is 7S9.

Prime Farmland

In this section, prime farmland is defined and the soils in Searcy County that are considered prime farmland are listed.

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

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to food, feed, forage, fiber, and oilseed crops. Such soils have properties that favor the economic production of sustained high yields of crops. The soils need only to be treated and managed by acceptable farming methods. The moisture supply must be adequate, and the growing season must be sufficiently long. Prime farmland soils produce the highest yields with minimal expenditure of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They are used for food or fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land is land not available for farming in national forests, national parks, military reservations, and state parks.

Prime farmland soils usually receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not frequently flooded during the growing season. The slope ranges mainly from 0 to 8 percent.

About 30,052 acres in Searcy County, or only 7 percent of the total acreage, is prime farmland. This land is in scattered areas throughout the central and southern parts of the county. It is on gently sloping mountaintops and plateaus and along the larger streams. It is mainly in general soil map units 7 and 8. Most of the prime farmland in the Ozark National Forest is used as woodland, and that on privately owned land is used mainly as pasture and hayland.

Most of the prime farmland in the county is used for some agricultural purpose. There has been no significant trend to convert the prime farmland to industrial and urban uses. A loss of this land would put pressure on marginal land, which generally is less productive because it is more erodible, droughty, and difficult to cultivate.

The following map units are considered prime farmland in Searcy County. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 4. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

The soils identified as prime farmland in Searcy County are:

30	Healing silt loam, occasionally flooded
32C	Linker fine sandy loam, 3 to 8 percent slopes
34C	Linker gravelly fine sandy loam, 3 to 8 percent slopes
45C	Nauvoo fine sandy loam, 2 to 7 percent slopes
46C	Nella gravelly loam, 3 to 8 percent slopes
66C	Peridge silt loam, 1 to 5 percent slopes
68C	Portia fine sandy loam, 3 to 8 percent slopes
74B	Samba silty clay loam, 0 to 2 percent slopes
78C	Sidon loam, 2 to 6 percent slopes
80B	Spadra loam, 1 to 5 percent slopes

Use and Management of the Soils

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

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

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

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

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

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

Crops and Pasture

Larry O. Farris, conservation agronomist, Soil Conservation Service, helped prepare this section.

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

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

About 134,400 acres in Searcy County is used for crops or pasture. Of this, about 1,200 acres is used for cultivated crops and 133,200 acres for pasture. Also, about 12,300 acres is used as unimproved pasture or rangeland. Much of the 280,800 acres of woodland in the county also is grazed by livestock.

Most of the cleared land in the county is used for pasture and hay. The acreage of row crops is small. It has declined rapidly over the past 30 years. The soils that are well suited to row crops are primarily on bottom land and terraces along the Buffalo River, on terraces above the flood plains along the smaller streams, and in a few small, gently sloping areas on uplands. The suitable crops in these areas are grain sorghum, corn, small grain, and soybeans. Some gently sloping or moderately sloping soils on uplands are moderately suited or well suited to drilled or sown crops, mainly oats, wheat, and grain sorghum. Most of the soils in the county are poorly suited or unsuited to intensive use as cropland because of surface stoniness, the slope, shallowness to bedrock, and a high content of coarse fragments.

Contour farming, grassed waterways, and terraces are needed on the more sloping soils that are used for cultivated crops. Annual cover crops or grasses and legumes should be grown regularly in the cropping system if the hazard of erosion is severe or very severe.

Unless protected by a plant cover, most of the soils tend to compact and form a crust after heavy rains. High-residue crops, cover crops, and proper

management of crop residue help to maintain good tilth. Shredding crop residue and spreading it evenly on the surface can help to control erosion and add organic matter to the soil. Conservative tillage is needed in areas where the hazard of erosion is slight or moderate. No-till farming is needed in areas where the hazard of erosion is severe.

In general, the soils on uplands in the county are low in content of nitrogen, potassium, phosphorus, calcium, and organic matter. The kinds and amounts of fertilizer applied on these soils should be based on the results of soil tests, the kind of crop to be grown, past experience, the productivity of the soil, and the expected level of yields. Applications of lime improve crop growth on most soils. Lime generally is needed for the satisfactory production of such crops as alfalfa, soybeans, white clover, and red clover and of vegetables and other specialty crops.

Many of the soils in the county are well suited to improved pasture. Grazing is essential for the production of high-quality forage, for stand survival, and for erosion control. Grazing helps to maintain sufficient and generally vigorous top growth during the growing season. Good management includes restricted grazing of tall fescue and other cool-season grasses during the hot, dry summer. Brush control is essential, and weed control generally is needed. Rotation grazing and applications of fertilizer also are needed.

Pasture grasses respond well to applications of nitrogen fertilizer. Grass and legume mixtures may require phosphate, potash, and lime. The amounts should be based on the results of soil tests.

Perennial grasses or mixtures of grasses and legumes are grown for pasture and hay. The mixtures generally consist of either a warm-season or a cool-season perennial grass and a suitable legume.

Tall fescue is the most common pasture grass grown in the county. It is a cool-season perennial that is propagated by seeding, generally in fall. Common bermudagrass and improved bermudagrasses also are grown. These warm-season perennials are propagated by sprigging, generally in spring. Bermudagrass usually is propagated by sprigging because seeded stands of this grass are more susceptible to winterkill. Red clover, white clover, annual lespedeza, and sericea lespedeza are the most common legumes. The fertile, well drained Razort and Spadra soils on bottom land and terraces along the Buffalo River and other large streams are suited to alfalfa.

A small acreage in the county is used for commercial or home orchards or for home gardens. Although they produce little income, these enterprises are important. Most farm families and many urban families either can or freeze homegrown fruit and vegetables for personal use.

Yields Per Acre

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

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

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

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

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

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major, and generally expensive, landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and

limitations of groups of soils for woodland and for engineering purposes.

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

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 they have other limitations, impractical to remove, that limit their use.

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

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

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

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 hazard is the risk of erosion unless a close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

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

The capability classification of each map unit is given in the section "Detailed Soil Map Units."

Woodland Management and Productivity

Kelly M. Koonce, forester, Soil Conservation Service, helped prepare this section.

According to 1988 Forest Service statistics for Arkansas Counties in the Ozarks, about 285,500 acres in Searcy County, or 67 percent of the total acreage, is used as woodland. Of this, 232,349 acres, or about 81 percent, is privately owned; 31,123 acres, or 11 percent, is administered by the Forest Service; and 6,275 acres, or about 2 percent, is owned by industries. There are approximately 2,268 forest landowners in the county. The county has 15 industries that manufacture lumber, charcoal, cabinets, crossties, pallets, furniture, posts, handles, and chips.

The principal forest cover type *(6)* is oak-hickory, which covers more than 256,400 acres in the county. Other types are oak-pine, which covers about 17,500 acres, and loblolly-shortleaf pine, which covers about 11,600 acres. These forest types make up about 220.2 million cubic feet of live hardwood stock and 23 million cubic feet of live softwood stock.

The main tree species are white oak, red oak, shortleaf pine, eastern redcedar, sweetgum, blackgum, post oak, and various hickories. On most of the soils in the county, trees can be grown for commercial timber and for wildlife habitat, recreation, esthetic value, and soil and water conservation.

Soils vary in their ability to produce trees. Available water capacity and depth of the root zone have major effects on tree growth. Fertility and texture also influence tree growth. Elevation, aspect, and climate determine the kinds of trees that can grow on a site. Elevation and aspect are of particular importance in mountainous areas.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to applications of fertilizer than others, and some are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special reforestation efforts. In the section "Detailed Soil Map Units," the description of each map unit in the survey area suitable for timber includes information about productivity, limitations in harvesting timber, and management concerns in producing timber. The common forest understory plants also are listed. Table 6 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight*, *moderate*, and *severe* are used to indicate the degree of

the major soil limitations to be considered in forest management.

Table 6 lists the *woodland suitability group* symbol for each soil. The first part of the symbol, a number, indicates the potential productivity of a soil for the indicator species in cubic meters per hectare. The larger the number, the greater the potential productivity. Potential productivity is based on the site index and the point where mean annual increment is the greatest.

The second part of the woodland suitability group symbol, a letter, indicates the major kind of soil limitation affecting use and management. The letter *R* indicates a soil that has a significant limitation because of steepness of slope. The letter *X* indicates that a soil has restrictions because of stones or rocks on the surface. The letter *W* indicates a soil in which excessive water, either seasonal or year-round, causes a significant limitation. The letter *T* indicates a soil that has, within the root zone, excessive alkalinity or acidity, sodium salts, or other toxic substances that limit the development of desirable trees. The letter *D* indicates a soil that has a limitation because of a restricted rooting depth, such as a shallow soil that is underlain by bedrock, a hardpan, or other layers that restrict roots. The letter *C* indicates a soil that has a limitation because of the kind or amount of clay in the upper part of the profile. The letter *S* indicates a dry, sandy soil. The letter *F* indicates a soil that has a large amount of coarse fragments. The letter *A* indicates a soil having no significant limitations that affect forest use and management. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

The third part of the woodland suitability group symbol, a numeral, indicates the kind of trees to which the soils in the group are best suited and the severity of hazards or limitations to be considered in forest management. Only the erosion hazard, the equipment limitation, and seedling mortality are considered in the ratings. 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.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation or harvesting activities expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion-control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of *moderate* or *severe* indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning harvesting and reforestation activities, or the use of special equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, or susceptibility of the surface layer to compaction. As slope gradient and length increase, it becomes more difficult to use wheeled equipment. On the steeper slopes, tracked equipment must be used. On the steepest slopes, even tracked equipment cannot be operated and more sophisticated systems are needed. The rating is *slight* if equipment use is restricted by soil wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are so steep that wheeled equipment cannot be operated safely across the slope, if wetness restricts equipment use from 2 to 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize soil compaction. The rating is *severe* if slopes are so steep that tracked equipment cannot be operated safely across the slope, if wetness restricts equipment use for more than 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize soil compaction. Ratings of *moderate* or *severe* indicate a need to choose the most suitable equipment and to carefully plan the timing of harvesting and other management activities.

Ratings of *seedling mortality* refer to the probability of the death of naturally occurring or properly planted seedlings of good stock in periods of normal rainfall, as influenced by kinds of soil or topographic features. Seedling mortality is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, rooting depth, and the aspect of the slope. The mortality rate generally is highest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of *moderate* or *severe* indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, installing a surface drainage system, and providing artificial shade for seedlings. Reinforcement planting is often needed if the risk is moderate or severe.

Ratings of *windthrow hazard* indicate the likelihood that trees will be uprooted by the wind. A restricted rooting depth is the main reason for windthrow. Rooting depth can be restricted by a high water table, a fragipan, or bedrock or by a combination of such factors as soil wetness, texture, structure, and depth. The risk is *slight* if strong winds cause trees to break but do not uproot them; *moderate* if strong winds cause an occasional tree to be blown over and many trees to break; and *severe* if moderate or strong winds commonly blow trees over. Ratings of *moderate* or *severe* indicate that care is needed in thinning or that the stand should not be thinned at all. Special equipment may be needed to prevent damage to shallow root systems in partial cutting operations. A plan for the periodic removal of windthrown trees and the maintenance of a road and trail system may be needed.

The *potential productivity* of *common trees* on a soil is expressed as a *site index* and a *volume* number. Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate. The first tree listed for each soil is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands. The procedures and techniques for determining site index are given in the site index tables used for this soil survey *(3, 4, 8, 9)*.

The *volume* is the yield likely to be produced by the most important trees, expressed in cubic feet per acre per year calculated at the age of culmination of mean annual increment.

Trees to plant are those that are used for reforestation or, under suitable conditions, natural regeneration. They are suited to the soils and can produce a commercial wood crop. The desired product, topographic position (such as a low, wet area), and personal preference are three factors among many that can influence the choice of trees for use in reforestation.

Recreation

In table 7, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 7, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 7 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 10 and interpretations for dwellings without basements and for local roads and streets in table 9.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes, stones, or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Wildlife Habitat

By Paul Brady, biologist, Soil Conservation Service.

Searcy County has about 280,800 acres of forest land, 134,400 acres of pasture, and 1,200 acres of cropland. About 60 percent of the county is in the Ozark Mountains, and the rest is in the Boston Mountains.

The forests consist of about 80 percent hardwoods and 20 percent shortleaf pine and eastern redcedar. In the areas of hardwoods, oak-hickory is the climax vegetation on uplands and oak-sweetgum is the climax vegetation on lowlands.

Tall fescue is the main pasture grass. Other significant grasses are orchardgrass and common and hybrid bermudagrasses. White clover and annual lespedeza are the primary pasture legumes. Native grasses, such as bluestems, are grown to some extent as forage for livestock.

About 31,123 acres in the county is in the Ozark National Forest, and 24,392 acres is in and around the Buffalo River. All of this land is federally administered. Much of it is forested, and some of the management practices are intended to maintain or improve wildlife habitat.

Some native plants of major importance to wildlife in this county are woolly croton, annual lespedeza, milk pea, panicgrass, partridge pea, paspalum, common ragweed, tickclover, vetches, and woody plants, such as oaks, hickories, hackberry, shortleaf pine, eastern redcedar, elderberry, grapes, dogwoods, blackberry, greenbrier, Japanese honeysuckle, persimmon, wild cherry, and sumacs. The abundant hardwood forests, interpersed pastures, fencerows, and numerous vegetative edges provide abundant habitat for white-tailed deer, black bear, squirrels, bobwhite quail, wild turkey, raccoons, coyotes, skunks, opossum, foxes, bobcats, rabbits, owls, hawks, numerous nongame birds, small mammals, reptiles, and other wildlife.

The Arkansas Game and Fish Commission manages the Buffalo River Wildlife Management Area and Loafer's Glory Game Management Area. Game animals in these areas include deer, squirrels, turkeys, quails, and rabbits.

Searcy County has hundreds of farm ponds that are used primarily as livestock watering facilities and for sportfishing of largemouth bass, bluegills, redear sunfish, and channel catfish. The county has about 123 miles of fishable streams. The largest and most important of these is the Buffalo River. Other major streams are the Middle Fork of the Little Red River, Richland Creek, Big Creek, Bear Creek, and Calf Creek. All of these are cool-water streams. They provide opportunities for fishing smallmouth bass, Kentucky bass, rock bass, longear sunfish, and green sunfish. The Buffalo River, the Middle Fork of the Little Red River, and Richland Creek provide especially good opportunities for fishing smallmouth bass.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 8, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

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

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, 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. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, 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. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, 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 woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, and blackberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian olive, autumn olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, cedar, and juniper.

Wetland plants are annual and perennial, wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet, and because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water

table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

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

Building Site Development

Table 9 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer, stone content, soil texture, and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. Depth to a high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, depth to a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost-action potential, and depth to a high water table affect the traffic-supporting capacity.

Sanitary Facilities

Table 10 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 10 also shows the suitability of the soils for

use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 10 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 10 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, depth to a water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 11 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils

are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and depth to the water table is less than 1 foot. These soils may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 11, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and releases a variety of plant nutrients as it decomposes.

Water Management

Table 12 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives the restrictive features that affect each soil for drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 13 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SM-SC.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20, or higher, for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated

sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index generally are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 14 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They influence the soil's adsorption of cations, moisture retention, shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water through the soil when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage in each major soil layer is stated in inches of water per inch of soil. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change

of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 14, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 15 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

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

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 15 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional,* or *frequent. None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. December-May, for example, means that flooding can occur during the period December through May. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely, thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons characteristic of soils that are not subject to flooding.

Also considered is local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 15 are the depth to the seasonal high water table, the kind of water table, and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 15. A perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severely corrosive environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and the amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(12)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 16 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning humid, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizonation, plus *udult*, the suborder of the Ultisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, siliceous, mesic Typic Hapludults.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the substratum within a series.

Soil Series and Their Morphology

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

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (11)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (12)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Arkana Series

The Arkana series consists of moderately deep or deep, well drained, very slowly permeable soils that formed in clayey residuum of cherty limestone bedrock.

These gently sloping to steep soils are on ridges and hillsides. The native vegetation was mixed hardwoods and eastern redcedar. Slopes range from 3 to 30 percent.

The Arkana soils in this survey area are considered taxadjuncts because the mollic surface layer is thinner than is definitive for the series. This difference, however, does not significantly affect the use, behavior, or management of the soils.

Arkana soils are geographically associated with Clarksville, Moko, and Noark soils. Clarksville soils are on hillsides at the higher elevations. They have a loamy-skeletal control section and are more than 60 inches deep over bedrock. Moko soils are in landscape positions similar to those of the Arkana soils. They are less than 20 inches deep over bedrock and do not have an argillic horizon. Noark soils are on hillsides and ridgetops at the higher elevations. They have a clayey-skeletal control section and are more than 60 inches deep over bedrock.

Typical pedon of Arkana very cherty silt loam, in a wooded area of Arkana-Moko complex, 20 to 40 percent slopes, NW¼SE¼SW¼ sec. 34, T. 16 N., R. 14 W.

A—0 to 3 inches; very dark grayish brown (10YR 3/2) very cherty silt loam; weak fine granular structure; friable; many fine and medium roots; about 40 percent, by volume, chert fragments less than 3 inches in diameter; slightly acid; gradual smooth boundary.

E—3 to 14 inches; yellowish brown (10YR 5/4) very cherty silt loam; moderate medium subangular blocky structure; friable; many fine roots; about 40 percent, by volume, chert fragments less than 3 inches in diameter; slightly acid; gradual wavy boundary.

Bt1—14 to 20 inches; reddish brown (5YR 4/4) cherty clay; moderate medium subangular blocky structure; firm; common fine roots; thin patchy clay films on faces of peds; about 20 percent, by volume, chert fragments less than 3 inches in diameter; slightly acid; clear wavy boundary.

Bt2—20 to 42 inches; red (2.5YR 4/6) cherty clay; moderate medium subangular blocky structure; firm, plastic; common fine roots; thick continuous clay films on faces of peds; about 30 percent, by volume, chert fragments less than 3 inches in diameter; neutral; abrupt smooth boundary.

R—42 to 44 inches; gray, hard, level-bedded limestone bedrock.

The thickness of the solum and the depth to bedrock range from 20 to 45 inches. Reaction is slightly acid or neutral in the A and E horizons and ranges from strongly acid to neutral in the Bt horizon. The content of coarse fragments ranges, by volume, from 35 to 60 percent in the A and E horizons, from 15 to 35 percent in the Bt1 horizon, and from 0 to 35 percent in the Bt2 horizon.

The A horizon has hue of 10YR and has value and chroma of 2 or value of 3 and chroma of 1 or 2. The E horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4.

The Bt1 and Bt2 horizons have hue of 5YR and have value of 4 and chroma of 4 to 6 or value of 5 and chroma of 6 to 8, or they have hue of 2.5YR, value of 4 or 5, and chroma of 6 or 8. The Bt1 horizon is cherty silty clay or cherty clay. The Bt2 horizon is clay or cherty clay. The Bt3 horizon, if it occurs, has hue of 2.5YR, value of 4, and chroma of 6; hue of 7.5YR, value of 5, and chroma of 6; or hue of 10YR, value of 4 or 5, and chroma of 4. It has mottles in shades of brown. It is clay or cherty clay.

The R horizon is gray, level-bedded, hard limestone or cherty limestone bedrock.

Captina Series

The Captina series consists of deep, moderately well drained, slowly permeable soils that formed in loamy and cherty material over limestone. These gently sloping soils are on broad upland flats. They have a seasonal high water table at a depth of 2 to 3 feet from December through April. The native vegetation was mixed upland hardwoods. Slopes range from 2 to 7 percent.

Captina soils are geographically associated with Nixa and Noark soils. Nixa soils are on ridgetops. They have a loamy-skeletal control section. Noark soils are on side slopes and ridgetops. They do not have a fragipan and have a clayey-skeletal control section.

Typical pedon of Captina silt loam, 2 to 7 percent slopes, in a pasture, SW¼NW¼NE¼ sec. 23, T. 17 N., R. 18 W.

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam; moderate medium granular structure; friable; moderately acid; clear smooth boundary.

Bt—7 to 21 inches; strong brown (7.5YR 5/8) silty clay loam; moderate medium subangular blocky structure; friable; few thin patchy clay films on faces of peds; very strongly acid; clear smooth boundary.

Btx1—21 to 34 inches; yellowish red (5YR 4/6) silty clay loam; common medium prominent light brownish gray (10YR 6/2) mottles; strong medium subangular blocky structure; firm; compact and brittle; thin

patchy clay films on faces of peds; very strongly acid; gradual smooth boundary.

Btx2—34 to 72 inches; mottled yellowish red (5YR 4/6), light brownish gray (10YR 6/2), and strong brown (7.5YR 5/8) silty clay loam; strong medium subangular blocky structure; firm; compact and brittle; thin patchy clay films on faces of peds; about 5 percent, by volume, chert fragments ¼ inch to 3 inches in diameter; very strongly acid.

The thickness of the solum and the depth to consolidated bedrock are more than 72 inches. Depth to the fragipan ranges from 19 to 24 inches. Reaction ranges from very strongly acid to moderately acid in the A horizon and is very strongly acid or strongly acid in the B horizon. The content of coarse fragments ranges, by volume, from 0 to 5 percent in the A and Bt horizons and from 0 to 15 percent in the Btx horizon.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The BE horizon, if it occurs, has hue of 10YR, value of 5, and chroma of 4. It is silt loam or silty clay loam. The Bt horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 6 to 8. It is silty clay loam or silt loam. The Btx horizon has hue of 5YR, value of 4 or 5, and chroma of 4 or 6 and is mottled in shades of gray or brown, or it has no matrix color and is mottled in shades of red, gray, or brown.

Ceda Series

The Ceda series consists of deep, well drained, rapidly permeable soils that formed in cobbly and loamy alluvium. These level and nearly level soils are on flood plains. They are frequently flooded for very brief periods from December through April in most years. The native vegetation was mixed hardwoods and eastern redcedar. Slopes range from 0 to 3 percent.

Ceda soils are geographically associated with Enders, Kenn, Nella, Razort, Spadra, and Steprock soils. Enders soils are on side slopes or foot slopes. They have a clayey control section and an argillic horizon. Kenn, Nella, Razort, and Spadra soils have a fine-loamy control section and an argillic horizon. Kenn soils are in the slightly higher positions on flood plains. Nella soils are on side slopes. Razort soils are in positions on the landscape similar to those of the Ceda soils. Spadra soils are on stream terraces. Steprock soils are on side slopes. They have an argillic horizon and are 20 to 40 inches deep over soft bedrock.

Typical pedon of Ceda very cobbly loam, frequently flooded, SE¼NE¼SE¼ sec. 24, T. 14 N., R. 14 W.

A—0 to 8 inches; brown (10YR 5/3) very cobbly loam; weak medium granular structure; friable; about 30 percent, by volume, sandstone gravel and 15 percent sandstone cobbles; common fine and medium roots; many fine pores; moderately acid; clear wavy boundary.

C1—8 to 30 inches; yellowish brown (10YR 5/4) very cobbly loam; massive; friable; about 40 percent, by volume, sandstone gravel and 15 percent sandstone cobbles; common medium roots; few fine pores; moderately acid; gradual wavy boundary.

C2—30 to 70 inches; strong brown (7.5YR 5/6) extremely cobbly loam; massive; friable; about 40 percent, by volume, sandstone gravel and 30 percent sandstone cobbles; few medium roots; few fine pores; moderately acid.

The cobbly, gravelly, and loamy sediments are 60 to more than 72 inches thick. Reaction is slightly acid or moderately acid throughout the profile.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The content of coarse fragments ranges from 35 to 60 percent, by volume.

The C horizon has hue of 10YR, value of 5, and chroma of 4 to 6, or it has hue of 7.5YR and has value of 4 and chroma of 6 or value of 5 and chroma of 4 to 6. It is the very gravelly, very cobbly, or extremely cobbly analogs of loam or fine sandy loam. The content of gravel and cobbles ranges from 35 to 75 percent, by volume.

Clarksville Series

The Clarksville series consists of deep, somewhat excessively drained, moderately permeable, very cherty soils that formed in residuum of cherty limestone. These steep and very steep soils are on hillsides. The native vegetation was mixed hardwoods and pine. Slopes range from 20 to 50 percent.

Clarksville soils are geographically associated with Arkana, Elsah, Moko, Nixa, Noark, and Secesh soils. Arkana soils are at the lower elevations. They are 20 to 45 inches deep over bedrock and have a very fine textured control section. Elsah soils are on flood plains. They do not have an argillic horizon. Moko soils are on the tops and sides of the lower hills. They are less than 20 inches deep over bedrock and do not have an argillic horizon. Nixa soils are on the higher ridgetops. They have a fragipan. Noark soils are in positions on the landscape similar to those of the Clarksville soils. They have a clayey-skeletal control section. Secesh soils are on flood plains. They have a fine-loamy control section.

Typical pedon of Clarksville very cherty silt loam, 20 to 50 percent slopes, in a wooded area, NE¼SW¼SW¼ sec. 5, T. 16 N., R. 17 W.

A—0 to 4 inches; dark brown (10YR 4/3) very cherty silt loam; weak fine granular structure; very friable; many fine roots; about 55 percent, by volume, chert fragments as much as 3 inches in diameter; strongly acid; clear smooth boundary.

E—4 to 10 inches; pale brown (10YR 6/3) very cherty silt loam; weak fine granular structure; friable; many fine roots; about 50 percent, by volume, chert fragments ¼ inch to 3 inches in diameter; strongly acid; clear smooth boundary.

Bt1—10 to 25 inches; strong brown (7.5YR 5/6) very cherty silt loam; weak medium subangular blocky structure; firm; common fine roots; many fine pores; thin continuous clay films on faces of peds and in pores and root channels; about 55 percent, by volume, chert fragments ¼ inch to 3 inches in diameter; very strongly acid; gradual wavy boundary.

Bt2—25 to 48 inches; strong brown (7.5YR 5/6) extremely cherty silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; many fine pores; thin continuous clay films on faces of peds and in pores and root channels; about 75 percent, by volume, chert fragments ¼ inch to 5 inches in diameter; very strongly acid; gradual smooth boundary.

Bt3—48 to 80 inches; strong brown (7.5YR 5/6) extremely cherty silty clay loam; moderate medium subangular blocky structure; firm; many fine pores; thin continuous clay films on faces of peds and in pores and root channels; about 80 percent, by volume, chert fragments ¼ inch to 5 inches in diameter; very strongly acid.

The solum is 60 to more than 72 inches thick. Reaction ranges from moderately acid to very strongly acid in the A and E horizons and is strongly acid or very strongly acid in the B horizon.

The A horizon has hue of 10YR and has value of 3 or 4 and chroma of 2 or 3 or value of 5 and chroma of 3. In areas where value is 3, this horizon is less than 7 inches thick. The content of chert fragments ranges from 35 to 60 percent, by volume.

The E horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. The content of chert fragments ranges from 40 to 60 percent, by volume.

The BE horizon, if it occurs, has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. It is very cherty silt loam or very cherty silty clay loam. The content of chert fragments ranges from 40 to 60 percent, by volume.

The Bt1 and Bt2 horizons have hue of 7.5YR or 5YR, value of 5, and chroma of 4 to 6. They are the very cherty or extremely cherty analogs of silt loam or silty clay loam. The content of chert fragments ranges from 40 to 75 percent, by volume. The Bt3 horizon has hue of 7.5YR or 5YR, value of 5, and chroma of 4 to 6. It is the very cherty or extremely cherty analogs of silty clay loam or silty clay. The content of chert fragments ranges from 50 to 90 percent, by volume.

Eden Series

The Eden series consists of moderately deep, well drained, slowly permeable soils that formed in residuum of interbedded calcareous shale and fossiliferous limestone. These gently sloping to very steep soils are on mountainsides. The native vegetation was upland hardwoods and eastern redcedar. Slopes range from 3 to 60 percent.

Eden soils are geographically associated with Moko, Newnata, Samba, and Summit soils. Moko and Newnata soils are in landscape positions similar to those of the Eden soils. Moko soils have a loamy-skeletal control section and a solum that is less than 20 inches thick. Newnata soils are 40 to 60 inches deep over hard limestone bedrock. Samba soils are on depressional terraces. Their solum is more than 40 inches thick. Summit soils are on foot slopes. Their solum is more than 50 inches thick.

Typical pedon of Eden flaggy silty clay loam, in an area of Newnata-Eden-Moko complex, 3 to 20 percent slopes, NE¼SW¼SE¼ sec. 15, T. 14 N., R. 17 W.

A—0 to 5 inches; very dark grayish brown (10YR 3/2) flaggy silty clay loam; moderate medium subangular blocky structure; friable; many fine roots; about 30 percent, by volume, limestone flagstones 10 to 24 inches in diameter; slightly acid; clear smooth boundary.

Bt1—5 to 10 inches; dark brown (10YR 4/3) flaggy silty clay; weak medium subangular blocky structure; firm, sticky; common fine roots; thin continuous clay films; about 10 percent, by volume, limestone flagstones as much as 6 inches in diameter and 10 percent fine shale fragments; slightly acid; gradual smooth boundary.

Bt2—10 to 24 inches; yellowish brown (10YR 5/6) channery clay; moderate medium subangular blocky structure; firm, sticky; about 15 percent, by volume, fine shale fragments; slightly acid; clear smooth boundary.

BC—24 to 36 inches; yellowish brown (10YR 5/6) channery clay; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm, sticky; about 15 percent, by volume, fine shale fragments; slightly acid; clear smooth boundary.

Cr—36 to 45 inches; soft, calcareous, interbedded shale and limestone.

The solum is 14 to 40 inches thick. The depth to paralithic contact ranges from 20 to 40 inches. Reaction ranges from moderately acid to moderately alkaline throughout the profile. The content of coarse fragments ranges, by volume, from 15 to 35 percent in the A horizon and from 10 to 35 percent in the B and BC horizons.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 2 or 3. In areas where value is 2 or 3, this horizon is less than 6 inches thick. The B horizon has hue of 10YR, value of 4 or 5, and chroma of 3, 4, or 6, or it has hue of 2.5Y and has value of 4 or 5 and chroma of 4 or value of 5 and chroma of 6. It has olive to brown mottles in some pedons. It is silty clay, clay, or the channery or flaggy analogs of those textures. The Cr horizon is black, gray, or brown, weathered, soft shale that has thin strata of fossiliferous limestone.

Elsah Series

The Elsah series consists of deep, somewhat excessively drained, moderately rapidly permeable soils that formed in cherty and loamy alluvium. These level and nearly level soils are on narrow flood plains on the Springfield Plateau. They are frequently flooded for very brief periods from December through May in most years. The native vegetation was bottom-land hardwoods. Slopes range from 0 to 3 percent.

Elsah soils are geographically associated with Clarksville, Moko, Nixa, Noark, Razort, and Secesh soils. Clarksville soils are on hillsides. They have an argillic horizon and have a solum that is more than 60 inches thick. Moko soils are on hilltops and hillsides. They are less than 20 inches deep over bedrock. Nixa soils are on ridgetops and are moderately well drained. They have a fragipan. Noark soils are on ridgetops and hillsides. They have an argillic horizon and a clayey-skeletal control section. Razort and Secesh soils are on flood plains downstream from the Elsah soils. They have a fine-loamy control section and an argillic horizon.

Typical pedon of Elsah cherty silt loam, frequently flooded, in a hayfield, SE¼NW¼NW¼ sec. 13, T. 15 N., R. 15 W.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) cherty silt loam; weak fine granular structure; friable; about 20 percent, by volume, chert fragments ½ inch to 3 inches in diameter; moderately acid; clear smooth boundary.

C1—8 to 24 inches; yellowish brown (10YR 5/4) very cherty silt loam; massive; friable; about 40 percent, by volume, chert fragments ½ inch to 3 inches in diameter; moderately acid; clear wavy boundary.

C2—24 to 30 inches; brown (7.5YR 5/4) very cherty silt loam; massive; friable; about 50 percent, by volume, chert fragments ½ inch to 3 inches in diameter; moderately acid; gradual smooth boundary.

C3—30 to 60 inches; brown (7.5YR 5/4) very cherty loam; massive; friable; about 60 percent, by volume, chert fragments ½ inch to 3 inches in diameter; moderately acid; gradual smooth boundary.

C4—60 to 80 inches; brown (7.5YR 5/4) extremely cherty loam; massive; friable; about 20 percent, by volume, chert fragments 3 to 5 inches in diameter and 50 percent chert fragments ½ inch to 3 inches in diameter; moderately acid.

The loamy sediments range from 60 to more than 80 inches in thickness. Reaction is slightly acid or moderately acid throughout the profile.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. In areas where value is 3, this horizon is less than 6 inches thick. The content of chert fragments ranges from 15 to 35 percent, by volume.

The C horizon has hue of 7.5YR, value of 4 or 5, and chroma of 4 to 6, or it has hue of 10YR, value of 4 or 5, and chroma of 3, 4, or 6. It is very cherty loam, extremely cherty loam, very cherty silt loam, or extremely cherty silt loam. The content of chert fragments ranges from 35 to 80 percent, by volume.

Enders Series

The Enders series consists of deep, well drained, very slowly permeable soils that formed in residuum and colluvium derived from acid shale or interbedded shale and sandstone. These gently sloping to steep soils are on upland crests, mountainsides, and foot slopes. The native vegetation was upland hardwoods. Slopes range from 3 to 40 percent.

Enders soils are geographically associated with Ceda, Kenn, Linker, Mountainburg, Nauvoo, Nella, Sidon, Spadra, and Steprock soils. Ceda soils are on flood plains. They have a loamy-skeletal control section and do not have an argillic horizon. Kenn, Linker, Nauvoo, Nella, Sidon, and Spadra soils have a fine-loamy control section. Kenn soils are on flood plains. Linker soils are on mountaintops. They are less than 40 inches deep over hard sandstone bedrock. Nauvoo and Sidon soils are on mountaintops. Sidon soils have a fragipan. Nella soils are in landscape positions similar to those of the Ender soils. Their solum is more than 60 inches thick. Spadra soils are on terraces. Mountainburg soils are on mountaintops and the higher

mountainsides. They have a loamy-skeletal control section and are less than 20 inches deep over hard sandstone bedrock. Steprock soils are in landscape positions similar to those of the Enders soils. They have a loamy-skeletal control section and are less than 40 inches deep over soft sandstone bedrock.

Typical pedon of Enders gravelly loam, 3 to 8 percent slopes, NE¼SW¼SE¼ sec. 10, T. 14 N., R. 15 W.

A—0 to 3 inches; very dark grayish brown (10YR 3/2) gravelly loam; weak fine granular structure; friable; many fine roots; common fine pores; about 15 percent, by volume, sandstone fragments that are mainly 1 to 3 inches in diameter; very strongly acid; clear smooth boundary.

E—3 to 8 inches; strong brown (7.5YR 5/4) gravelly silt loam; weak fine subangular blocky structure; friable; common medium and fine roots; common medium pores; about 15 percent, by volume, sandstone fragments that are mainly less than 3 inches in diameter; very strongly acid; clear smooth boundary.

Bt1—8 to 19 inches; yellowish red (5YR 4/6) silty clay; moderate medium subangular blocky structure; firm; thin continuous clay films on faces of peds; common medium roots; few fine pores; very strongly acid; gradual smooth boundary.

Bt2—19 to 30 inches; red (2.5YR 4/8) clay; common medium distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; thick continuous clay films on faces of peds; common medium roots; very strongly acid; gradual wavy boundary.

Bt3—30 to 40 inches; red (2.5YR 4/8) clay; common medium prominent gray (10YR 6/1) mottles; moderate medium subangular blocky structure; firm; thick continuous clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt4—40 to 54 inches; mottled red (2.5YR 4/8) and gray (10YR 6/1) clay; moderate medium subangular blocky structure; firm; thick continuous clay films on faces of peds; about 5 percent, by volume, soft, thin, black shale fragments; very strongly acid; clear smooth boundary.

Cr—54 to 58 inches; black, level-bedded, fissile shale.

The thickness of the solum and the depth to shale bedrock range from 40 to 60 inches. Reaction ranges from strongly acid to extremely acid throughout the profile. The content of coarse fragments ranges, by volume, from 15 to 35 percent sandstone fragments in the A and E horizons and from 0 to 35 percent sandstone and shale fragments in the BA, Bt, and BC horizons.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. In areas where value is 3, this horizon is less than 7 inches thick. It is gravelly or stony loam.

The E horizon has hue of 7.5YR, value of 5, and chroma of 3 or 4. It is loam, silt loam, gravelly loam, gravelly silt loam, or stony loam.

The Bt horizon has hue of 5YR and has value of 4 or 5 and chroma of 6 or value of 5 and chroma of 8, or it has hue of 2.5YR, value of 4 or 5, and chroma of 6 or 8. The lower part of this horizon is commonly mottled in shades of brown, red, or gray. The Bt1, Bt2, and Bt3 horizons are silty clay, clay, silty clay loam, or the channery or gravelly analogs of those textures. The Bt4 horizon is silty clay, clay, or the channery analogs of those textures.

The BC horizon, if it occurs, is mottled in shades of brown, red, or gray. It is silty clay, clay, or the channery analogs of those textures.

The Cr horizon is dark gray to black, extremely acid, weathered shale grading to hard shale.

Estate Series

The Estate series consists of deep, well drained, slowly permeable soils that formed in residuum of interbedded sandstone and limestone. These gently sloping to steep soils are on hillsides and hilltops. The native vegetation was upland hardwoods and eastern redcedar. Slopes range from 3 to 35 percent.

Estate soils are geographically associated with Lily and Portia soils. Lily soils are in landscape positions similar to those of the Estate soils. They have a fine-loamy control section and are 20 to 40 inches deep over bedrock. Portia soils are on foot slopes. They have a fine-loamy control section and are more than 60 inches deep over bedrock.

Typical pedon of Estate stony sandy loam, in a wooded area of Estate-Lily-Udorthents complex, 15 to 35 percent slopes, NW¼SW¼NE¼ sec. 31, T. 16 N., R. 18 W.

A—0 to 2 inches; dark brown (10YR 4/3) stony sandy loam; weak fine granular structure; very friable; common fine and medium roots; about 5 percent, by volume, sandstone gravel and 25 percent sandstone fragments more than 10 inches in diameter; strongly acid; clear smooth boundary.

E—2 to 10 inches; yellowish brown (10YR 5/4) stony sandy loam; weak fine granular structure; very friable; common fine and medium roots; about 5 percent, by volume, sandstone gravel and 25 percent sandstone fragments more than 10 inches

in diameter; strongly acid; gradual smooth boundary.
BE—10 to 17 inches; strong brown (7.5YR 4/6) gravelly sandy clay loam; moderate medium subangular blocky structure; friable; few fine and medium roots; about 25 percent, by volume, sandstone gravel; moderately acid; clear smooth boundary.
Bt1—17 to 21 inches; yellowish red (5YR 5/6) clay loam; moderate medium subangular blocky structure; firm; thick continuous clay films on faces of peds; few fine roots; common black stains; about 10 percent, by volume, sandstone gravel; moderately acid; gradual smooth boundary.
Bt2—21 to 41 inches; yellowish red (5YR 4/6) clay; moderate medium subangular blocky structure; firm; thick continuous clay films on faces of peds; few fine roots; about 10 percent, by volume, sandstone gravel; moderately acid; abrupt smooth boundary.
R—41 to 45 inches; hard sandstone bedrock.

The thickness of the solum and the depth to bedrock range from 40 to 60 inches. Reaction ranges from strongly acid to neutral in the A, E, and BE horizons and from moderately acid to neutral in the Bt horizon.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. In areas where value is 3, this horizon is less than 7 inches thick. The content of coarse fragments ranges from 15 to 30 percent, by volume.

The E horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is fine sandy loam, sandy loam, or the stony or gravelly analogs of those textures. The content of coarse fragments ranges from 5 to 30 percent, by volume.

The BE horizon has hue of 7.5YR, value of 4 or 5, and chroma of 6. It is sandy loam, sandy clay loam, or the gravelly analogs of those textures. The content of coarse fragments ranges from 5 to 25 percent, by volume.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8. It is clay, clay loam, sandy clay, or the gravelly or cobbly analogs of those textures. The content of coarse fragments ranges from 0 to 25 percent, by volume.

The R horizon is level-bedded to undulating, hard, interbedded sandstone and limestone.

Healing Series

The Healing series consists of deep, well drained, moderately permeable soils that formed in silty alluvium. These level and nearly level soils are on low terraces along the Buffalo River. They are occasionally flooded for very brief or brief periods from December through April. The native vegetation was mixed bottom-land hardwoods. Slopes range from 0 to 3 percent.

Healing soils are geographically associated with Razort and Wideman soils. Razort soils are on flood plains. They have a fine-loamy control section. Wideman soils are on natural levees and flood plains. They have a sandy control section and do not have an argillic horizon.

Typical pedon of Healing silt loam, occasionally flooded, in a meadow, SW¼SE¼SE¼ sec. 35, T. 16 N., R. 17 W.

Ap—0 to 6 inches; dark brown (10YR 3/3) silt loam; moderate medium granular structure; friable; many fine roots; slightly acid; clear smooth boundary.
A—6 to 14 inches; dark brown (10YR 3/3) silt loam; weak medium subangular blocky structure; friable; common fine roots; few fine pores; moderately acid; clear smooth boundary.
Bt1—14 to 42 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; common fine roots; common fine pores; thin patchy clay films on faces of peds; moderately acid; gradual smooth boundary.
Bt2—42 to 72 inches; dark brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; common medium pores; medium continuous clay films on faces of peds; moderately acid.

The solum is 60 to more than 80 inches thick. Reaction is moderately acid or slightly acid throughout the profile. The content of gravel ranges from 0 to 5 percent, by volume, throughout the profile.

The Ap and A horizons have hue of 10YR, value of 3, and chroma of 2 or 3 or hue of 7.5YR, value of 3, and chroma of 2. The Bt horizon has hue of 10YR, value of 4, and chroma of 3 or 4 or has hue of 7.5YR and value and chroma of 4. In some pedons it is mottled in shades of yellow or brown in the lower part. This horizon is silt loam or silty clay loam.

Kenn Series

The Kenn series consists of deep, well drained, moderately permeable soils that formed in loamy alluvium. These level and nearly level soils are on flood plains. They are frequently flooded for very brief periods from December through April in most years. The native vegetation was mixed hardwoods and pine. Slopes range from 0 to 3 percent.

Kenn soils are geographically associated with Ceda, Enders, Nella, Spadra, and Steprock soils. Ceda soils are at the slightly lower elevations on flood plains. They have a loamy-skeletal control section and do not have

an argillic horizon. Enders soils are on side slopes and foot slopes. They have a clayey control section. Nella soils are on side slopes. They have a solum that is more than 60 inches thick and have lower base saturation than the Kenn soils. Spadra soils are on stream terraces. They have lower base saturation than the Kenn soils and contain less gravel in the subsoil and substratum. Steprock soils are on side slopes. They have a loamy-skeletal control section and are less than 40 inches deep over soft bedrock.

Typical pedon of Kenn gravelly fine sandy loam, in an area of Ceda-Kenn complex, frequently flooded, NW¼SE¼NW¼ sec. 25, T. 13 N., R. 17 W.

A—0 to 7 inches; dark brown (10YR 4/3) gravelly fine sandy loam; moderate medium granular structure; friable; common fine roots; few fine pores; about 20 percent, by volume, sandstone fragments as much as 3 inches in diameter; moderately acid; abrupt smooth boundary.

BA—7 to 14 inches; brown (7.5YR 4/4) gravelly fine sandy loam; weak fine subangular blocky structure; friable; common fine roots; few fine pores; about 15 percent, by volume, sandstone gravel; strongly acid; clear smooth boundary.

Bt1—14 to 28 inches; reddish brown (5YR 4/4) gravelly sandy clay loam; moderate medium subangular blocky structure; friable; few thin patchy clay films on faces of peds; few fine roots; few fine pores; about 25 percent, by volume, sandstone gravel; strongly acid; clear smooth boundary.

Bt2—28 to 38 inches; yellowish red (5YR 5/6) gravelly sandy clay loam; moderate fine subangular blocky structure; friable; few thin patchy clay films on faces of peds; about 20 percent, by volume, sandstone gravel; strongly acid; clear smooth boundary.

2BC—38 to 45 inches; yellowish red (5YR 5/6) extremely gravelly sandy clay loam; weak medium subangular blocky structure; friable; about 60 percent, by volume, sandstone gravel; very strongly acid; clear smooth boundary.

2C—45 to 60 inches; brown (7.5YR 5/4) extremely gravelly loam; massive; friable; about 70 percent, by volume, sandstone gravel; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. Reaction ranges from slightly acid to strongly acid in the A and BA horizons and is strongly acid or very strongly acid in the B, 2BC, and 2C horizons.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. In areas where value is 3, this horizon is less than 6 inches thick. The content of coarse fragments ranges from about 15 to 30 percent, by volume.

The BA horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 or 6. It is loam, fine sandy loam, gravelly loam, or gravelly fine sandy loam. The content of coarse fragments ranges from 5 to 35 percent, by volume.

The Bt horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is clay loam, sandy clay loam, gravelly clay loam, or gravelly sandy clay loam. The content of coarse fragments ranges from 5 to 35 percent, by volume.

The 2BC horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6. It is the very gravelly, extremely gravelly, or very cobbly analogs of clay loam or sandy clay loam. The content of coarse fragments ranges from 35 to 75 percent, by volume.

The 2C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is the extremely gravelly or extremely cobbly analogs of loam or fine sandy loam. The content of coarse fragments ranges from 60 to 90 percent, by volume.

Lily Series

The Lily series consists of moderately deep, well drained, moderately rapidly permeable soils that formed in residuum of sandstone. These gently sloping to steep soils are on hilltops and hillsides. The native vegetation was mixed hardwoods and shortleaf pine. Slopes range from 3 to 35 percent.

Lily soils are geographically associated with Estate and Portia soils. Estate soils are in landscape positions similar to those of the Lily soils. They have a fine textured control section and are 40 to 60 inches deep over bedrock. Portia soils are on foot slopes. They are more than 60 inches deep over bedrock.

Typical pedon of Lily stony sandy loam, in a wooded area of Estate-Lily-Udorthents complex, 15 to 35 percent slopes, NW¼SW¼NE¼ sec. 31, T. 16 N., R. 18 W.

A—0 to 1 inch; grayish brown (10YR 5/2) stony sandy loam; weak fine granular structure; very friable; common fine roots; about 30 percent, by volume, sandstone fragments more than 10 inches in diameter; strongly acid; clear smooth boundary.

BA—1 to 7 inches; dark yellowish brown (10YR 4/4) stony sandy loam; weak fine granular structure; very friable; common fine roots; about 30 percent, by volume, sandstone fragments more than 10 inches in diameter; strongly acid; clear smooth boundary.

Bt1—7 to 20 inches; yellowish red (5YR 5/6) stony sandy clay loam; moderate medium subangular blocky structure; friable; common fine roots; about 25 percent, by volume, sandstone fragments that

are mainly more than 10 inches in diameter; thin patchy clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—20 to 26 inches; strong brown (7.5YR 5/8) gravelly clay loam; moderate medium subangular blocky structure; firm; about 20 percent, by volume, sandstone fragments less than 3 inches in diameter; thin continuous clay films on faces of peds; very strongly acid; abrupt smooth boundary.

R—26 to 29 inches; hard sandstone bedrock.

The thickness of the solum and the depth to sandstone bedrock range from 20 to 40 inches. Reaction ranges from strongly acid to extremely acid throughout the profile. The content of coarse fragments ranges, by volume, from 15 to 30 percent in the A and E horizons and from 0 to 30 percent in the BA, Bt, and BC horizons.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. In areas where value is 3, this horizon is less than 6 inches thick.

The E horizon, if it occurs, has hue of 10YR, value of 5 or 6, and chroma of 2 to 4. It is loam, sandy loam, or the stony or gravelly analogs of those textures.

The BA horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 or 6. It is loam, sandy loam, or the gravelly or stony analogs of those textures.

The Bt horizon has hue of 7.5YR, value of 4 or 5, and chroma of 4, 6, or 8, or it has hue of 5YR and has value of 4 or 5 and chroma of 4 or 6 or value of 5 and chroma of 8. In some pedons it is mottled in shades of brown or red in the lower part. This horizon is clay loam, sandy clay loam, loam, or the stony or gravelly analogs of those textures.

The BC and Cr horizons, if they occur, are mottled in shades of gray, brown, or red. The BC horizon is loam, sandy clay loam, or the gravelly analogs of those textures. The Cr horizon consists of thin strata of weakly cemented, level-bedded sandstone that crushes to loamy sand.

The R horizon is hard, level-bedded sandstone bedrock.

Linker Series

The Linker series consists of moderately deep, well drained, moderately permeable soils that formed in loamy residuum of acid sandstone. These gently sloping to moderately steep soils are on mountaintops. The native vegetation was mixed hardwoods and some shortleaf pine. Slopes range from 3 to 20 percent.

Linker soils are geographically associated with Enders, Mountainburg, Nauvoo, Nella, Sidon, and Steprock soils. Enders soils are on side slopes. They have a clayey control section and are more than 40 inches deep over bedrock. Mountainburg, Nauvoo, and Sidon soils are in landscape positions similar to those of the Linker soils. Mountainburg soils have a loamy-skeletal control section and are less than 20 inches deep over sandstone bedrock. Nauvoo soils are more than 40 inches deep over soft sandstone bedrock. Sidon soils have a fragipan and are more than 40 inches deep over bedrock. Nella soils are in colluvial areas on side slopes. They are more than 60 inches deep over bedrock. Steprock soils are on mountaintops and the steeper side slopes. They have a loamy-skeletal control section.

Typical pedon of Linker gravelly fine sandy loam, 3 to 8 percent slopes, in a pasture, SW¼NW¼NW¼ sec. 10, T. 13 N., R. 16 W.

Ap—0 to 6 inches; dark brown (7.5YR 4/4) gravelly fine sandy loam; weak fine granular structure; friable; many fine and medium roots; common fine pores; about 15 percent, by volume, sandstone fragments that are mainly ½ to 1 inch in diameter; very strongly acid; abrupt smooth boundary.

BA—6 to 13 inches; strong brown (7.5YR 5/6) gravelly loam; weak medium subangular blocky structure; friable; many fine and medium roots; common fine pores; about 20 percent, by volume, sandstone fragments that are mainly ½ to 1 inch in diameter; very strongly acid; clear smooth boundary.

Bt—13 to 31 inches; yellowish red (5YR 5/8) gravelly clay loam; moderate medium subangular blocky structure; friable; common medium roots; common fine pores; thin patchy clay films on faces of peds; about 25 percent, by volume, sandstone fragments that are mainly ¼ to 1 inch in diameter; very strongly acid; abrupt smooth boundary.

R—31 to 34 inches; hard, level-bedded, acid sandstone bedrock.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. Reaction ranges from strongly acid to extremely acid throughout the profile. The content of coarse fragments ranges, by volume, from 0 to 25 percent throughout the profile.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4, or it has hue of 7.5YR and value and chroma of 4. The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. In areas where value is 3, this horizon is less than 6 inches thick. The Ap and A horizons are gravelly fine sandy loam or fine sandy loam.

The E horizon, if it occurs, has hue of 10YR, value of 5, and chroma of 3 or 4. It is fine sandy loam, loam, or the gravelly analogs of those textures.

The BA horizon has hue of 5YR and has value of 4 and chroma of 6 or value of 5 and chroma of 6 to 8, or it has hue of 7.5YR, value of 4 or 5, and chroma of 4 or 6. It is fine sandy loam, loam, or the gravelly analogs of those textures.

The Bt horizon has hue of 5YR and has value of 4 and chroma of 6 or value of 5 and chroma of 6 to 8, or it has hue of 2.5YR, value of 4 or 5, and chroma of 6 to 8. In some pedons it is mottled in shades of brown or red in the lower part. This horizon is sandy clay loam, clay loam, loam, or the gravelly analogs of those textures. The BC horizon, if it occurs, has colors and textures similar to those of the Bt horizon or is mottled in shades of red, brown, or gray.

The Cr horizon, if it occurs, is red, brown, or gray, weathered, soft sandstone. The R horizon is hard, level-bedded, acid, red, brown, or gray sandstone bedrock.

Moko Series

The Moko series consists of shallow, well drained, moderately permeable soils that formed in residuum of limestone. These gently sloping to very steep soils are on hilltops and hillsides. The native vegetation was an open stand of eastern redcedar and hardwoods and native grasses in the open areas. Slopes range from 3 to 60 percent.

Moko soils are geographically associated with Arkana, Clarksville, Eden, Elsah, Newnata, and Noark soils. Arkana, Clarksville, Eden, and Noark soils have an argillic horizon. Arkana soils are in landscape positions similar to those of the Moko soils. They are more than 20 inches deep over bedrock. Clarksville soils are on hillsides at the higher elevations. They are more than 60 inches deep over bedrock. Eden soils are in landscape positions similar to those of the Moko soils. They have a fine textured control section. Noark soils are on ridges and hillsides at the higher elevations. They are more than 60 inches deep over bedrock. Elsah soils are on flood plains. They are deep over bedrock. Newnata soils are in landscape positions similar to those of the Moko soils. They have a fine textured control section and are 40 to 60 inches deep over bedrock.

Typical pedon of Moko very stony silt loam, in a wooded area of Moko-Rock outcrop complex, 15 to 50 percent slopes, SW¼NE¼SW¼ sec. 2, T. 16 N., R. 14 W.

A1—0 to 4 inches; very dark gray (10YR 3/1) very stony silt loam, gray (10YR 5/1) dry; weak fine granular structure; friable; many fine roots; common fine pores; about 35 percent, by volume, limestone fragments more than 10 inches in diameter; mildly alkaline; clear smooth boundary.

A2—4 to 17 inches; very dark grayish brown (10YR 3/2) very stony silty clay loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure; friable; common fine and medium roots; about 40 percent, by volume, limestone fragments more than 10 inches in diameter; mildly alkaline; abrupt smooth boundary.

R—17 to 20 inches; hard, level-bedded limestone bedrock.

The thickness of the solum and the depth to bedrock range from 8 to 20 inches. Reaction is neutral or mildly alkaline throughout the profile. The content of coarse fragments ranges, by volume, from 35 to 60 percent throughout the profile.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is very stony silt loam or very stony silty clay loam.

Mountainburg Series

The Mountainburg series consists of shallow, well drained, moderately rapidly permeable soils that formed in loamy residuum of acid sandstone. These gently sloping to very steep soils are on mountaintops, mountainsides, and ridges. The native vegetation was upland hardwoods. Slopes range from 3 to 60 percent.

Mountainburg soils are geographically associated with Enders, Linker, Nauvoo, Nella, Sidon, and Steprock soils. Enders soils are on upland crests, mountainsides, and foot slopes. They have a clayey control section and are more than 40 inches deep over shale bedrock. Linker, Nauvoo, Sidon, and Steprock soils are on mountaintops. Linker and Nauvoo soils have a fine-loamy control section. Linker soils are 20 to 40 inches deep over sandstone bedrock. Nauvoo soils are more than 40 inches deep over soft sandstone bedrock. Sidon soils have a fragipan and are more than 40 inches deep over bedrock. Steprock soils are 20 to 40 inches deep over weathered sandstone bedrock. Nella soils are on mountainsides and benches. They are more than 60 inches deep over bedrock and have a fine-loamy control section.

Typical pedon of Mountainburg stony fine sandy loam, in a wooded area of Linker-Mountainburg complex, 3 to 8 percent slopes, SE¼SE¼NW¼ sec. 12, T. 13 N., R. 17 W.

A—0 to 3 inches; dark brown (10YR 4/3) stony fine sandy loam; weak fine granular structure; very friable; many medium roots; about 10 percent, by volume, sandstone fragments 1 to 3 inches in diameter and 20 percent 3 to 24 inches in diameter;

moderately acid; clear smooth boundary.
BA—3 to 8 inches; yellowish brown (10YR 5/6) very cobbly loam; weak medium subangular blocky structure; friable; common medium and fine roots; about 15 percent, by volume, sandstone fragments 1 to 3 inches in diameter and 20 percent 3 to 14 inches in diameter; very strongly acid; clear smooth boundary.
Bt—8 to 16 inches; strong brown (7.5YR 5/6) very cobbly loam; weak medium subangular blocky structure; friable; few medium and fine roots; few thin patchy clay films on faces of peds; about 15 percent, by volume, sandstone fragments 1 to 3 inches in diameter and 30 percent 3 to 14 inches in diameter; very strongly acid; abrupt smooth boundary.
R—16 to 18 inches; hard, level-bedded, acid sandstone bedrock.

The thickness of the solum and the depth to bedrock range from 12 to 20 inches. Reaction is very strongly acid to moderately acid in the A and BA horizons and strongly acid or very strongly acid in the B horizon. The content of coarse fragments ranges, by volume, from 15 to 60 percent in the A, E, and BA horizons and from 35 to 60 percent in the Bt horizon.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. In areas where value is 3, this horizon is less than 5 inches thick. The Ap horizon, if it occurs, has hue of 10YR and has value of 4 or 5 and chroma of 3 or value of 4 and chroma of 2. The A and Ap horizons are gravelly fine sandy loam, stony fine sandy loam, or very stony fine sandy loam.

The E horizon, if it occurs, has hue of 10YR, value of 4 to 6, and chroma of 3 or 4. It is the gravelly, very gravelly, cobbly, very cobbly, stony, or very stony analogs of fine sandy loam or sandy loam.

The BA horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 6. It is the gravelly, very gravelly, cobbly, very cobbly, stony, or very stony analogs of loam, sandy loam, or fine sandy loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 or 6, or it has hue of 5YR and has value of 4 or 5 and chroma of 6 or value of 5 and chroma of 8. It is the very gravelly, very cobbly, or very stony analogs of loam, sandy clay loam, or fine sandy loam.

The R horizon is hard, level-bedded to undulating, acid sandstone bedrock.

Nauvoo Series

The Nauvoo series consists of deep, well drained, moderately permeable soils that formed in loamy residuum of acid sandstone. These gently sloping soils are on mountaintops and benches. The native vegetation was mixed hardwoods and some shortleaf pine. Slopes range from 2 to 7 percent.

Nauvoo soils are geographically associated with Enders, Linker, Mountainburg, Nella, Sidon, and Steprock soils. Enders soils are on side slopes. They have a clayey control section. Linker, Mountainburg, and Sidon soils are in landscape positions similar to those of the Nauvoo soils. Linker soils are less than 40 inches deep over bedrock. Mountainburg soils have a loamy-skeletal control section and are less than 20 inches deep over sandstone bedrock. Sidon soils have a fragipan. Nella soils are in colluvial areas on side slopes. They are more than 60 inches deep over bedrock. Steprock soils are on mountaintops and the steeper side slopes. They have a loamy-skeletal control section.

Typical pedon of Nauvoo fine sandy loam, 2 to 7 percent slopes, in a cultivated field, SW¼SE¼NE¼ sec. 34, T. 14 N., R. 16 W.

Ap—0 to 8 inches; dark brown (7.5YR 4/4) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; common fine pores; strongly acid; abrupt smooth boundary.
BE—8 to 16 inches; yellowish red (5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; many fine and medium roots; common fine pores; strongly acid; clear smooth boundary.
Bt1—16 to 23 inches; yellowish red (5YR 5/6) clay loam; moderate medium subangular blocky structure; firm; common medium roots; common fine pores; thin patchy clay films on faces of peds; very strongly acid; gradual smooth boundary.
Bt2—23 to 40 inches; red (2.5YR 4/6) clay loam; common medium distinct light brown (7.5YR 6/4) mottles; moderate medium subangular blocky structure; firm; about 5 percent, by volume, sandstone gravel; thin patchy clay films on faces of peds; very strongly acid; gradual smooth boundary.
BC—40 to 50 inches; yellowish red (5YR 4/6) sandy clay loam; common medium distinct light brown (7.5YR 6/4) mottles; weak fine subangular blocky structure; very strongly acid; abrupt smooth boundary.
Cr—50 to 56 inches; massive, weathered, level-bedded sandstone bedrock.

The thickness of the solum ranges from 30 to 50 inches, and the depth to bedrock ranges from 40 to 60 inches. Reaction is strongly acid or very strongly acid throughout the profile. The content of coarse fragments ranges, by volume, from 0 to 5 percent in the A horizon and from 0 to 10 percent in the BE, Bt, and BC horizons.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4 or hue of 7.5YR and value and chroma of 4. The BE horizon has hue of 5YR, value of 5, and chroma of 6 to 8 or hue of 7.5YR, value of 4 or 5, and chroma of 4 or 6. The Bt horizon has hue of 5YR and has value of 4 and chroma of 6 or value of 5 and chroma of 6 to 8, or it has hue of 2.5YR, value of 4 or 5, and chroma of 6 to 8. In some pedons it is mottled in shades of brown or red in the lower part. This horizon is sandy clay loam, clay loam, or loam. The BC horizon has hue of 5YR and has value of 4 and chroma of 4 to 6 or value of 5 and chroma of 6 to 8. It has mottles in shades of brown or yellow. It is loam or sandy clay loam. The Cr horizon is red, brown, or gray, weathered, soft sandstone.

Nella Series

The Nella series consists of deep, well drained, moderately permeable soils that formed in colluvium derived from acid sandstone and shale. These gently sloping to very steep soils are on mountainsides, foot slopes, and benches. The native vegetation was mixed upland hardwoods and some pine. Slopes range from 3 to 60 percent.

Nella soils are geographically associated with Ceda, Enders, Kenn, Mountainburg, Nauvoo, Spadra, and Steprock soils. Ceda soils are on flood plains. They have a loamy-skeletal control section and do not have an argillic horizon. Enders soils are in landscape positions similar to those of the Nella soils. They have a clayey control section and are 40 to 60 inches deep over shale bedrock. Kenn soils are on flood plains. They have a solum that is less than 60 inches thick and have higher base saturation than the Nella soils. Mountainburg soils are on mountaintops and on steep and very steep side slopes. They have a loamy-skeletal control section and are less than 20 inches deep over bedrock. Nauvoo soils are on mountaintops. They are less than 60 inches deep over soft sandstone bedrock. Spadra soils are on terraces. Their solum is less than 60 inches thick. Steprock soils are in landscape positions similar to those of the Nella soils. They are 20 to 40 inches deep over soft bedrock and have a loamy-skeletal control section.

Typical pedon of Nella very stony loam, in a wooded area of Nella-Steprock-Mountainburg complex, 40 to 60 percent slopes, SE¼SE¼NW¼ sec. 26, T. 15 N., R. 18 W.

A—0 to 2 inches; dark brown (10YR 4/3) very stony loam; weak fine granular structure; very friable; many fine and medium roots; about 40 percent sandstone fragments, half of which are more than 10 inches in diameter; very strongly acid; abrupt smooth boundary.

BE—2 to 6 inches; yellowish brown (10YR 5/6) cobbly loam; weak fine granular structure; friable; many fine and medium roots; about 15 percent sandstone fragments, half of which are more than 3 inches in diameter; very strongly acid; abrupt smooth boundary.

Bt1—6 to 12 inches; yellowish red (5YR 4/6) cobbly clay loam; weak fine subangular blocky structure; friable; many fine and medium roots; thin patchy clay films on faces of peds; about 15 percent, by volume, sandstone fragments more than 3 inches in diameter; very strongly acid; clear smooth boundary.

Bt2—12 to 24 inches; red (2.5YR 4/8) clay loam; weak medium subangular blocky structure; friable; common fine roots; thin patchy clay films on faces of peds; about 10 percent, by volume, sandstone fragments as much as 10 inches in diameter; very strongly acid; gradual smooth boundary.

Bt3—24 to 43 inches; red (2.5YR 4/8) cobbly clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; thin patchy clay films on faces of peds; about 20 percent sandstone fragments, 10 percent of which are more than 3 inches in diameter; very strongly acid; gradual smooth boundary.

Bt4—43 to 60 inches; red (2.5YR 4/8) cobbly clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; thin patchy clay films on faces of peds; about 30 percent sandstone fragments, 20 percent of which are more than 3 inches in diameter; very strongly acid; gradual smoooth boundary.

Bt5—60 to 72 inches; red (2.5YR 4/6) cobbly clay loam; common medium distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; firm; thin patchy clay films on faces of peds; about 15 percent sandstone fragments more than 3 inches in diameter; very strongly acid.

The solum is 60 to more than 80 inches thick. Reaction is strongly acid or very strongly acid throughout the profile. The content of sandstone fragments ranges, by volume, from 15 to 50 percent in the A horizon and from 10 to 30 percent in the E, BE, and Bt horizons.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. It is gravelly loam, stony loam, or very stony loam.

The E horizon, if it occurs, has hue of 10YR, value of

5 or 6, and chroma of 3 or 4. It is fine sandy loam, sandy loam, or the gravelly or cobbly analogs of those textures.

The BE horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 to 6, or it has hue of 5YR and has value of 4 or 5 and chroma of 4 to 6 or value of 5 and chroma of 8. It is loam, clay loam, or the gravelly or cobbly analogs of those textures.

The Bt horizon has hue of 5YR and has value of 4 and chroma of 4 to 6 or value of 5 and chroma of 4, 6, or 8, or it has hue of 2.5YR, value of 4, and chroma of 6 to 8. It is commonly mottled in shades of red, brown, or yellow in the lower part. This horizon is sandy clay loam, clay loam, clay, or the gravelly or cobbly analogs of those textures.

Newnata Series

The Newnata series consists of deep, well drained, slowly permeable soils that formed in residuum of interbedded limestone and calcareous shale. These gently sloping to steep soils are on foot slopes and mountainsides. The native vegetation was mixed upland hardwoods and eastern redcedar. Slopes range from 3 to 40 percent.

Newnata soils are geographically associated with Eden, Moko, Samba, and Summit soils. Eden soils are in landscape positions similar to those of the Newnata soils. They are less than 40 inches deep over shale bedrock. Moko soils are on side slopes. They have a loamy-skeletal control section and are less than 20 inches deep over limestone bedrock. Samba soils are on depressional terraces. They have a mollic epipedon. Summit soils are on foot slopes and mountainsides. They are more than 60 inches deep over soft bedrock and have vertic properties.

Typical pedon of Newnata stony silty clay loam, in an area of Newnata-Eden-Moko complex, 3 to 20 percent slopes, NE¼SW¼SE¼ sec. 15, T. 14 N., R. 17 W.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) stony silty clay loam; weak medium subangular blocky structure; friable; many fine and medium roots; about 20 percent, by volume, limestone and sandstone fragments that are mainly 4 to 24 inches in diameter; slightly acid; clear smooth boundary.

BA—4 to 18 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; common fine and medium roots; common medium pores; about 10 percent, by volume, limestone fragments that are mainly 4 to 10 inches in diameter; slightly acid; clear smooth boundary.

Bt1—18 to 30 inches; dark yellowish brown (10YR 4/6) clay; moderate medium subangular blocky structure; firm; few fine and medium roots; few fine pores; continuous thick clay films on faces of peds; about 10 percent, by volume, limestone fragments that are mainly 4 to 10 inches in diameter; slightly acid; gradual wavy boundary.

Bt2—30 to 48 inches; yellowish brown (10YR 5/6) clay; moderate medium subangular blocky structure; firm; few fine roots; few fine pores; continuous thick clay films on faces of peds; about 5 percent, by volume, limestone fragments 4 to 10 inches in diameter; slightly acid; gradual wavy boundary.

R—48 to 50 inches; gray, hard limestone bedrock.

The thickness of the solum and the depth to hard bedrock range from 40 to 60 inches. Reaction ranges from strongly acid to slightly acid in the A and E horizons and from strongly acid to mildly alkaline in the BA and B horizons. The content of coarse fragments ranges, by volume, from 0 to 35 percent throughout the profile.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. In areas where value is 3, this horizon is less than 7 inches thick. It is silty clay loam, flaggy silty clay loam, or stony silty clay loam.

The E horizon, if it occurs, has hue of 10YR, value of 5 or 6, and chroma of 2 to 4. It is gravelly or flaggy silt loam.

The BA horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is silty clay, silty clay loam, or the gravelly or flaggy analogs of those textures.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It has mottles in shades of red or brown. It is silty clay, clay, or the gravelly or flaggy analogs of those textures.

Some pedons have a Cr horizon. This horizon is soft, platy shale that has clay or silty clay between the plates. The soil material has the same colors and textures as those in the Bt horizon. The R horizon is hard, gray limestone or interbedded fossiliferous limestone and calcareous shale bedrock.

Nixa Series

The Nixa series consists of deep, moderately well drained, very slowly permeable soils that formed in residuum of cherty limestone. These gently sloping to strongly sloping soils are on ridgetops. The native vegetation was mixed upland hardwoods and some pine. Slopes range from 5 to 12 percent.

Nixa soils are geographically associated with Captina, Clarksville, Elsah, Noark, and Peridge soils. Captina soils are on broad upland flats. They have a

fine-silty control section. Clarksville soils are on the lower hillsides. They do not have a fragipan. Elsah soils are on flood plains and are somewhat excessively drained. They do not have a fragipan. Noark soils are on hillsides and ridgetops. They have a clayey-skeletal control section and do not have a fragipan. Peridge soils are on terraces. They have a fine-silty control section and do not have a fragipan.

Typical pedon of Nixa very cherty silt loam, 5 to 12 percent slopes, in a pastured area, SE¼NE¼NE¼ sec. 24, T. 17 N., R. 18 W.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) very cherty silt loam; weak fine granular structure; friable; many fine and medium roots; about 35 percent, by volume, chert fragments 1 to 4 inches in diameter; strongly acid; abrupt smooth boundary.

E—6 to 14 inches; yellowish brown (10YR 5/4) very cherty silt loam; weak fine subangular blocky structure; friable; many fine and medium roots; about 35 percent, by volume, chert fragments 1 to 4 inches in diameter; very strongly acid; clear smooth boundary.

Bw—14 to 23 inches; yellowish brown (10YR 5/6) very cherty silt loam; moderate medium subangular blocky structure; friable; common fine roots; about 35 percent, by volume, chert fragments 1 to 4 inches in diameter; strongly acid; gradual smooth boundary.

Btx—23 to 37 inches; yellowish brown (10YR 5/6) very cherty silty clay loam; many medium distinct pale brown (10YR 6/3) and common medium prominent red (2.5YR 4/8) mottles; strong medium subangular blocky structure; firm and brittle; many fine vesicular pores; about 50 percent, by volume, chert fragments 1 to 4 inches in diameter; very strongly acid; clear smooth boundary.

Bt—37 to 72 inches; red (2.5YR 4/6) very cherty silty clay; many medium prominent grayish brown (10YR 5/2) mottles; strong medium subangular blocky structure; firm and slightly brittle; about 40 percent, by volume, chert fragments 1 to 4 inches in diameter; thin continuous clay films on faces of peds; very strongly acid.

The thickness of the solum and the depth to consolidated bedrock are more than 60 inches. Depth to the fragipan ranges from 14 to 24 inches. Reaction is strongly acid or very strongly acid throughout the profile. The content of chert fragments ranges, by volume, from 35 to 60 percent in the A, E, and Bw horizons and from 40 to 75 percent in the Btx and Bt horizons.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2. The Ap horizon has hue of 10YR and has value of 4 or 5 and chroma of 2 or 3 or value of 5 and chroma of 4. In areas where value is 3, this horizon is less than 6 inches thick. The E horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4.

The Bw horizon has hue of 10YR, value of 5 or 6, and chroma of 4 or 6. It is very cherty silt loam or very cherty loam.

The Btx horizon has hue of 10YR, value of 5, and chroma of 4 to 6 or has hue of 7.5YR, value of 5, and chroma of 6 and is mottled in shades of brown, red, or gray, or it has no matrix color and is mottled in shades of brown, gray, or red. It is the very cherty or extremely cherty analogs of silt loam or silty clay loam.

The Bt horizon has hue of 2.5YR, value of 4, and chroma of 6, or it has hue of 5YR, value of 4 or 5, and chroma of 6. It is mottled in shades of red, brown, or gray. It is the very cherty or extremely cherty analogs of silty clay or silty clay loam.

Noark Series

The Noark series consists of deep, well drained, moderately permeable soils that formed in residuum of cherty limestone. These gently sloping to steep soils are on hillsides and ridgetops. The native vegetation was mixed hardwoods and pine. Slopes range from 3 to 35 percent.

Noark soils are geographically associated with Arkana, Captina, Clarksville, Elsah, Moko, Nixa, Peridge, and Secesh soils. Arkana soils are on hillsides at the lower elevations. They are less than 45 inches deep over bedrock and have a very fine textured control section. Captina soils are on broad upland flats. They have a fine-silty control section and a fragipan. Clarksville soils are on side slopes. They have a loamy-skeletal control section. Elsah soils are on flood plains. They have a loamy-skeletal control section and do not have an argillic horizon. Moko soils are on hillsides near limestone outcrops at the lower elevations. They are less than 20 inches deep over bedrock and do not have an argillic horizon. Nixa soils are on ridgetops. They have a loamy-skeletal control section and a fragipan. Peridge soils are on terraces. They have a fine-silty control section and have higher base saturation than the Noark soils. Secesh soils are on flood plains. They have a fine-loamy control section.

Typical pedon of Noark very cherty silt loam, 3 to 8 percent slopes, in a wooded area, NE¼NE¼SE¼ sec. 17, T. 15 N., R. 15 W.

A—0 to 2 inches; dark grayish brown (10YR 4/2) very cherty silt loam; weak fine granular structure; friable; many fine and medium roots; about 40

percent, by volume, angular chert fragments ½ inch to 5 inches in diameter; moderately acid; clear smooth boundary.

E—2 to 11 inches; brown (10YR 5/3) very cherty silt loam; weak fine subangular blocky structure; very friable; many fine and medium roots; about 40 percent, by volume, angular chert fragments ½ inch to 6 inches in diameter; very strongly acid; clear smooth boundary.

BE—11 to 16 inches; strong brown (7.5YR 5/6) very cherty silty clay loam; moderate medium subangular blocky structure; friable; few fine pores; common fine and medium roots; about 40 percent, by volume, angular chert fragments ½ inch to 6 inches in diameter; very strongly acid; clear smooth boundary.

Bt1—16 to 35 inches; red (2.5YR 4/6) very cherty clay; moderate medium subangular blocky structure; very firm; thin continuous clay films on faces of peds; few fine pores; common medium roots; about 50 percent, by volume, angular chert fragments ½ inch to 6 inches in diameter; very strongly acid; gradual smooth boundary.

Bt2—35 to 72 inches; red (2.5YR 4/8) extremely cherty clay; moderate medium subangular blocky structure; very firm; thin continuous clay films on faces of peds; few medium roots; about 65 percent, by volume, angular chert fragments ½ inch to 6 inches in diameter; very strongly acid.

The thickness of the solum ranges from 60 to more than 80 inches. Reaction ranges from very strongly acid to slightly acid in the A and E horizons and is very strongly acid or strongly acid in the B horizon. The content of chert fragments ranges, by volume, from 35 to 60 percent in the A, E, BE, and Bt1 horizons and from 50 to 80 percent in the Bt2 and Bt3 horizons.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. In areas where value is 3, this horizon is less than 6 inches thick. The Ap horizon has hue of 10YR and value and chroma of 4. The E horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4.

The BE horizon has hue of 5YR, value of 4 or 5, and chroma of 6, or it has hue of 7.5YR or 10YR, value of 5, and chroma of 4 to 6. It is very cherty silt loam or very cherty silty clay loam.

The Bt horizon has hue of 2.5YR, value of 4 or 5, and chroma of 6 to 8, or it has hue of 5YR and has value of 4 or 5 and chroma of 6 or value of 5 and chroma of 8. In some pedons it has mottles in shades of gray or brown below a depth of 30 inches. The Bt1 horizon is very cherty clay or very cherty silty clay, and the Bt2 horizon is extremely cherty clay, extremely cherty silty clay, very cherty clay, or very cherty silty clay.

Peridge Series

The Peridge series consists of deep, well drained, moderately permeable soils that formed in residuum of interbedded limestone and siltstone. These nearly level and gently sloping soils are on high terraces. The native vegetation was mixed upland hardwoods. Slopes range from 1 to 5 percent.

Peridge soils are geographically associated with Nixa, Noark, and Razort soils. Nixa soils are on ridgetops. They have a loamy-skeletal control section and a fragipan. Noark soils are on hillsides and ridgetops. They have a clayey-skeletal control section and have lower base saturation than the Peridge soils. Razort soils are on flood plains. They have a fine-loamy control section.

Typical pedon of Peridge silt loam, 1 to 5 percent slopes, in a pasture, NW¼SW¼NW¼ sec. 36, T. 15 N., R. 16 W.

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

BA—4 to 17 inches; strong brown (7.5YR 5/6) silt loam; weak medium subangular blocky structure; friable; common fine and medium roots; few black stains on faces of peds; strongly acid; clear smooth boundary.

Bt1—17 to 23 inches; yellowish red (5YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; thin patchy clay films on faces of peds; common black stains on faces of peds; very strongly acid; gradual smooth boundary.

Bt2—23 to 37 inches; red (2.5YR 4/6) silty clay loam; common fine distinct pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; firm; thin patchy clay films on faces of peds; common black stains on faces of peds; very strongly acid; clear smooth boundary.

Bt3—37 to 62 inches; yellowish red (5YR 5/8) silty clay loam; common medium distinct yellowish brown (10YR 5/4) and pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; thin continuous clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt4—62 to 84 inches; mottled red (2.5YR 4/6), yellowish red (5YR 5/8), yellowish brown (10YR 5/4), and pale brown (10YR 6/3) silty clay; moderate medium subangular blocky structure; firm; thin continuous clay films on faces of peds; very strongly acid.

The solum is 80 or more inches thick. Reaction ranges from very strongly acid to moderately acid throughout the profile. The content of gravel ranges, by volume, from 0 to 5 percent in the upper 40 inches and from 0 to 15 percent below 40 inches.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3 or hue of 7.5YR and value and chroma of 4. The BA horizon has hue of 7.5YR, value of 4 or 5, and chroma of 4 or 6.

The Bt1 horizon has hue of 5YR and has value of 4 or 5 and chroma of 6 or value of 5 and chroma of 8, or it has hue of 2.5YR, value of 4, and chroma of 6 to 8. It is silt loam or silty clay loam. The lower part of the Bt horizon has colors similar to those of the Bt1 horizon but is mottled in shades of red or brown, or it has no matrix color and is mottled in shades of red or brown. It is silty clay loam or silty clay.

Portia Series

The Portia series consists of deep, well drained, moderately permeable soils that formed in loamy residuum of interbedded sandstone and limestone. These gently sloping to strongly sloping soils are on foot slopes. The native vegetation was mixed upland hardwoods and pine. Slopes range from 3 to 12 percent.

Portia soils are geographically associated with Estate and Lily soils. Estate soils are on hilltops and hillsides. They have a fine textured control section and are less than 60 inches deep over bedrock. Lily soils are on hillsides and ridges. They are less than 40 inches deep over bedrock.

Typical pedon of Portia fine sandy loam, 8 to 12 percent slopes, in a wooded area, NE¼NW¼SE¼ sec. 20, T. 17 N., R. 18 W.

A—0 to 5 inches; dark brown (10YR 4/3) fine sandy loam; weak medium granular structure; friable; strongly acid; clear smooth boundary.

BA—5 to 14 inches; strong brown (7.5YR 5/6) fine sandy loam; weak medium subangular blocky structure; very friable; very strongly acid; clear smooth boundary.

Bt1—14 to 26 inches; yellowish red (5YR 4/6) sandy clay loam; weak medium subangular blocky structure; friable; thin patchy clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt2—26 to 38 inches; red (2.5YR 4/6) sandy clay loam; common medium prominent strong brown (7.5YR 4/6) mottles; moderate medium subangular blocky structure; firm; thin patchy clay films on faces of peds; about 5 percent, by volume, sandstone fragments ½ inch to 3 inches in diameter; very strongly acid; gradual smooth boundary.

Bt3—38 to 72 inches; red (2.5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; firm; thin patchy clay films on faces of peds; very strongly acid.

The solum is 60 to more than 80 inches thick. Reaction is very strongly acid to moderately acid in the A and BA horizons and very strongly acid or strongly acid in the Bt horizon. The content of coarse fragments ranges, by volume, from 0 to 10 percent throughout the profile.

The A horizon has hue of 10YR and chroma and value of 3 or 4. The Ap horizon has hue of 10YR, value of 4, and chroma of 2 to 4. The E horizon, if it occurs, has hue of 10YR, value of 5, and chroma of 4. It is fine sandy loam or loam.

The BE or BA horizon has hue of 5YR, value of 4 or 5, and chroma of 4 to 6, or it has hue of 7.5YR and has value and chroma of 4 or value of 5 and chroma of 4 to 6. It is fine sandy loam or loam.

The upper part of the Bt horizon has hue of 5YR and value of 4 and chroma of 6 or value of 5 and chroma of 6 to 8; hue of 7.5YR, value of 5, and chroma of 4, 6, or 8; or hue of 2.5YR, value of 4 or 5, and chroma of 6. It is sandy clay loam or loam. The lower part has hue of 5YR and has value of 4 and chroma of 6 or value of 5 and chroma of 6 to 8, or it has hue of 2.5YR, value of 4, and chroma of 6 to 8. It has mottles in shades of brown. It is sandy clay loam or clay loam.

Razort Series

The Razort series consists of deep, well drained, moderately permeable soils that formed in loamy alluvium. These level and nearly level soils are on flood plains. They are frequently flooded for very brief or brief periods from December through April. The native vegetation was mixed bottom-land hardwoods. Slopes range from 0 to 3 percent.

Razort soils are geographically associated with Ceda, Elsah, Healing, Peridge, Secesh, and Wideman soils. Ceda, Elsah, and Wideman soils do not have an argillic horizon. Ceda and Elsah soils have a loamy-skeletal control section, and Wideman soils have a sandy control section. Ceda soils are in landscape positions similar to those of the Razort soils. Elsah soils are on narrow flood plains upstream from the Razort soils. Wideman soils are on the lower flood plains. Healing and Peridge soils are on terraces. They have a fine-silty control section. Secesh soils are in landscape positions similar to those of the Razort soils. They have siliceous mineralogy.

Typical pedon of Razort loam, frequently flooded, in

a meadow, NE¼NE¼SE¼ sec. 18, T. 15 N., R. 16 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) loam; moderate medium granular structure; very friable; many fine roots; slightly acid; clear smooth boundary.
BA—8 to 18 inches; dark brown (10YR 3/3) silt loam; moderate medium subangular blocky structure; friable; common fine roots; few fine pores; moderately acid; clear smooth boundary.
Bt1—18 to 35 inches; dark brown (10YR 3/3) clay loam; moderate medium subangular blocky structure; firm; common fine roots; common fine pores; thin patchy clay films on faces of peds; moderately acid; gradual smooth boundary.
Bt2—35 to 54 inches; dark brown (10YR 3/3) clay loam; moderate medium subangular blocky structure; firm; common medium pores; medium continuous clay films on faces of peds; moderately acid; gradual smooth boundary.
2C—54 to 68 inches; dark yellowish brown (10YR 4/4) sandy loam; massive; friable; about 10 percent, by volume, gravel less than 1 inch in diameter; moderately acid.

The solum is 38 to more than 60 inches thick. Reaction is slightly acid or neutral in the A horizon and moderately acid or slightly acid in the BA, B, and 2C horizons. The content of coarse fragments ranges, by volume, from 0 to 15 percent in the A and BA horizons, from 0 to 25 percent in the Bt and BC horizons, and from 0 to 50 percent in the 2C horizon.

The A horizon has hue of 10YR, value of 3, and chroma of 2 or 3. The BA horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is loam or silt loam.

The Bt horizon has hue of 10YR, value of 3 or 4, and chroma of 3 or 4, or it has hue of 7.5YR and value and chroma of 4. It is silt loam, loam, clay loam, or the gravelly analogs of those textures.

The BC horizon, if it occurs, has hue of 10YR and value and chroma of 3 or 4, or it has hue of 7.5YR and value and chroma of 4. It is silt loam, loam, or the gravelly analogs of those textures.

The 2C horizon has colors similar to those of the Bt and BC horizons. It is silt loam, loam, sandy loam, or the gravelly or very gravelly analogs of those textures.

Samba Series

The Samba series consists of deep, poorly drained, very slowly permeable soils that formed in silty and clayey sediments. These level and nearly level soils are on depressional stream terraces in mountain valleys. They have a perched seasonal high water table within 12 inches of the surface from December through April. They can be flooded for brief periods under unusual weather conditions. The native vegetation was mixed hardwoods. Slopes are 0 to 2 percent.

Samba soils are geographically associated with Eden, Newnata, and Summit soils. Eden soils are on side slopes. They are less than 40 inches deep over soft shale bedrock. Newnata soils are on mountainsides and foot slopes. They are 40 to 60 inches deep over bedrock and do not have an umbric epipedon. Summit soils are on foot slopes and mountainsides and are well drained and slowly permeable. They have vertic properties.

Typical pedon of Samba silty clay loam, 0 to 2 percent slopes, in a pasture, NW¼SW¼NE¼ sec. 16, T. 14 N., R. 14 W.

Ap—0 to 8 inches; black (10YR 2/1) silty clay loam; moderate medium granular structure; friable; common fine and many very fine roots; moderately acid; abrupt smooth boundary.
A—8 to 15 inches; very dark grayish brown (10YR3/2) silty clay loam; moderate medium subangular blocky structure; firm; many very fine roots; moderately acid; gradual smooth boundary.
Btg1—15 to 34 inches; grayish brown (2.5Y 5/2) clay; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; continuous thick clay films on faces of peds; many fine and very fine roots; strongly acid; gradual wavy boundary.
Btg2—34 to 48 inches; light brownish gray (2.5Y 6/2) clay; common medium distinct yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; firm; continuous thick clay films on faces of peds; common fine roots; strongly acid; gradual wavy boundary.
Btg3—48 to 72 inches; light brownish gray (2.5Y 6/2) silty clay; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; few very fine roots; strongly acid.

The depth to shale bedrock is more than 60 inches. Reaction is slightly acid or moderately acid in the A horizon and ranges from strongly acid to neutral in the B horizon.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The Btg horizon has hue of 10YR, value of 4 or 5, and chroma of 1, or it has hue of 2.5Y, value of 5 or 6, and chroma of 2. It has mottles in shades of yellow, red, or brown. It is silty clay loam, silty clay, or clay.

Secesh Series

The Secesh series consists of deep, well drained, moderately permeable soils that formed in loamy alluvium. These level and nearly level soils are on flood plains and low terraces. They are frequently flooded for very brief periods from December through April in most years. The native vegetation was bottom-land hardwoods. Slopes range from 0 to 3 percent.

The Secesh soils in this survey area are taxadjuncts to the series. The content of chert in the BA horizon and in the upper part of the Bt horizon is higher than is definitive for the series. Also, no lithologic discontinuity was recognized in these soils, and the decrease in content of clay with increasing depth is less than 20 percent of the maximum. These differences, however, do not significantly affect the use, behavior, or management of the soils.

Secesh soils are geographically associated with Clarksville, Elsah, Noark, and Razort soils. Clarksville and Elsah soils have a loamy-skeletal control section. Clarksville soils are on steep and very steep side slopes. Elsah soils are on flood plains upstream from the Secesh soils. They do not have an argillic horizon. Noark soils are on side slopes. They have a clayey-skeletal control section. Razort soils are in landscape positions similar to those of the Secesh soils. They have mixed mineralogy.

Typical pedon of Secesh silt loam, frequently flooded, in a pasture, NW¼NE¼NW¼ sec. 23, T. 15 N., R. 16 W.

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

BA—6 to 16 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; about 5 percent, by volume, chert gravel; moderately acid; clear smooth boundary.

Bt1—16 to 30 inches; dark yellowish brown (10YR 4/4) cherty silty clay loam; moderate medium subangular blocky structure; friable; thin patchy clay films on face of peds; about 20 percent, by volume, chert gravel; moderately acid; clear smooth boundary.

Bt2—30 to 38 inches; dark yellowish brown (10YR 4/4) cherty silty clay loam; moderate medium subangular blocky structure; friable; thin patchy clay films on faces of peds; about 30 percent, by volume, chert gravel; strongly acid; gradual wavy boundary.

Bt3—38 to 48 inches; strong brown (7.5YR 5/6) cherty silty clay loam; moderate medium subangular blocky structure; firm; distinct thin patchy clay films on faces of peds; about 35 percent, by volume, chert gravel; strongly acid; gradual wavy boundary.

Bt4—48 to 72 inches; yellowish red (5YR 5/6) very cherty silty clay loam; moderate medium subangular blocky structure; firm; distinct thin patchy clay films on faces of peds; about 45 percent, by volume, chert gravel; strongly acid.

The solum is more than 60 inches thick. The content of coarse fragments ranges, by volume, from 0 to 15 percent in the A horizon, from 5 to 35 percent in the BA and Bt1 horizons, and from 15 to 60 percent in the Bt2, Bt3, and Bt4 horizons. Reaction is slightly acid or moderately acid in the A and BA horizons and moderately acid or strongly acid in the Bt horizon.

The A horizon has hue of 10YR, value of 3, and chroma of 2 or 3. The BA horizon has hue of 10YR and has value of 4 or 5 and chroma of 4 or value of 5 and chroma of 6, or it has hue of 7.5YR, value of 5, and chroma of 4. It is silt loam, silty clay loam, or the cherty analogs of those textures.

The Bt1 horizon has hue of 10YR and value and chroma of 4 or value of 5 and chroma of 4 to 6; hue of 7.5YR and value of 4 and chroma of 6 or value of 5 and chroma of 4, 6, or 8; or hue of 5YR, value of 5, and chroma of 6 to 8. It is silt loam, silty clay loam, or the cherty analogs of those textures. The Bt2, Bt3, and Bt4 horizons have hue of 10YR, value of 4 or 5, and chroma of 4 to 6; hue of 7.5YR, value of 5, chroma of 4 to 6; or hue of 5YR, value of 5, and chroma of 6 to 8. They are the cherty or very cherty analogs of silty clay loam or clay loam.

Sidon Series

The Sidon series consists of deep, moderately well drained, slowly permeable soils that formed in residuum of sandstone. These gently sloping soils are on mountaintops. They have a perched seasonal high water table at a depth of about 2 to 3 feet from December through April. The native vegetation was mixed hardwoods and some shortleaf pine. Slopes range from 2 to 6 percent.

Sidon soils are geographically associated with Enders, Linker, Mountainburg, and Nauvoo soils. None of the associated soils have a fragipan. Enders soils are on upland crests and mountainsides. They have a clayey control section. Linker soils are in landscape positions similar to those of the Sidon soils. They are less than 40 inches deep over hard bedrock. Mountainburg soils are on the top and sides of mountains. They are less than 20 inches deep over bedrock. Nauvoo soils are in landscape positions similar to those of the Sidon soils. They are 40 to 60 inches deep over soft sandstone bedrock.

Typical pedon of Sidon loam, 2 to 6 percent slopes,

in a pasture, SW¼NE¼NE¼ sec. 36, T. 14 N., R. 16 W.

Ap—0 to 6 inches; dark yellowish brown (10YR 4/4) loam; moderate medium granular structure; friable; about 5 percent, by volume, sandstone fragments that are mainly 3 to 5 inches in diameter; strongly acid; clear smooth boundary.

Bt—6 to 22 inches; yellowish brown (10YR 5/8) loam; moderate medium subangular blocky structure; friable; few thin patchy clay films on faces of peds; about 5 percent, by volume, sandstone fragments that are mainly 3 to 5 inches in diameter; strongly acid; clear smooth boundary.

Btx1—22 to 39 inches; mottled red (2.5YR 4/8), light gray (10YR 7/2), and yellowish brown (10YR 5/6) loam; weak coarse prismatic structure parting to moderate medium subangular blocky; very firm; compact and brittle; continuous thin clay films on faces of peds; about 5 percent, by volume, sandstone fragments that are mainly 3 to 5 inches in diameter; strongly acid; gradual smooth boundary.

Btx2—39 to 53 inches; red (2.5YR 4/6) clay loam; common medium prominent light brownish gray (10YR 6/2) and common fine prominent strong brown (7.5YR 5/8) mottles; weak coarse prismatic structure parting to strong medium subangular blocky; very firm; compact and brittle; continuous thin clay films on faces of peds; about 3 percent, by volume, sandstone fragments that are mainly 3 to 5 inches in diameter; very strongly acid; clear smooth boundary.

Btx3—53 to 72 inches; red (2.5YR 4/6) clay loam; common fine prominent strong brown (7.5YR 5/8) and common medium prominent light gray (10YR 7/2) mottles; weak coarse prismatic structure parting to strong medium subangular blocky; very firm; compact and brittle; common thin clay films on faces of peds; about 6 percent, by volume, sandstone fragments ½ inch to 3 inches in diameter; very strongly acid.

The thickness of the solum and the depth to bedrock typically are more than 60 inches but range to 45 inches in some pedons. Depth to the fragipan ranges from 20 to 34 inches. Reaction is strongly acid or very strongly acid throughout the profile. The content of coarse fragments ranges, by volume, from 0 to 10 percent in the A and Bt horizons and from 0 to 25 percent in the Btx and BC horizons.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The Bt horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 6 to 8. It is loam, clay loam, or silty clay loam. The Btx horizon has hue of 7.5YR or 5YR, value of 5, and chroma of 6 to 8 or has hue of 2.5YR, value of 4 or 5, and chroma of 6 to 8 and is mottled in shades of gray, brown, or red, or it has no matrix color and is mottled in shades of gray, brown, or red. It is loam, sandy clay loam, clay loam, or the gravelly analogs of those textures. The BC and C horizons, if they occur, have colors similar to those of the Btx horizon. They are clay loam, sandy clay loam, or the gravelly analogs of those textures. The R horizon is hard, level-bedded, acid sandstone.

Spadra Series

The Spadra series consists of deep, well drained, moderately permeable soils that formed in loamy alluvium derived mainly from sandstone, siltstone, and shale. These nearly level and gently sloping soils are on stream terraces. They can be flooded under unusual weather conditions. The native vegetation was mixed hardwoods and pine. Slopes range from 1 to 5 percent.

Spadra soils are geographically associated with Ceda, Enders, Kenn, and Nella soils. Ceda and Kenn soils are on flood plains. Ceda soils have a loamy-skeletal control section and do not have an argillic horizon. Kenn soils have higher base saturation than the Spadra soils and are more gravelly in the subsoil and substratum. Enders and Nella soils are on side slopes. Enders soils have a clayey control section. Nella soils have a solum that is more than 60 inches thick.

Typical pedon of Spadra loam, 1 to 5 percent slopes, in a pasture, SW¼SE¼SW¼ sec. 14, T. 14 N., R. 17 W.

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

Bt—6 to 28 inches; dark brown (7.5YR 4/4) sandy clay loam; weak fine subangular blocky structure; friable; thin patchy clay films on faces of peds; common fine roots; few fine and medium pores; strongly acid; gradual smooth boundary.

BC—28 to 46 inches; dark brown (7.5YR 4/4) loam; weak fine subangular blocky structure; friable; few dark stains on faces of peds; few fine pores; strongly acid; gradual smooth boundary.

C—46 to 65 inches; reddish brown (5YR 4/4) loam; massive; friable; few dark stains on faces of peds; strongly acid.

The thickness of the solum ranges from 40 to 60 inches. The depth to bedrock is more than 72 inches. Reaction ranges from moderately acid to very strongly

acid throughout the profile. The content of gravel ranges, by volume, from 0 to 5 percent in the A and B horizons and from 0 to 20 percent in the BC and C horizons.

The Ap horizon has hue of 10YR and has value of 3 or 4 and chroma of 4 or value of 4 and chroma of 2 or 3, or it has hue of 7.5YR or 5YR and value and chroma of 4.

The Bt horizon has hue of 5YR, value of 4 or 5, and chroma of 4 to 6 or hue of 7.5YR, value of 4, and chroma of 4 to 6. It has mottles in shades of yellow or brown in some pedons. It is loam, clay loam, or sandy clay loam.

The BC and C horizons have hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6 or have hue of 10YR, value of 4, and chroma of 3. They have mottles in shades of brown in some pedons. They are sandy loam, fine sandy loam, loam, or the gravelly analogs of those textures.

Steprock Series

The Steprock series consists of moderately deep, well drained, moderately permeable soils that formed in residuum of interbedded sandstone, siltstone, and shale. These gently sloping to very steep soils are on benches and side slopes. The native vegetation was upland hardwoods and pine. Slopes range from 3 to 60 percent.

Steprock soils are geographically associated with Ceda, Enders, Kenn, Linker, Mountainburg, Nauvoo, and Nella soils. Ceda soils are on flood plains. They do not have an argillic horizon and are more than 60 inches deep over bedrock. Enders soils are in landscape positions similar to those of the Steprock soils. They have a clayey control section and are 40 to 60 inches deep over shale bedrock. Kenn, Linker, Nauvoo, and Nella soils have a fine-loamy control section. Kenn soils are on flood plains. Their solum is 40 to 60 inches thick. Linker and Nauvoo soils are on mountaintops. Nauvoo soils are 40 to 60 inches deep over soft sandstone bedrock. Nella and Mountainburg soils are in landscape positions similar to those of the Steprock soils. Nella soils have a solum that is more than 60 inches thick. Mountainburg soils are less than 20 inches deep over hard sandstone bedrock.

Typical pedon of Steprock very stony sandy loam, in a wooded area of Nella-Steprock-Mountainburg complex, 40 to 60 percent slopes, NW¼NW¼NW¼ sec. 29, T. 13 N., R. 18 W.

A—0 to 4 inches; dark brown (10YR 4/3) very stony sandy loam; weak fine granular structure; very friable; many fine and medium roots; few fine pores; about 35 percent, by volume, sandstone fragments as much as 40 inches in diameter; very strongly acid; clear smooth boundary.

BA—4 to 10 inches; strong brown (7.5YR 5/6) very flaggy sandy loam; weak medium subangular blocky structure; friable; many fine and medium roots; few medium pores; about 35 percent, by volume, flat sandstone fragments as much as 18 inches in diameter; very strongly acid; clear smooth boundary.

Bt—10 to 22 inches; yellowish red (5YR 5/6) very flaggy sandy clay loam; moderate medium subangular blocky structure; friable; common fine and medium roots; few medium pores; few thin patchy clay films on faces of peds; about 35 percent, by volume, flat sandstone fragments that are mainly 1 to 10 inches in diameter; very strongly acid; gradual wavy boundary.

Cr—22 to 53 inches; soft, weathered, platy, level-bedded sandstone that has less than 5 percent yellowish red (5YR 5/6) clay loam between the plates.

The thickness of the solum and the depth to soft bedrock range from 20 to 40 inches. Reaction is strongly acid or very strongly acid throughout the profile. The content of coarse fragments ranges, by volume, from 35 to 60 percent throughout the profile.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. In areas where value is 3, this horizon is less than 5 inches thick.

The E horizon, if it occurs, has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. It is the very gravelly or very flaggy analogs of loam or fine sandy loam.

The BA horizon has hue of 7.5YR, value of 5, and chroma of 6 to 8. It is the very gravelly or very flaggy analogs of fine sandy loam, sandy loam, or loam.

The Bt horizon has hue of 5YR, value of 5, and chroma of 6 to 8, or it has hue of 2.5YR, value of 4 or 5, and chroma of 6 to 8. It is the very gravelly or very flaggy analogs of sandy clay loam, clay loam, or loam.

The Cr horizon is soft, weathered, level-bedded sandstone bedrock that has less than 5 percent silt and clay.

Summit Series

The Summit series consists of deep, moderately well drained, slowly permeable soils that formed in residuum of interbedded fossiliferous limestone and calcareous shale. These gently sloping to steep soils are on the lower hillsides and foot slopes in mountain valleys. They have a seasonal high water table at a depth of 2 to 3 feet from December through April. The native

vegetation was mixed hardwoods and eastern redcedar. Slopes range from 3 to 25 percent.

The Summit soils in this survey area are taxadjuncts because they are more acid than is definitive for the series, are steeper, and have a higher content of coarse fragments in the lower part of the Bt horizon and in the BC and C horizons. Also, Searcy County is considerably east of the normal range of the series. These differences, however, do not significantly affect the use, behavior, or management of the soils.

Summit soils are geographically associated with Eden, Newnata, and Samba soils. Eden soils are on mountainsides. They are less than 40 inches deep over shale bedrock. Newnata soils are on mountainsides and foot slopes. They are 40 to 60 inches deep over hard bedrock and do not have vertic properties. Samba soils are on depressional stream terraces and are poorly drained and very slowly permeable.

Typical pedon of Summit silty clay loam, 3 to 8 percent slopes, eroded, in a pasture, SE¼NW¼NW¼ sec. 5, T. 14 N., R. 15 W.

Ap—0 to 5 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark grayish brown (10YR 4/2) dry; strong fine and medium subangular blocky structure; firm; many fine and very fine roots; few very fine tubular pores; about 2 percent, by volume, thin platy shale fragments and 2 percent limestone pebbles; moderately acid; clear smooth boundary.

A—5 to 14 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark gray (10YR 4/1) dry; few fine faint brown mottles; moderate medium prismatic structure parting to strong fine and medium subangular blocky; firm; many very fine roots; common very fine pores; about 6 percent, by volume, limestone pebbles and thin platy shale fragments; moderately acid; clear smooth boundary.

Bt1—14 to 27 inches; very dark gray (10YR 3/1) silty clay; few medium faint dark brown (10YR 3/3) mottles; moderate coarse prismatic structure parting to strong medium subangular blocky; firm; continuous thick clay films on faces of peds; many fine and very fine roots; common very fine pores; few nonintersecting slickensides; about 5 percent, by volume, thin platy shale fragments and 4 percent chert and limestone pebbles; moderately acid; gradual smooth boundary.

Bt2—27 to 39 inches; very dark gray (10YR 3/1) silty clay; common medium distinct dark brown (10YR 4/3) mottles; moderate coarse prismatic structure parting to strong fine and medium subangular blocky; firm; continuous thick clay films on faces of peds; common fine roots; common fine pores; few nonintersecting slickensides; few coarse carbonate nodules and few medium rounded concretions of iron and manganese oxide; about 12 percent, by volume, thin, platy shale fragments; few fossiliferous limestone and sandstone pebbles; neutral; gradual wavy boundary.

Bt3—39 to 59 inches; very dark gray (10YR 3/1) silty clay; common coarse distinct dark brown (10YR 4/3) mottles; moderate coarse prismatic structure parting to strong medium subangular blocky; firm; continuous thick clay films on faces of peds; few fine roots; few very fine pores; few medium rounded concretions of iron and manganese oxide; few coarse carbonate nodules; few nonintersecting slickensides; about 12 percent, by volume, thin platy shale fragments and few fossiliferous limestone pebbles; neutral; clear smooth boundary.

BC—59 to 81 inches; dark gray (10YR 4/1) silty clay; moderate medium distinct dark yellowish brown (10YR 3/4) mottles; weak medium subangular blocky structure; firm; few nonintersecting slickensides; few very fine roots; few very fine pores; few coarse carbonate nodules; few medium rounded concretions of iron and manganese oxide; about 10 percent, by volume, thin platy shale fragments and few flaggy limestone fragments; moderately alkaline.

The thickness of the solum and the depth to shale bedrock are more than 50 inches. Reaction ranges from strongly acid to neutral in the A horizon and in the upper part of the B horizon and from moderately acid to moderately alkaline in the lower part of the B horizon and in the BC and C horizons. The content of coarse fragments, mainly shale fragments, ranges, by volume, from 0 to 15 percent in the A horizon and in the upper part of the B horizon and from 0 to 35 percent in the lower part of the B horizon and in the BC and C horizons.

The Ap and A horizons have hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The A horizon is silty clay loam to silty clay.

The Bt, BC, and C horizons have hue of 10YR, value of 3 to 5 and chroma of 1 to 4; have hue of 2.5Y, value of 3 to 5, and chroma of 2 to 4; or are neutral in hue and have value of 3 to 5 and chroma of 0. They have mottles in shades of red, brown, or gray. They are silty clay, clay, or the shaly analogs of those textures.

The Cr horizon, if it occurs, is soft, weathered, black or gray shale bedrock.

Wideman Series

The Wideman series consists of deep, excessively drained, moderately rapidly permeable soils that formed

in sandy recent alluvium. These level and nearly level soils are on flood plains and natural levees along streams. They are frequently flooded for very brief periods from December through May in most years. The native vegetation was bottom-land hardwoods. Slopes range from 0 to 3 percent.

Wideman soils are geographically associated with Healing and Razort soils. Healing soils are on the higher stream terraces. They have a fine-silty control section and an argillic horizon. Razort soils are on the slightly higher flood plains. They have a fine-loamy control section and an argillic horizon.

Typical pedon of Wideman loamy fine sand, frequently flooded, in a meadow, NE¼SE¼SW¼ sec. 31, T. 16 N., R. 18 W.

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

C1—6 to 13 inches; light yellowish brown (10YR 6/4) loamy sand; single grain; very friable; many fine and medium roots; strongly acid; clear abrupt smooth boundary.

C2—13 to 17 inches; dark yellowish brown (10YR 4/4) sandy loam; massive; very friable; about 5 percent, by volume, sandstone fragments less than 3 inches in diameter; common fine roots; strongly acid; abrupt smooth boundary.

C3—17 to 22 inches; light yellowish brown (10YR 6/4) loamy sand; massive; very friable; few fine roots; few fine pores; strongly acid; clear smooth boundary.

C4—22 to 25 inches; very pale brown (10YR 7/4) loamy sand; massive; very friable; few fine roots; few pockets of dark yellowish brown (10YR 4/4) fine sandy loam; strongly acid; abrupt smooth boundary.

C5—25 to 38 inches; light yellowish brown (10YR 6/4) loamy fine sand; massive; very friable; thin strata of dark yellowish brown (10YR 4/4) fine sandy loam; strongly acid; clear smooth boundary.

C6—38 to 51 inches; very pale brown (10YR 7/3) loamy sand; massive; very friable; strongly acid; abrupt smooth boundary.

C7—51 to 56 inches; dark grayish brown (10YR 4/2) fine sandy loam; massive; friable; about 5 percent, by volume, coarse fragments less than 3 inches in diameter; strongly acid; abrupt smooth boundary.

C8—56 to 72 inches; very pale brown (10YR 7/4) loamy sand; massive; very friable; about 10 percent, by volume, coarse fragments less than 3 inches in diameter; strongly acid.

The sandy sediments range from 60 to more than 72 inches in thickness. Reaction is strongly acid or moderately acid in the A horizon and ranges from strongly acid to slightly acid in the C horizon.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. The C horizon has hue of 10YR, value of 4 to 7, and chroma of 2 to 4. It is dominantly loamy fine sand, loamy sand, or fine sand but has strata of fine sandy loam or finer textured material. The content of gravel in this horizon ranges from 0 to 10 percent, by volume.

Formation of the Soils

Factors of Soil Formation

Soil is a natural body on the Earth's surface that supports plants. Its properties are the result of the integrated effects of climate and living matter acting on parent material, as conditioned by relief, over time.

The interaction of the five main soil-forming factors results in differences among soils *(10)*. These factors include physical and chemical composition of the parent material, the climate during and after the accumulation of the parent material, the kinds of plants and organisms living in and on the soils, relief and its effect on runoff, and the length of time that the processes of soil formation have been active.

The influence of any one factor can vary from place to place. The interaction of all the factors determines the kind of soil that forms. In the following paragraphs, the factors of soil formation are related to the soils in the survey area.

Parent Material

The soils in Searcy County formed in alluvium and in material weathered from consolidated bedrock of the Ordovician through Pennsylvanian periods of the Paleozoic Era *(5, 7)*. The county is on the Springfield and Boston Mountain Plateaus of the Ozark Plateau Province. The Salem Plateau, which is part of this province, is directly north of the county. The Springfield Plateau is intermediate in age and elevation. It is south of the Salem Plateau. The Boston Mountain Plateau is the youngest of the three plateaus and is highest in elevation. It covers the southern part of the county.

St. Peter Sandstone and the Everton Formation of Middle Ordovician age are exposed in the valley of the Buffalo River and in other large stream valleys in the northern part of the county. The lower part of the Everton Formation consists of brownish gray, sandy crystalline dolomite that grades to fine or medium grained sandstone. The upper part of this formation consists of sandy dolomitic limestone that grades laterally to sandy dolomite. St. Peter Sandstone overlies the Everton Formation. It is massive, fine or medium grained sandstone in the upper and lower parts and fine grained sandstone interbedded with dolomite in the middle part. Plattin Limestone, Fernvale Limestone, Cason Shale, and St. Clair Limestone of the Upper Ordovician and Silurian periods form discontinuous wedges between outcrops of St. Peter Sandstone and the Boone Formation. In outcrops above the St. Peter Sandstone and below the Boone Formation, one or more of these formations is exposed. Estate and Portia soils formed in material weathered from these formations.

The Boone Formation of the Mississipian period caps the uplands and ridges throughout the northern part of the county. It forms the Springfield Plateau, which is highly eroded and dissected. The formation consists of three distinct lithologic units. The basal unit is fine to coarse grained sandstone that ranges from a few inches to a few feet in thickness. The middle unit, the St. Joe Limestone Member, consists of very fine crystalline limestone. The upper unit, which is the thickest, is interbedded light gray, fossiliferous limestone and medium gray to brownish gray chert. The amount of chert varies vertically and laterally within the formation. Clarksville, Nixa, and Noark soils formed in material weathered from the Boone Formation. Because the limestone in this formation weathers more rapidly than the chert, these soils contain large quantities of chert.

Fayetteville Shale and Pitkin Limestone, which contain small quantities of dark gray chert, are exposed on the northern escarpment of the Boston Mountains. Fayetteville Shale consists mainly of dark gray shale and dark gray, microcrystalline, petroliferous limestone. Pitkin Limestone consists mainly of medium gray limestone that has thin beds of dark gray limy shale. Eden, Newnata, and Summit soils formed in material weathered from these rocks.

The Hale Formation is exposed on most of the Boston Mountain Plateau. This formation is made up of the Cane Hill Member, Bloyd Shale, and the Prairie Grove Member, which are mainly fine to coarse grained sandstone and shale. Enders, Nella, and Steprock soils formed in material weathered from these rocks.

The soils on terraces and flood plains in the county

formed in sediment deposited by the Buffalo River, the Middle Fork of the Red River, and numerous smaller streams. This alluvium is a mixture of material derived from many different kinds of soil, rock, and unconsolidated material. It was transported by water from uplands in Searcy County and from counties to the west. Razort, Ceda, Healing, Wideman, and Spadra soils formed in alluvium.

Climate

The climate in Searcy County is characterized by relatively cool winters, warm or hot summers, and fairly abundant rainfall. The present climate probably is similar to the climate under which the soils formed. The average daily maximum temperature is 92 degrees F in July and 50 degrees in January. Annual rainfall is about 42 inches and is generally well distributed throughout the year.

The warm, moist climate in the county promotes rapid soil formation and chemical reaction. The large amount of water that percolates through the soil moves dissolved or suspended material downward through the profile. Plant remains decompose rapidly. The resulting organic acid hastens the removal of carbonates and the formation of clay. Because the soil freezes only to a shallow depth and for a relatively short period, soil formation continues almost throughout the year. The climate is relatively uniform throughout the county and thus has not helped to differentiate the soils within the county. The effects of climate, however, are modified locally by elevation and slope aspect.

Living Organisms

Plants and animals, including insects, bacteria, and fungi, are important in the formation of soils. Among the effects of plants and animals on soils are additions of organic matter and nitrogen, additions or losses of plant nutrients, and changes in structure and porosity.

Before Searcy County was settled, the influence of native vegetation on soil formation was greater than that of animal activity. Forests consisting of stands of hardwoods or of mixed hardwoods and shortleaf pine covered most of the county.

Shallow soils that are underlain by limestone or sandstone are in scattered areas on uplands throughout the northern part of the county. These soils supported savanna vegetation that included eastern redcedar or mixed eastern redcedar and hardwoods. Grasses grew tall in the openings between the trees. Udorthents and Moko soils are dominant in these areas. The surface layer of these soils is dark to a depth of several inches because of the accumulation of organic matter.

The native vegetation on most of the gently sloping to very steep, dissected uplands consisted of stands of upland oaks and hickory mixed with shortleaf pine. The soils in these areas have a significant accumulation of organic matter and are dark only in the upper few inches. Clarksville, Enders, Estate, Linker, Nella, Nixa, and Noark soils formed in these uplands. They differ from each other mainly because of variations in their parent material, relief, age, and degree of weathering.

In the alluvial areas of the county, the native vegetation was mainly hardwoods, such as cottonwood, sycamore, elm, black walnut, oak, and hickory. The understory vegetation was mainly cane, vines, and briers. Razort, Ceda, Spadra, Healing, and Wideman soils formed in these areas.

Variations in native vegetation in the county are related partly to variations in the available water capacity and in the surface and internal drainage of the soils. Slope, aspect, and soil fertility also cause minor variations. Only the major differences in the original vegetation are reflected to any extent in the characteristics of the soils.

Human activities have an important influence on soil formation. These activities include clearing the forests; cultivating the land; introducing new kinds of plants; applying fertilizer, organic residue, lime, and chemicals for insect, disease, and weed control; building dams for flood control; cutting, filling, and grading; compacting the surface; and covering the surface with structures or pavement. The effects of other living organisms on soil formation have been drastically changed by these activities. Some of the results of human activities may not be known for many centuries.

Relief

Relief in Searcy County generally is the result of geologic erosion and entrenchment of drainageways into the land surface. In a few areas it is the result of faulting. The highest point in the county, which is about 2,203 feet above sea level, is about 7 miles west of Snowball, on Horn Mountain. The lowest point, which is about 460 feet above sea level, is in an area in the northeastern part of the county where Big Creek flows out of the county.

Some of the greatest differences among the soils in the county are caused by the varying effects of relief on drainage, runoff, erosion, and percolation of water through the profile. Relief varies widely. The landscape ranges from nearly vertical bluffs to broad, nearly level and gently sloping areas.

Some of the soils on the steeper slopes, narrow ridges, and mountaintops are shallow because they have lost much soil material through geologic erosion. Moko and Mountainburg soils are examples. In other

areas of strong relief, the soils formed in material weathered from cherty limestone. Clarksville and Noark soils are examples. These soils contain large quantities of chert and have a mantle of chert that retards geologic erosion. Soils that are on nearly level and gently sloping uplands, such as Sidon, Peridge, and Linker soils, have lost little soil material through geologic erosion.

Nella soils, which are on colluvial slopes, formed in thick accumulations of material that washed or sloughed down from the higher adjacent slopes. Spadra soils, which are on gently sloping stream terraces, formed in thick deposits of loamy material that washed from uplands and was deposited on flood plains along streams before the streams were further entrenched.

The soils on flood plains and low terraces along streams in the county are level or nearly level and are subject to flooding. Spadra, Ceda, Kenn, Healing, and Razort soils are in these areas. They formed in thick deposits of silty or loamy alluvium that in places contains chert or gravel.

Time

The length of time required for soils to form depends largely on the other factors of soil formation. Generally, less time is required if the climate is warm and humid and the vegetation is abundant. Loamy parent material generally weathers more rapidly than clayey material.

In terms of geologic time, most of the soils in Searcy County are old, regardless of whether they are on mountaintops, hillsides, or stream terraces. The young soils formed either in recent alluvium along streams or in residuum in areas where geologic erosion generally has kept pace with the weathering of bedrock.

The soils on uplands formed in material weathered from rocks of Ordovician through Pennsylvanian age. Most of these soils are old. Most of the cations have been leached out, and reaction is strongly acid or very strongly acid. There has been considerable weathering and translocation of clay, and the horizons are clearly expressed. Iron has been translocated from the A horizon to the B horizon and then oxidized, giving the B horizon stronger red, brown, and yellow colors than the A horizon. Nella, Enders, Linker, Nauvoo, Noark, and Peridge soils clearly show the effects of time on soil formation.

Ceda soils are young. They formed in recent alluvium on flood plains along streams. No definite horizons have formed below the A horizon. Instead, these soils still have depositional bedding planes and have no soil structure. Base saturation is high, and reaction generally is moderately acid or slightly acid. The range in reaction indicates that leaching has been minimal. The content of organic matter decreases irregularly with increasing depth. Except for the slight changes caused by worms and roots, there is little evidence of soil formation.

Razort and Spadra soils are intermediate in age. They formed in loamy alluvium on flood plains and low terraces along large streams. The horizons in these soils are weakly expressed, but there is evidence of the translocation of clay.

Soil Horizon Differentiation

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

Most soil profiles have four major horizons—the A, B, C, and E horizons. Young soils do not have a B horizon.

The horizon of maximum accumulation of organic matter is called the A horizon, or the surface layer. An Ap horizon is a plowed surface layer. The horizon of maximum leaching of dissolved or suspended material is called the E horizon, or the subsurface layer.

The B horizon lies directly below the A or E horizon. It is generally is called the subsoil *(13)*. It is the horizon of maximum accumulation of dissolved or suspended material, such as iron and clay. Commonly, the B horizon has blocky structure and is firmer than the horizons directly above or below it.

The C horizon is below the B horizon. It typically has been affected little by the soil-forming processes, though in places it has been materially modified by weathering. In some young soils, the C horizon has been only slightly modified by living organisms and by weathering and lies directly below the A horizon.

In this survey area, several processes have been active in the formation of soil horizons. Among these processes are the accumulation of organic matter; the leaching of carbonates and bases; the oxidation, reduction, and transfer of iron; and the formation and translocation of silicate clay minerals. In most of the soils, more than one of these processes have been active. The leaching of bases and the translocation of silicate clay are among the most important processes of horizon differentiation in the survey area.

Through heating and cooling and through wetting and drying, physical weathering slowly breaks down rocks into small pieces that form the parent material of the residual soils. This weathering is most evident in Moko and Mountainburg soils.

The accumulation of organic matter in the A horizon is readily evident in Nixa and Estate soils. These soils have a light colored subsurface layer from which organic matter, clay, and iron oxides have been removed.

Leaching of carbonates and bases has occurred to some extent in nearly all of the soils in the survey area. Generally, bases are leached downward before the translocation of silicate clay minerals. Most of the soils in the survey are strongly leached. Razort soils are moderately leached, and Moko soils are only slightly leached.

The oxidation of iron is evident in moderately well drained and well drained soils, such as Peridge, Linker, and Nella soils. A red or brown B horizon is an indication of the oxidation of iron.

Gleying, or the reduction and transfer of iron has occurred to a significant extent in poorly drained and somewhat poorly drained soils. Gray colors or gray mottles below the surface layer indicate the reduction and loss of iron. Some horizons have red, brown, or yellow mottles and dark iron or manganese concretions. Gleying is most pronounced in Summit soils.

The translocation of silicate clay minerals has contributed to horizon development in most of the soils in the survey area. In areas where the soils have been cultivated, most of the eluviated E horizon has been destroyed. In areas where it remains, the E horizon has blocky to granular structure, has less clay than the lower horizons, and is lighter colored than the rest of the profile. Clay films generally have accumulated in pores and on faces of peds in the B horizon. The soils were probably leached of carbonates and soluble salts to a great extent before silicate clay was translocated. Enders and Noark soils exhibit the effects of this translocation.

References

(1) American Association of State Highway and Transportation Officials. 1982. Standard specifications for highway materials and methods of sampling and testing. Ed. 13, 2 vols., illus.

(2) American Society for Testing and Materials. 1988. Standard test method for classification of soils for engineering purposes. ASTM Stand. D 2487.

(3) Broadfoot, Walter M. 1964. Soil suitability for hardwoods in the Midsouth. U.S. Dep. Agric., Forest Serv., South. Forest Exp. Stn. Res. Note SO-10, 10 pp., illus.

(4) Coile, T.S., and F.X. Schumacher. 1953. Site index of young stands of loblolly and shortleaf pines in the Piedmont Plateau Region. J. For. 51: 432-435, illus.

(5) Croneis, Carey. 1930. Geology of the Arkansas Paleozoic Area. Ark. Geol. Surv. Bull. 3, 457 pp., illus.

(6) Eyre, F.H. 1980. Forest cover types of the United States and Canada. Soc. of Am. For., 148 pp.

(7) Haley, Boyd R., and others. 1976. Geology map of Arkansas. Ark. Geol. Comm. and U.S. Geol. Surv.

(8) Olson, D.J. 1959. Site index curves for upland oak in the Southeast. U.S. Dep. Agric., Forest Serv., Southeast. Forest Exp. Stn. Res. Note 125, 2 pp.

(9) Tennessee Valley Authority. 1948. Site curves for eastern redcedar. (Unpublished, processed curves based on 271 observations from plots throughout the Tennessee Valley)

(10) United States Department of Agriculture. 1938. Soils and men. U.S. Dep. Agric. Yearb., 1,232 pp., illus.

(11) United States Department of Agriculture. 1951 (being revised). Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus.

(12) United States Department of Agriculture. 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.

(13) Winters, Eric, and Roy W. Simonson. 1951. The subsoil. Adv. Agron. 3: 1-92.

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

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:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

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

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 the 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 flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

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

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

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

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

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

Clay film. A thin coating of oriented clay on the surface

of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

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. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

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

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

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

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

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

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

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

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

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

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

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

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

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

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

Moderately well drained.—Water is removed from

the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

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

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

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

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic).—Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated).—Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, such as fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay are in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The movement of water into the soil is rapid.

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.*

Fine textured soil. Sandy clay, silty clay, or 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.

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.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

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

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

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 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual.* The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

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

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

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

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

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

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a

constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:
Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.
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.
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.
Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.
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.

Large stones (in tables). Rock fragments that are 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

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

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

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

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

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

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

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

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

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For

example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of the 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 degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

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.

Rippable. Rippable bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). There is a shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-

water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

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.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

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.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

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.

Slippage (in tables). The soil mass is susceptible to movement downslope when loaded, excavated, or wet.

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.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

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

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, thickness of the line can be one fragment or more. It generally overlies material that weathered in place, and it is 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.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). An otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, such as zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited in stream valleys by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors that are assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. This 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 a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-84 at Gilbert, Arkansas)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	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-----	50.2	22.6	36.4	76	-5	14	2.18	1.04	3.16	4	2.2
February----	55.0	26.6	40.8	78	0	22	2.74	1.38	3.91	5	2.0
March-------	63.0	34.4	48.7	87	11	125	3.80	1.87	5.47	7	1.2
April-------	74.0	44.9	59.5	91	22	303	4.30	2.41	5.97	7	.1
May---------	80.4	52.8	66.6	93	33	515	5.22	3.24	7.00	8	.0
June--------	87.6	60.7	74.2	98	44	726	3.89	1.52	5.90	6	.0
July--------	92.4	64.7	78.6	103	50	887	3.27	1.60	4.72	6	.0
August------	91.8	62.7	77.3	104	48	846	2.95	1.47	4.23	5	.0
September---	85.0	56.0	70.5	100	36	615	3.50	1.31	5.32	6	.0
October-----	75.8	43.5	59.7	93	22	315	3.20	1.31	4.79	5	.0
November----	62.7	33.6	48.2	83	9	72	4.06	1.63	6.10	5	1.1
December----	53.5	26.6	40.1	77	-1	31	3.43	1.29	5.21	5	1.4
Yearly:											
Average----	72.6	44.1	58.4	---	---	---	---	---	---	---	---
Extreme----	---	---	---	105	-9	---	---	---	---	---	---
Total------	---	---	---	---	---	4,471	42.54	34.36	49.79	69	8.0

* 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 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-84 at Gilbert, Arkansas)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 15	Apr. 20	Apr. 30
2 years in 10 later than--	Apr. 10	Apr. 16	Apr. 27
5 years in 10 later than--	Apr. 1	Apr. 9	Apr. 20
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 20	Oct. 17	Oct. 3
2 years in 10 earlier than--	Oct. 24	Oct. 21	Oct. 8
5 years in 10 earlier than--	Nov. 1	Oct. 28	Oct. 18

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-84 at Gilbert, Arkansas)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	198	186	163
8 years in 10	203	192	169
5 years in 10	214	202	181
2 years in 10	224	212	192
1 year in 10	230	217	198

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
2CD	Arkana-Moko complex, 3 to 20 percent slopes	1,170	0.3
2EF	Arkana-Moko complex, 20 to 40 percent slopes	3,935	0.9
8C	Captina silt loam, 2 to 7 percent slopes	385	0.1
10	Ceda very cobbly loam, frequently flooded	935	0.2
12	Ceda-Kenn complex, frequently flooded	2,515	0.6
14F	Clarksville very cherty silt loam, 20 to 50 percent slopes	62,465	14.6
18	Elsah cherty silt loam, frequently flooded	2,055	0.5
20C	Enders gravelly loam, 3 to 8 percent slopes	7,350	1.7
20DE	Enders gravelly loam, 8 to 15 percent slopes	1,590	0.4
22CD	Enders stony loam, 3 to 20 percent slopes	21,905	5.1
22EF	Enders stony loam, 20 to 40 percent slopes	3,560	0.8
24CD	Enders-Nella stony loams, 3 to 20 percent slopes	25,080	5.9
24EF	Enders-Nella stony loams, 20 to 40 percent slopes	8,870	2.1
28CD	Estate-Lily-Udorthents complex, 3 to 15 percent slopes	3,300	0.8
28EF	Estate-Lily-Udorthents complex, 15 to 35 percent slopes	13,295	3.1
30	Healing silt loam, occasionally flooded	1,560	0.4
32C	Linker fine sandy loam, 3 to 8 percent slopes	2,205	0.5
34C	Linker gravelly fine sandy loam, 3 to 8 percent slopes	6,755	1.6
34D	Linker gravelly fine sandy loam, 8 to 12 percent slopes	1,155	0.3
36C	Linker-Mountainburg complex, 3 to 8 percent slopes	5,425	1.3
36DE	Linker-Mountainburg complex, 8 to 20 percent slopes	4,290	1.0
38EF	Moko-Rock outcrop complex, 15 to 50 percent slopes	6,060	1.4
39G	Moko-Rock outcrop-Eden complex, 40 to 60 percent slopes	5,005	1.2
42C	Mountainburg gravelly fine sandy loam, 3 to 8 percent slopes	515	0.1
45C	Nauvoo fine sandy loam, 2 to 7 percent slopes	11,750	2.7
46C	Nella gravelly loam, 3 to 8 percent slopes	1,310	0.3
46DE	Nella gravelly loam, 8 to 15 percent slopes	530	0.1
48CD	Nella stony loam, 3 to 15 percent slopes	1,960	0.5
49CD	Nella-Steprock complex, 3 to 20 percent slopes	13,600	3.2
50EF	Nella-Steprock-Mountainburg complex, 20 to 40 percent slopes	27,130	6.3
50G	Nella-Steprock-Mountainburg complex, 40 to 60 percent slopes	23,530	5.5
54C2	Newnata-Summit silty clay loams, 3 to 8 percent slopes, eroded	3,785	0.9
54D2	Newnata-Summit complex, 8 to 15 percent slopes, eroded	2,135	0.5
54E2	Newnata-Summit complex, 15 to 25 percent slopes, eroded	1,925	0.4
56CD	Newnata-Eden-Moko complex, 3 to 20 percent slopes	14,120	3.3
56EF	Newnata-Eden-Moko complex, 20 to 40 percent slopes	10,120	2.4
58C	Nixa very cherty silt loam, 5 to 12 percent slopes	905	0.2
62C	Noark very cherty silt loam, 3 to 8 percent slopes	19,320	4.5
62DE	Noark very cherty silt loam, 8 to 20 percent slopes	53,705	12.5
62EF	Noark very cherty silt loam, 20 to 40 percent slopes	19,715	4.6
66C	Peridge silt loam, 1 to 5 percent slopes	1,385	0.3
68C	Portia fine sandy loam, 3 to 8 percent slopes	785	0.2
68D	Portia fine sandy loam, 8 to 12 percent slopes	1,330	0.3
70	Razort loam, frequently flooded	5,080	1.2
72	Riverwash, frequently flooded	1,685	0.4
73	Rock outcrop, very steep	1,075	0.3
74B	Samba silty clay loam, 0 to 2 percent slopes	2,205	0.5
76	Secesh silt loam, frequently flooded	2,110	0.5
78C	Sidon loam, 2 to 6 percent slopes	10,025	2.3
80B	Spadra loam, 1 to 5 percent slopes	2,095	0.5
82C2	Summit silty clay loam, 3 to 8 percent slopes, eroded	1,325	0.3
84	Wideman loamy fine sand, frequently flooded	1,513	0.4
	Total	427,533	100.0

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Corn	Grain sorghum	Wheat	Common bermudagrass	Improved bermudagrass	Tall fescue
	Bu	Bu	Bu	AUM*	AUM*	AUM*
2CD Arkana-Moko	---	---	---	---	---	4.0
2EF. Arkana-Moko						
8C Captina	70	45	30	6.0	7.5	7.0
10 Ceda	---	---	---	6.0	6.5	6.0
12 Ceda-Kenn	---	---	---	6.5	7.0	6.5
14F. Clarksville						
18 Elsah	---	---	---	7.0	7.5	7.5
20C Enders	---	35	25	5.0	5.5	5.0
20DE Enders	---	---	---	5.0	5.0	5.0
22CD Enders	---	---	---	4.0	4.5	4.0
22EF. Enders						
24CD Enders-Nella	---	---	---	4.1	5.2	4.5
24EF. Enders-Nella						
28CD Estate-Lily-Udorthents	---	---	---	3.8	4.3	3.8
28EF. Estate-Lily-Udorthents						
30 Healing	85	90	45	8.0	10.0	8.0
32C Linker	55	40	30	5.5	6.5	5.0
34C Linker	50	35	25	5.5	6.5	5.0
34D Linker	---	30	25	5.0	6.0	4.5

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Grain sorghum	Wheat	Common bermudagrass	Improved bermudagrass	Tall fescue
	Bu	Bu	Bu	AUM*	AUM*	AUM*
36C---------- Linker-Mountainburg	---	---	---	4.6	5.6	4.6
36DE---------- Linker-Mountainburg	---	---	---	4.0	5.0	4.0
38EF**. Moko-Rock outcrop						
39G**. Moko-Rock outcrop-Eden						
42C---------- Mountainburg	---	---	---	4.0	5.0	4.5
45C---------- Nauvoo	75	45	35	6.5	7.0	6.5
46C, 46DE---------- Nella	75	45	35	6.5	7.0	6.5
48CD---------- Nella	---	---	---	5.5	6.5	5.0
49CD---------- Nella-Steprock	---	---	---	5.0	6.1	4.5
50EF, 50G. Nella-Steprock-Mountainburg						
54C2---------- Newnata-Summit	---	---	---	6.0	6.1	5.7
54D2---------- Newnata-Summit	---	---	---	4.5	5.5	5.0
54E2---------- Newnata-Summit	---	---	---	4.5	5.0	4.5
56CD---------- Newnata-Eden-Moko	---	---	---	4.0	4.5	4.0
56EF. Newnata-Eden-Moko						
58C---------- Nixa	---	---	---	5.5	7.0	6.0
62C---------- Noark	55	50	---	6.0	7.5	7.0
62DE---------- Noark	---	---	---	5.0	6.0	6.0
62EF. Noark						
66C---------- Peridge	75	50	45	7.0	8.5	7.5

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Grain sorghum	Wheat	Common bermudagrass	Improved bermudagrass	Tall fescue
	Bu	Bu	Bu	AUM*	AUM*	AUM*
68C---------- Portia	75	70	40	7.0	7.5	7.0
68D---------- Portia	50	60	35	6.0	6.5	6.0
70---------- Razort	70	80	---	8.5	9.0	8.5
72**. Riverwash						
73**. Rock outcrop						
74B---------- Samba	70	70	---	6.0	7.5	6.5
76---------- Secesh	---	40	40	7.0	7.5	6.0
78C---------- Sidon	---	35	40	6.0	7.5	6.0
80B---------- Spadra	65	80	35	7.0	9.0	7.5
82C2---------- Summit	---	35	35	5.0	5.5	7.0
84---------- Wideman	---	---	---	4.5	5.5	4.5

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Woodland suitability group	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Volume*	
2CD**:									
Arkana	5F8	Slight	Slight	Moderate	Moderate	Shortleaf pine	55	78	Shortleaf pine, eastern redcedar.
						Northern red oak	55	---	
						Eastern redcedar	35	---	
						White oak	---	---	
Moko	2X2	Slight	Moderate	Moderate	Severe	Eastern redcedar	30	32	Eastern redcedar.
2EF**:									
Arkana	5R8	Moderate	Moderate	Moderate	Moderate	Shortleaf pine	55	78	Shortleaf pine, eastern redcedar.
						Northern red oak	55	---	
						Eastern redcedar	35	---	
						White oak	---	---	
Moko	2R2	Moderate	Moderate	Moderate	Severe	Eastern redcedar	30	32	Eastern redcedar.
8C	7D8	Slight	Slight	Slight	Moderate	Shortleaf pine	64	97	Shortleaf pine, northern red oak.
Captina						Northern red oak	65	---	
						White oak	60	---	
						Black oak	65	---	
						Eastern redcedar	40	---	
						Post oak	---	---	
10	8F8	Slight	Slight	Moderate	Slight	Shortleaf pine	70	110	Loblolly pine, shortleaf pine, American sycamore, sweetgum.
Ceda						Southern red oak	---	---	
						White oak	---	---	
						Sweetgum	80	---	
						American sycamore	80	---	
12**:									
Ceda	8F8	Slight	Slight	Moderate	Slight	Shortleaf pine	70	110	Loblolly pine, shortleaf pine, American sycamore, sweetgum.
						Southern red oak	---	---	
						White oak	---	---	
						Sweetgum	80	---	
						American sycamore	80	---	
Kenn	8W8	Slight	Slight	Moderate	Slight	Shortleaf pine	70	110	Shortleaf pine, loblolly pine.
						Southern red oak	70	---	
						Sweetgum	80	---	
						Post oak	---	---	
14F	6R9	Severe	Severe	Moderate	Slight	Shortleaf pine	61	90	White oak, shortleaf pine.
Clarksville						White oak	58	---	
						Black oak	61	---	
						Northern red oak	61	---	
18	5F8	Slight	Slight	Moderate	Slight	Sweetgum	76	70	Black walnut, green ash, sweetgum.
Elsah						Eastern cottonwood	95	---	
						American sycamore	---	---	
						Black walnut	---	---	

See footnotes at end of table.

TABLE 6.--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	Windthrow hazard	Common trees	Site index	Volume*	
20C, 20DE-------- Enders	6A7	Slight	Slight	Slight	Slight	Shortleaf pine------ Northern red oak---- White oak---------- Eastern redcedar----	60 60 55 40	88 --- --- ---	Loblolly pine, shortleaf pine, eastern redcedar.
22CD------------ Enders	6X8	Slight	Moderate	Slight	Slight	Shortleaf pine------ Eastern redcedar---- Northern red oak---- White oak----------	60 40 60 56	88 --- --- ---	Shortleaf pine, loblolly pine.
22EF: Enders--------- (south and west aspects)	5R9	Moderate	Moderate	Severe	Slight	Shortleaf pine------ Northern red oak---- White oak---------- Eastern redcedar----	50 50 50 35	78 --- --- ---	Shortleaf pine, loblolly pine.
Enders--------- (north and east aspects)	6R8	Moderate	Moderate	Slight	Slight	Shortleaf pine------ Eastern redcedar---- Northern red oak---- White oak----------	60 40 60 56	88 --- --- ---	Shortleaf pine, loblolly pine.
24CD**: Enders--------- Nella----------	6X8 8X8	Slight Slight	Moderate Moderate	Slight Slight	Slight Slight	Shortleaf pine------ Eastern redcedar---- Northern red oak---- White oak---------- Shortleaf pine------ Northern red oak---- Eastern redcedar---- Black walnut--------	60 40 60 56 70 70 50 ---	88 --- --- --- 110 --- --- ---	Shortleaf pine, loblolly pine. Loblolly pine, shortleaf pine.
24EF**: Enders--------- (north and east aspects)	6R8	Moderate	Moderate	Slight	Slight	Shortleaf pine------ Eastern redcedar---- Northern red oak---- White oak----------	60 40 60 56	88 --- --- ---	Shortleaf pine, loblolly pine.
Nella---------- (north and east aspects)	8R8	Slight	Moderate	Slight	Slight	Shortleaf pine------ Northern red oak---- Eastern redcedar---- Black walnut--------	70 70 50 ---	110 --- --- ---	Loblolly pine, shortleaf pine.
Enders--------- (south and west aspects)	5R9	Moderate	Moderate	Severe	Slight	Shortleaf pine------ Northern red oak---- White oak---------- Eastern redcedar----	50 50 50 35	78 --- --- ---	Shortleaf pine, loblolly pine.
Nella---------- (south and west aspects)	6R9	Slight	Moderate	Severe	Slight	Shortleaf pine------ Northern red oak---- Eastern redcedar----	60 60 30	88 --- ---	Loblolly pine, shortleaf pine.

See footnotes at end of table.

TABLE 6.--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	Windthrow hazard	Common trees	Site index	Volume*	
28CD**:									
Estate	6X8	Slight	Moderate	Slight	Slight	Shortleaf pine	60	88	Shortleaf pine, loblolly pine, eastern redcedar, northern red oak.
						Northern red oak	65	---	
						Eastern redcedar	40	---	
						Black walnut	---	---	
						Black locust	---	---	
						White oak	---	---	
						Black cherry	---	---	
Lily	7X8	Slight	Moderate	Slight	Moderate	Shortleaf pine	63	97	Shortleaf pine, white oak, northern red oak.
						Black oak	---	---	
						White oak	69	---	
Udorthents.									
28EF**:									
Estate	6R8	Slight	Moderate	Slight	Slight	Shortleaf pine	60	88	Shortleaf pine, loblolly pine, eastern redcedar, northern red oak.
						Northern red oak	65	---	
						Eastern redcedar	40	---	
						Black walnut	---	---	
						Black locust	---	---	
						White oak	---	---	
						Black cherry	---	---	
Lily	7R8	Moderate	Moderate	Slight	Moderate	Shortleaf pine	63	97	Shortleaf pine, white oak, northern red oak.
						Black oak	---	---	
						White oak	69	---	
						Hickory	---	---	
Udorthents.									
30--Healing	9W8	Slight	Slight	Moderate	Slight	Shortleaf pine	80	130	Shortleaf pine, northern red oak, white oak, black walnut.
						Northern red oak	80	---	
						White oak	70	---	
						Eastern cottonwood	90	---	
32C, 34C, 34D--Linker	6D8	Slight	Slight	Slight	Moderate	Shortleaf pine	60	88	Shortleaf pine, loblolly pine, eastern redcedar.
						Northern red oak	50	---	
						White oak	50	---	
						Eastern redcedar	40	---	
36C**, 36DE**:									
Linker	6D8	Slight	Slight	Slight	Moderate	Shortleaf pine	60	88	Shortleaf pine, loblolly pine, eastern redcedar.
						Southern red oak	50	---	
						White oak	50	---	
						Eastern redcedar	40	---	
Mountainburg	5X3	Slight	Moderate	Moderate	Severe	Shortleaf pine	55	68	Shortleaf pine, eastern redcedar, loblolly pine.
						Eastern redcedar	35	---	
						Post oak	---	---	
38EF**:									
Moko	2R3	Moderate	Moderate	Moderate	Severe	Eastern redcedar	30	32	Eastern redcedar.
Rock outcrop.									

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Woodland suitability group	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Volume*	Trees to plant
39G**:									
Moko	2R3	Severe	Severe	Moderate	Severe	Eastern redcedar	30	32	Eastern redcedar.
Rock outcrop.									
Eden	2R3	Moderate	Severe	Moderate	Moderate	Eastern redcedar	35	37	Eastern redcedar.
						Black locust	---	---	
						Persimmon	---	---	
42C Mountainburg	5D3	Slight	Slight	Moderate	Severe	Shortleaf pine	55	68	Shortleaf pine, eastern redcedar, loblolly pine.
						Eastern redcedar	30	---	
						Post oak	---	---	
						Blackjack oak	---	---	
45C Nauvoo	9A7	Slight	Slight	Slight	Slight	Shortleaf pine	80	130	Loblolly pine, shortleaf pine, sweetgum.
						Sweetgum	90	---	
46C, 46DE Nella	8A7	Slight	Slight	Slight	Slight	Shortleaf pine	70	110	Loblolly pine, shortleaf pine.
						Southern red oak	70	---	
						Eastern redcedar	50	---	
						Black walnut	---	---	
48CD Nella	8X8	Slight	Moderate	Slight	Slight	Shortleaf pine	70	110	Loblolly pine, shortleaf pine.
						Southern red oak	70	---	
						Eastern redcedar	50	---	
						Black walnut	---	---	
49CD**:									
Nella	8X8	Slight	Moderate	Slight	Slight	Shortleaf pine	70	110	Loblolly pine, shortleaf pine.
						Southern red oak	70	---	
						Eastern redcedar	50	---	
						Black walnut	---	---	
Steprock	6X8	Slight	Moderate	Slight	Moderate	Shortleaf pine	58	84	Shortleaf pine, loblolly pine.
						Northern red oak	56	---	
						White oak	56	---	
						Eastern redcedar	40	---	
50EF**:									
Nella (north and east aspects)	8R8	Slight	Moderate	Moderate	Slight	Shortleaf pine	70	110	Loblolly pine, shortleaf pine.
						Northern red oak	70	---	
						Eastern redcedar	50	---	
						Black walnut	---	---	
Steprock (north and east aspects)	6R8	Slight	Moderate	Moderate	Moderate	Shortleaf pine	58	84	Shortleaf pine, loblolly pine.
						Northern red oak	56	---	
						White oak	56	---	
						Eastern redcedar	40	---	
Mountainburg (north and east aspects)	5R2	Slight	Moderate	Moderate	Severe	Shortleaf pine	55	78	Shortleaf pine, eastern redcedar, loblolly pine.
						Eastern redcedar	35	---	
						Post oak	---	---	

See footnotes at end of table.

TABLE 6.--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	Windthrow hazard	Common trees	Site index	Volume*	
50EF**:									
Nella (south and west aspects)	6R9	Slight	Moderate	Severe	Slight	Shortleaf pine	60	88	Loblolly pine, shortleaf pine.
						Northern red oak	60	---	
						Eastern redcedar	30	---	
Steprock (south and west aspects)	5R9	Slight	Moderate	Severe	Moderate	Shortleaf pine	50	78	Shortleaf pine, loblolly pine, eastern redcedar.
						Northern red oak	50	---	
						White oak	50	---	
						Eastern redcedar	30	---	
Mountainburg (south and west aspects)	4R3	Slight	Moderate	Severe	Severe	Shortleaf pine	45	57	Shortleaf pine, eastern redcedar, loblolly pine.
						Eastern redcedar	30	---	
						Post oak	---	---	
50G**:									
Nella (north and east aspects)	8R9	Moderate	Severe	Moderate	Slight	Shortleaf pine	70	110	Loblolly pine, shortleaf pine.
						Southern red oak	70	---	
						Eastern redcedar	50	---	
						Black walnut	---	---	
Steprock (north and east aspects)	6R9	Moderate	Severe	Moderate	Moderate	Shortleaf pine	58	84	Shortleaf pine, loblolly pine, eastern redcedar.
						Northern red oak	56	---	
						White oak	56	---	
						Eastern redcedar	40	---	
Mountainburg (north and east aspects)	5R3	Moderate	Severe	Moderate	Severe	Shortleaf pine	55	78	Shortleaf pine, eastern redcedar, loblolly pine.
						Eastern redcedar	35	---	
						Post oak	---	---	
Nella (south and west aspects)	6R9	Moderate	Severe	Severe	Slight	Shortleaf pine	60	88	Loblolly pine, shortleaf pine.
						Northern red oak	60	---	
						Eastern redcedar	30	---	
Steprock (south and west aspects)	5R9	Moderate	Severe	Severe	Moderate	Shortleaf pine	50	68	Shortleaf pine, loblolly pine, eastern redcedar.
						Northern red oak	50	---	
						White oak	50	---	
						Eastern redcedar	30	---	
Mountainburg (south and west aspects)	4R3	Moderate	Severe	Severe	Severe	Shortleaf pine	45	57	Shortleaf pine, eastern redcedar, loblolly pine.
						Eastern redcedar	30	---	
						Post oak	---	---	
54C2**:									
Newnata	6R8	Moderate	Slight	Slight	Slight	Shortleaf pine	60	88	Shortleaf pine, northern red oak, white oak, eastern redcedar.
						Northern red oak	65	---	
						Eastern redcedar	40	---	
						Hackberry	---	---	
						Black locust	---	---	
						White oak	---	---	
						Shagbark hickory	---	---	
Summit	3C8	Slight	Slight	Moderate	Slight	Eastern redcedar	40	43	Eastern redcedar.
						Honeylocust	50	---	
						Hackberry	50	---	

See footnotes at end of table.

TABLE 6.--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	Windthrow hazard	Common trees	Site index	Volume*	
54D2**:									
Newnata	6A7	Slight	Slight	Slight	Slight	Shortleaf pine	60	88	Shortleaf pine, northern red oak, white oak, eastern redcedar.
						Northern red oak	65	---	
						Eastern redcedar	40	---	
						Hackberry	---	---	
						White oak	---	---	
						Shagbark hickory	---	---	
Summit	3C8	Slight	Slight	Moderate	Slight	Eastern redcedar	40	43	Eastern redcedar.
						Honeylocust	50	---	
						Hackberry	50	---	
54E2**:									
Newnata	6R8	Moderate	Moderate	Slight	Slight	Shortleaf pine	60	88	Shortleaf pine, northern red oak, white oak, eastern redcedar.
						Northern red oak	65	---	
						Eastern redcedar	40	---	
						Hackberry	---	---	
						White oak	---	---	
						Shagbark hickory	---	---	
Summit	3R8	Moderate	Moderate	Moderate	Slight	Eastern redcedar	40	43	Eastern redcedar.
						Honeylocust	50	---	
						Hackberry	50	---	
56CD**:									
Newnata	6X8	Slight	Moderate	Slight	Slight	Shortleaf pine	60	88	Shortleaf pine, northern red oak, white oak, eastern redcedar.
						Northern red oak	65	---	
						Eastern redcedar	40	---	
						Hackberry	---	---	
						Shagbark hickory	---	---	
						White oak	---	---	
Eden	2C2	Slight	Moderate	Moderate	Moderate	Eastern redcedar	35	37	Eastern redcedar.
						Black locust	---	---	
						Persimmon	---	---	
Moko	2X3	Slight	Moderate	Moderate	Severe	Eastern redcedar	30	32	Eastern redcedar.
56EF**:									
Newnata	6R8	Moderate	Moderate	Slight	Slight	Shortleaf pine	60	88	Shortleaf pine, northern red oak, white oak, eastern redcedar.
						Northern red oak	65	---	
						Eastern redcedar	40	---	
						Hackberry	---	---	
						Shagbark hickory	---	---	
						White oak	---	---	
Eden	2R2	Slight	Moderate	Moderate	Moderate	Eastern redcedar	35	37	Eastern redcedar.
						Black locust	---	---	
						Persimmon	---	---	
Moko	2R3	Moderate	Moderate	Moderate	Severe	Eastern redcedar	30	32	Eastern redcedar.
58C	6D8	Slight	Slight	Moderate	Moderate	Shortleaf pine	60	88	Shortleaf pine, loblolly pine, eastern redcedar.
Nixa						White oak	60	---	
						Eastern redcedar	40	---	
						Black walnut	---	---	
						Black oak	63	---	

See footnotes at end of table.

TABLE 6.--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	Windthrow hazard	Common trees	Site index	Volume*	
62C, 62DE---- Noark	6F8	Slight	Slight	Moderate	Slight	Shortleaf pine	60	88	Shortleaf pine, eastern redcedar, northern red oak, white oak, black oak, white oak.
						Eastern redcedar	40	---	
						Northern red oak	66	---	
						White oak	64	---	
						Black oak	67	---	
						Northern red oak	66	---	
62EF---- Noark	6R8	Moderate	Moderate	Moderate	Slight	Shortleaf pine	60	88	Shortleaf pine, eastern redcedar, northern red oak, black oak, white oak.
						Eastern redcedar	40	---	
						Northern red oak	66	---	
						White oak	64	---	
						Black oak	67	---	
						Northern red oak	66	---	
66C---- Peridge	8A7	Slight	Slight	Slight	Slight	Shortleaf pine	70	110	Shortleaf pine, black walnut, northern red oak, white oak.
						Northern red oak	70	---	
						Eastern redcedar	50	---	
						Black walnut	---	---	
						White oak	---	---	
68C, 68D---- Portia	8A7	Slight	Slight	Slight	Slight	Shortleaf pine	72	110	Shortleaf pine, northern red oak, white oak.
						Sweetgum	80	---	
						Northern red oak	65	---	
70---- Razort	9W8	Slight	Slight	Moderate	Slight	Shortleaf pine	80	130	Shortleaf pine, northern red oak, white oak, black walnut.
						Northern red oak	80	---	
						Sweetgum	80	---	
						White oak	75	---	
74B---- Samba	4W9	Slight	Moderate	Moderate	Severe	Water oak	70	60	Sweetgum, water oak, willow oak.
						Sweetgum	70	---	
						Eastern redcedar	30	---	
						Hackberry	---	---	
76---- Secesh	8W8	Slight	Slight	Moderate	Slight	Shortleaf pine	70	110	Black walnut, shortleaf pine, American sycamore.
						White oak	60	---	
						American sycamore	---	---	
						Black walnut	---	---	
						Black oak	---	---	
78C---- Sidon	7D8	Slight	Slight	Slight	Moderate	Shortleaf pine	65	100	Loblolly pine, shortleaf pine.
						Northern red oak	63	---	
						White oak	60	---	
80B---- Spadra	9A7	Slight	Slight	Slight	Slight	Shortleaf pine	80	130	Loblolly pine, shortleaf pine, black walnut, southern red oak.
						Northern red oak	80	---	
						Eastern redcedar	50	---	
82C2---- Summit	3C8	Slight	Slight	Moderate	Slight	Eastern redcedar	40	43	Eastern redcedar.
						Honeylocust	50	---	
						Hackberry	50	---	

See footnotes at end of table.

TABLE 6.--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	Windthrow hazard	Common trees	Site index	Volume*	
84---------- Wideman	7S9	Slight	Slight	Severe	Slight	Eastern cottonwood-- Sweetgum---------- American sycamore---	90 80 80	103 --- ---	Eastern cottonwood, loblolly pine, shortleaf pine.

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--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
2CD*:				
Arkana	Severe: small stones, percs slowly.	Severe: small stones, percs slowly.	Severe: slope, small stones, percs slowly.	Slight.
Moko	Severe: depth to rock.	Severe: depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones.
2EF*:				
Arkana	Severe: slope, small stones, percs slowly.	Severe: slope, small stones, percs slowly.	Severe: slope, small stones, percs slowly.	Severe: slope.
Moko	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
8C	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight.
Captina				
10	Severe: flooding, large stones.	Severe: large stones.	Severe: flooding, large stones.	Moderate: flooding.
Ceda				
12*:				
Ceda	Severe: flooding, large stones.	Severe: large stones.	Severe: flooding, large stones.	Moderate: flooding.
Kenn	Severe: flooding.	Moderate: flooding, small stones.	Severe: small stones, flooding.	Moderate: flooding.
14F	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.
Clarksville				
18	Severe: flooding.	Moderate: flooding, small stones.	Severe: small stones, flooding.	Moderate: flooding.
Elsah				
20C	Severe: percs slowly.	Severe: percs slowly.	Severe: small stones, percs slowly.	Slight.
Enders				
20DE	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, small stones, percs slowly.	Slight.
Enders				

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
22CD---------- Enders	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Moderate: large stones.
22EF---------- Enders	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope.
24CD*:				
Enders----------	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Moderate: large stones.
Nella----------	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: large stones.
24EF*:				
Enders----------	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope.
Nella----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
28CD*:				
Estate----------	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Moderate: large stones.
Lily----------	Moderate: slope.	Moderate: slope.	Severe: small stones, slope.	Moderate: large stones.
Udorthents.				
28EF*:				
Estate----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Lily----------	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.
Udorthents.				
30---------- Healing	Severe: flooding.	Slight----------	Moderate: flooding.	Slight.
32C---------- Linker	Slight----------	Slight----------	Moderate: slope, small stones, depth to rock.	Slight.
34C---------- Linker	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight.
34D---------- Linker	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight.
36C*:				
Linker----------	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
36C*:				
Mountainburg	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Moderate: large stones.
36DE*:				
Linker	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight.
Mountainburg	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Moderate: large stones.
38EF*:				
Moko	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
Rock outcrop.				
39G*:				
Moko	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
Rock outcrop.				
Eden	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
42C	Severe:	Severe:	Severe:	Slight.
Mountainburg	depth to rock.	depth to rock.	small stones, depth to rock.	
45C	Slight	Slight	Moderate:	Slight.
Nauvoo			slope, small stones.	
46C	Slight	Slight	Severe:	Slight.
Nella			small stones.	
46DE	Moderate:	Moderate:	Severe:	Slight.
Nella	slope.	slope.	small stones, slope.	
48CD	Moderate:	Moderate:	Severe:	Moderate:
Nella	slope.	slope.	slope.	large stones.
49CD*:				
Nella	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: large stones.
Steprock	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Moderate: large stones.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
50EF*, 50G*:				
Nella	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.
Steprock	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.
Mountainburg	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope.	Severe: slope.
54C2*:				
Newnata	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight.
Summit	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness.	Slight.
54D2*:				
Newnata	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope, large stones.	Severe: erodes easily.
Summit	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.
54E2*:				
Newnata	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Severe: erodes easily.
Summit	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.
56CD*:				
Newnata	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.
Eden	Moderate: slope.	Moderate: slope.	Severe: slope, small stones.	Slight.
Moko	Severe: depth to rock.	Severe: depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones.
56EF*:				
Newnata	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
56EF*:				
Eden	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Moko	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
58C Nixa	Severe: small stones, percs slowly.	Severe: small stones, percs slowly.	Severe: slope, small stones, percs slowly.	Severe: small stones.
62C Noark	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.
62DE Noark	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Severe: small stones.
62EF Noark	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.
66C Peridge	Slight	Slight	Moderate: slope.	Slight.
68C Portia	Slight	Slight	Moderate: slope, small stones.	Slight.
68D Portia	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
70 Razort	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.
72*. Riverwash				
73*. Rock outcrop				
74B Samba	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.
76 Secesh	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.
78C Sidon	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Slight.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
80B Spadra	Severe: flooding.	Slight	Moderate: slope, small stones.	Slight.
82C2 Summit	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness.	Slight.
84 Wideman	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding, too sandy.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WILDLIFE HABITAT

(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							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
2CD*:										
Arkana	Fair	Good	Fair	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
Moko	Very poor.	Poor	Poor	---	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
2EF*:										
Arkana	Very poor.	Fair	Fair	Good	---	Very poor.	Very poor.	Poor	Good	Very poor.
Moko	Very poor.	Poor	Poor	---	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
8C---- Captina	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
10---- Ceda	Poor	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
12*:										
Ceda	Poor	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
Kenn	Poor	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
14F---- Clarksville	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
18---- Elsah	Fair	Fair	Fair	Good	Fair	Poor	Poor	Fair	Good	Poor.
20C, 20DE---- Enders	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
22CD---- Enders	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
22EF---- Enders	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
24CD*:										
Enders	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Nella	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
24EF*:										
Enders	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Nella	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
28CD*:										
Estate	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Lily	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Udorthents.										
28EF*:										
Estate	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Lily	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Udorthents.										
30--Healing	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
32C, 34C--Linker	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
34D--Linker	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
36C*:										
Linker	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
Mountainburg	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Poor	Very poor.
36DE*:										
Linker	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
Mountainburg	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Poor	Very poor.
38EF*:										
Moko	Very poor.	Poor	Poor	---	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Rock outcrop.										
39G*:										
Moko	Very poor.	Very poor.	Poor	---	Fair	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Rock outcrop.										
Eden	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
42C--Mountainburg	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Very poor.	Poor	Very poor.	Very poor.
45C--Nauvoo	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
46C, 46DE---------- Nella	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
48CD---------- Nella	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
49CD*: Nella----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Steprock----------	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
50EF*: Nella----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Steprock----------	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Mountainburg------	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Poor	Very poor.
50G*: Nella----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Steprock----------	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Mountainburg------	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Poor	Very poor.
54C2*: Newnata----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Summit----------	Fair	Good	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
54D2*: Newnata----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Poor	Very poor.
Summit----------	Fair	Good	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
54E2*: Newnata----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Poor	Very poor.
Summit----------	Poor	Fair	Fair	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
56CD*: Newnata----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Poor	Very poor.
Eden----------	Fair	Good	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
56CD*:										
Moko	Very poor.	Poor	Poor	---	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
56EF*:										
Newnata	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Poor	Very poor.
Eden	Very poor.	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Moko	Very poor.	Poor	Poor	---	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
58C---- Nixa	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
62C, 62DE---- Noark	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
62EF---- Noark	Very poor.	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
66C---- Peridge	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
68C---- Portia	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
68D---- Portia	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
70---- Razort	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
72*. Riverwash										
73*. Rock outcrop										
74B---- Samba	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
76---- Secesh	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
78C---- Sidon	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
80B---- Spadra	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
82C2---- Summit	Fair	Good	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
84---- Wideman	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.

* See description of the map unit for composition and behavior characteristics of the 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. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
2CD*:					
Arkana	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
Moko	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, large stones.
2EF*:					
Arkana	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Moko	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
8C---------- Captina	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: low strength, wetness.
10---------- Ceda	Moderate: flooding, large stones.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
12*:					
Ceda	Moderate: flooding, large stones.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Kenn	Moderate: flooding, large stones.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
14F---------- Clarksville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
18---------- Elsah	Moderate: large stones, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
20C---------- Enders	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.
20DE---------- Enders	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope, slippage.	Severe: shrink-swell, low strength.

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
22CD---------- Enders	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
22EF---------- Enders	Severe: slope, slippage.	Severe: slope, shrink-swell, slippage.	Severe: slope, shrink-swell, slippage.	Severe: shrink-swell, slope, slippage.	Severe: low strength, slope, shrink-swell.
24CD*:					
Enders----------	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
Nella----------	Moderate: large stones, slope.	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Moderate: slope, large stones.
24EF*:					
Enders----------	Severe: slope, slippage.	Severe: slope, shrink-swell, slippage.	Severe: slope, shrink-swell, slippage.	Severe: shrink-swell, slope, slippage.	Severe: low strength, slope, shrink-swell.
Nella----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
28CD*:					
Estate----------	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.
Lily----------	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.
Udorthents.					
28EF*:					
Estate----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
Lily----------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Udorthents.					
30---------- Healing	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, low strength.
32C, 34C---------- Linker	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.

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
34D Linker	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.
36C*: Linker	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.
Mountainburg	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.
36DE*: Linker	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.
Mountainburg	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, large stones.
38EF*: Moko	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
Rock outcrop.					
39G*: Moko	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
Rock outcrop.					
Eden	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
42C Mountainburg	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.
45C Nauvoo	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength.
46C Nella	Slight	Slight	Slight	Moderate: slope.	Slight.
46DE Nella	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
48CD Nella	Moderate: large stones, slope.	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Moderate: slope, large stones.

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
49CD*:					
Nella	Moderate: large stones, slope.	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Moderate: slope, large stones.
Steprock	Moderate: depth to rock, slope, large stones.	Moderate: slope, large stones.	Moderate: depth to rock, slope, large stones.	Severe: slope.	Moderate: slope, large stones.
50EF*, 50G*:					
Nella	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Steprock	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Mountainburg	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
54C2*:					
Newnata	Moderate: depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Summit	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
54D2*:					
Newnata	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: slope, shrink-swell.	Severe: low strength, shrink-swell.
Summit	Severe: wetness, slippage.	Severe: shrink-swell, slippage.	Severe: wetness, shrink-swell.	Severe: shrink-swell, slope, slippage.	Severe: low strength, shrink-swell, slippage.
54E2*:					
Newnata	Severe: slope.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell.	Severe: low strength, slope, shrink-swell.
Summit	Severe: wetness, slope, slippage.	Severe: shrink-swell, slope, slippage.	Severe: wetness, slope, shrink-swell.	Severe: shrink-swell, slope, slippage.	Severe: low strength, slope, shrink-swell.
56CD*:					
Newnata	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: slope, shrink-swell.	Severe: low strength, shrink-swell.

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
56CD*:					
Eden	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope, large stones.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.
Moko	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, large stones.
56EF*:					
Newnata	Severe: slope.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell.	Severe: low strength, slope, shrink-swell.
Eden	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
Moko	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
58C Nixa	Moderate: slope, too clayey.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
62C Noark	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Slight.
62DE Noark	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
62EF Noark	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
66C Peridge	Moderate: too clayey.	Slight	Slight	Slight	Severe: low strength.
68C Portia	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Slight.
68D Portia	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
70 Razort	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
72*. Riverwash					
73*. Rock outcrop					

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
74B---------- Samba	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.
76---------- Secesh	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
78C---------- Sidon	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Moderate: low strength, wetness.
80B---------- Spadra	Slight----------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, low strength.
82C2---------- Summit	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
84---------- Wideman	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
2CD*:					
Arkana	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
Moko	Severe: depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock.	Poor: depth to rock.
2EF*:					
Arkana	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, slope.
Moko	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
8C Captina	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: small stones.
10 Ceda	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Poor: large stones, seepage.
12*:					
Ceda	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Poor: large stones, seepage.
Kenn	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Poor: small stones.
14F Clarksville	Severe: slope.	Severe: seepage, slope.	Severe: slope.	Severe: seepage, slope.	Poor: small stones, slope.
18 Elsah	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Poor: small stones.
20C Enders	Severe: percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
20DE, 22CD Enders	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.

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
22EF---------- Enders	Severe: percs slowly, slope, slippage.	Severe: slope, slippage.	Severe: depth to rock, slope, too clayey.	Severe: slope, slippage.	Poor: too clayey, hard to pack, slope.
24CD*:					
Enders----------	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
Nella----------	Moderate: percs slowly, slope, large stones.	Severe: slope.	Moderate: slope, too clayey, large stones.	Moderate: slope.	Poor: small stones.
24EF*:					
Enders----------	Severe: percs slowly, slope, slippage.	Severe: slope, slippage.	Severe: depth to rock, slope, too clayey.	Severe: slope, slippage.	Poor: too clayey, hard to pack, slope.
Nella----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
28CD*:					
Estate----------	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
Lily----------	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock, small stones.
Udorthents.					
28EF*:					
Estate----------	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Lily----------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.
Udorthents.					
30---------- Healing	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Fair: too clayey.
32C, 34C---------- Linker	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, small stones.
34D---------- Linker	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, small stones.

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
36C*:					
Linker	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, small stones.
Mountainburg	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage, large stones.	Severe: depth to rock, seepage.	Poor: depth to rock, large stones, thin layer.
36DE*:					
Linker	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, small stones.
Mountainburg	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, large stones.	Severe: depth to rock, seepage.	Poor: depth to rock, large stones, thin layer.
38EF*:					
Moko	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Rock outcrop.					
39G*:					
Moko	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Rock outcrop.					
Eden	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, slope.
42C	Severe: depth to rock.	Severe: seepage, depth to rock, large stones.	Severe: depth to rock, seepage.	Severe: depth to rock.	Poor: depth to rock, small stones, thin layer.
Mountainburg					
45C	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Slight	Fair: area reclaim, thin layer.
Nauvoo					
46C	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey, large stones.	Slight	Poor: small stones.
Nella					
46DE	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey, large stones.	Moderate: slope.	Poor: small stones.
Nella					

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
48CD---------- Nella	Moderate: percs slowly, slope, large stones.	Severe: slope.	Moderate: slope, too clayey, large stones.	Moderate: slope.	Poor: small stones.
49CD*:					
Nella----------	Moderate: percs slowly, slope, large stones.	Severe: slope.	Moderate: slope, too clayey, large stones.	Moderate: slope.	Poor: small stones.
Steprock----------	Severe: depth to rock.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock.	Poor: depth to rock, small stones.
50EF*, 50G*:					
Nella----------	Severe: slope.	Severe: slope, large stones.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Steprock----------	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: depth to rock, slope, small stones.
Mountainburg-------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope, large stones.
54C2*:					
Newnata----------	Severe: percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
Summit----------	Severe: wetness, percs slowly.	Severe: wetness.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
54D2*:					
Newnata----------	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
Summit----------	Severe: wetness, percs slowly.	Severe: slope, wetness, slippage.	Severe: too clayey.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
54E2*:					
Newnata----------	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Summit----------	Severe: wetness, percs slowly, slope.	Severe: slope, wetness, slippage.	Severe: too clayey, slope, slippage.	Severe: slope, slippage.	Poor: too clayey, hard to pack, slope.

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
56CD*:					
Newnata	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
Eden	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey,
Moko	Severe: depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock.	Poor: depth to rock.
56EF*:					
Newnata	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Eden	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, slope.
Moko	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
58C--Nixa	Severe: percs slowly.	Severe: slope.	Moderate: too clayey, slope.	Moderate: slope.	Poor: small stones.
62C--Noark	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Poor: too clayey, small stones.
62DE--Noark	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, small stones.
62EF--Noark	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, small stones, slope.
66C--Peridge	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, thin layer.
68C--Portia	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, thin layer.
68D--Portia	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope, thin layer.

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
70--Razort	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding.	Fair: too clayey, small stones.
72*. Riverwash					
73*. Rock outcrop					
74B--Samba	Severe: wetness, percs slowly.	Severe: flooding.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
76--Secesh	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Poor: small stones.
78C--Sidon	Severe: percs slowly, wetness.	Severe: wetness.	Severe: depth to rock.	Moderate: depth to rock, wetness.	Fair: depth to rock, too clayey, wetness.
80B--Spadra	Moderate: flooding, percs slowly.	Moderate: seepage, slope.	Moderate: flooding, too clayey.	Moderate: flooding.	Fair: too clayey.
82C2--Summit	Severe: wetness, percs slowly.	Severe: wetness.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
84--Wideman	Severe: flooding, poor filter.	Severe: flooding, seepage.	Severe: seepage, flooding, too sandy.	Severe: flooding, seepage.	Poor: too sandy.

* See description of the map unit for composition and behavior characteristics of the 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 other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
2CD*:				
Arkana	Poor: depth to rock, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, too clayey.
Moko	Poor: depth to rock, large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, large stones.
2EF*:				
Arkana	Poor: depth to rock, shrink-swell, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope, too clayey.
Moko	Poor: depth to rock, large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, large stones, slope.
8C---------- Captina	Fair: wetness, thin layer, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
10---------- Ceda	Fair: large stones.	Improbable: small stones.	Probable	Poor: large stones, area reclaim.
12*:				
Ceda	Fair: large stones.	Improbable: small stones.	Probable	Poor: large stones, area reclaim.
Kenn	Fair: shrink-swell, large stones.	Improbable: small stones.	Probable	Poor: small stones, area reclaim.
14F---------- Clarksville	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
18---------- Elsah	Fair: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, area reclaim.
20C, 20DE---------- Enders	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
22CD---------- Enders	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
22EF---------- Enders	Poor: low strength, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
24CD*:				
Enders----------	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
Nella----------	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
24EF*:				
Enders----------	Poor: low strength, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
Nella----------	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
28CD*:				
Estate----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
Lily---------- Udorthents.	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
28EF*:				
Estate----------	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope, too clayey.
Lily---------- Udorthents.	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
30---------- Healing	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, area reclaim.
32C, 34C, 34D---------- Linker	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
36C*, 36DE*:				
Linker	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Mountainburg	Poor: depth to rock, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: depth to rock, large stones.
38EF*:				
Moko	Poor: depth to rock, large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, large stones, slope.
Rock outcrop.				
39G*:				
Moko	Poor: depth to rock, large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, large stones, slope.
Rock outcrop.				
Eden	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
42C	Poor: depth to rock.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: depth to rock, small stones.
Mountainburg				
45C	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
Nauvoo				
46C, 46DE	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Nella				
48CD	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Nella				
49CD*:				
Nella	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Steprock	Poor: depth to rock, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
50EF*, 50G*:				
Nella	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
50EF*, 50G*:				
Steprock	Poor: depth to rock, slope, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
Mountainburg	Poor: depth to rock, slope, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: depth to rock, large stones, slope.
54C2*, 54D2*:				
Newnata	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
Summit	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
54E2*:				
Newnata	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey, small stones.
Summit	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
56CD*:				
Newnata	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
Eden	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
Moko	Poor: depth to rock, large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, large stones.
56EF*:				
Newnata	Poor: low strength, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey, small stones.
Eden	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
Moko	Poor: depth to rock, large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, large stones, slope.
58C Nixa	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
62C, 62DE---------- Noark	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
62EF---------- Noark	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
66C---------- Peridge	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
68C---------- Portia	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
68D---------- Portia	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
70---------- Razort	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
72*. Riverwash				
73*. Rock outcrop				
74B---------- Samba	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
76---------- Secesh	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
78C---------- Sidon	Fair: depth to rock, thin layer, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, area reclaim.
80B---------- Spadra	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, area reclaim.
82C2---------- Summit	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
84---------- Wideman	Good----------	Probable----------	Improbable: too sandy.	Fair: too sandy.

* See description of the map unit for composition and behavior characteristics of the 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. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
2CD*:						
Arkana	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Droughty, percs slowly, depth to rock.	Slope, depth to rock, percs slowly.	Slope, depth to rock, percs slowly.
Moko	Severe: depth to rock.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
2EF*:						
Arkana	Severe: slope.	Severe: hard to pack.	Deep to water	Droughty, percs slowly, depth to rock.	Slope, depth to rock, percs slowly.	Slope, depth to rock, percs slowly.
Moko	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
8C Captina	Moderate: seepage.	Moderate: piping, wetness.	Percs slowly, slope.	Percs slowly, slope, wetness.	Erodes easily, wetness, rooting depth.	Erodes easily, rooting depth, percs slowly.
10 Ceda	Severe: seepage.	Severe: seepage.	Deep to water	Flooding, droughty, large stones.	Large stones	Droughty, large stones.
12*:						
Ceda	Severe: seepage.	Severe: seepage.	Deep to water	Flooding, droughty, large stones.	Large stones	Droughty, large stones.
Kenn	Moderate: seepage.	Moderate: piping, large stones.	Deep to water	Droughty, flooding.	Large stones	Large stones, droughty.
14F Clarksville	Severe: seepage, slope.	Moderate: large stones.	Deep to water	Droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
18 Elsah	Severe: seepage.	Severe: piping, large stones.	Deep to water	Large stones, droughty.	Large stones	Large stones, droughty, rooting depth.
20C Enders	Moderate: depth to rock.	Moderate: thin layer, hard to pack.	Deep to water	Slope, percs slowly.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
20DE Enders	Moderate: depth to rock.	Moderate: thin layer, hard to pack.	Deep to water	Slope, percs slowly.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
22CD Enders	Moderate: depth to rock.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, slope.	Slope, percs slowly.	Slope, percs slowly.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
22EF---------- Enders	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, slope.	Slope, percs slowly.	Slope, percs slowly.
24CD*:						
Enders----------	Moderate: depth to rock.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, slope.	Slope, percs slowly.	Slope, percs slowly.
Nella----------	Moderate: seepage.	Severe: piping.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
24EF*:						
Enders----------	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, slope.	Slope, percs slowly.	Slope, percs slowly.
Nella----------	Severe: slope.	Severe: piping.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
28CD*:						
Estate----------	Moderate: depth to rock, slope.	Moderate: thin layer, hard to pack, large stones.	Deep to water	Percs slowly, slope, large stones.	Slope, large stones, percs slowly.	Large stones, slope, percs slowly.
Lily---------- Udorthents.	Severe: seepage, slope.	Severe: piping.	Deep to water	Depth to rock, slope.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
28EF*:						
Estate----------	Severe: slope.	Moderate: thin layer, hard to pack, large stones.	Deep to water	Percs slowly, slope, large stones.	Slope, large stones, percs slowly.	Large stones, slope, percs slowly.
Lily---------- Udorthents.	Severe: seepage, slope.	Severe: piping.	Deep to water	Depth to rock, slope.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
30---------- Healing	Moderate: seepage.	Moderate: piping.	Deep to water	Erodes easily, flooding.	Erodes easily	Erodes easily.
32C---------- Linker	Moderate: seepage, depth to rock.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Depth to rock, soil blowing.	Depth to rock.
34C---------- Linker	Moderate: seepage, depth to rock.	Severe: piping.	Deep to water	Slope, droughty, depth to rock.	Depth to rock, soil blowing.	Droughty, depth to rock.
34D---------- Linker	Moderate: seepage, depth to rock.	Severe: piping.	Deep to water	Slope, droughty, depth to rock.	Slope, depth to rock, soil blowing.	Slope, droughty, depth to rock.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
36C*:						
Linker	Moderate: seepage, depth to rock.	Severe: piping.	Deep to water	Slope, droughty, depth to rock.	Depth to rock, soil blowing.	Droughty, depth to rock.
Mountainburg	Severe: depth to rock.	Severe: large stones, thin layer.	Deep to water	Slope, large stones, droughty.	Large stones, depth to rock.	Large stones, droughty, depth to rock.
36DE*:						
Linker	Moderate: seepage, depth to rock.	Severe: piping.	Deep to water	Slope, droughty, depth to rock.	Slope, depth to rock, soil blowing.	Slope, droughty, depth to rock.
Mountainburg	Severe: depth to rock.	Severe: large stones, thin layer.	Deep to water	Slope, large stones, droughty.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
38EF*:						
Moko	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Rock outcrop.						
39G*:						
Moko	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Rock outcrop.						
Eden	Severe: slope.	Severe: hard to pack, large stones.	Deep to water	Large stones, droughty.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
42C---------- Mountainburg	Severe: depth to rock.	Severe: thin layer, large stones.	Deep to water	Slope, large stones, droughty.	Large stones, depth to rock.	Large stones, droughty, depth to rock.
45C---------- Nauvoo	Moderate: seepage, depth to rock.	Moderate: thin layer, piping.	Deep to water	Slope----------	Favorable------	Favorable.
46C---------- Nella	Moderate: seepage.	Severe: piping.	Deep to water	Droughty, slope.	Large stones---	Large stones, droughty.
46DE---------- Nella	Moderate: seepage.	Severe: piping.	Deep to water	Droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
48CD---------- Nella	Moderate: seepage.	Severe: piping.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
49CD*:						
Nella	Moderate: seepage.	Severe: piping.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
49CD*:						
Steprock	Moderate: seepage, depth to rock.	Severe: thin layer, large stones.	Deep to water	Slope, large stones, depth to rock.	Slope, depth to rock, large stones.	Large stones, slope, droughty.
50EF*, 50G*:						
Nella	Severe: slope.	Severe: piping.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
Steprock	Severe: slope.	Severe: thin layer, large stones.	Deep to water	Slope, large stones, depth to rock.	Slope, depth to rock, large stones.	Large stones, slope, droughty.
Mountainburg	Severe: depth to rock, slope.	Severe: large stones, thin layer.	Deep to water	Slope, large stones, droughty.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
54C2*:						
Newnata	Moderate: depth to rock.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, slope, erodes easily.	Large stones, erodes easily, percs slowly.	Large stones, erodes easily, percs slowly.
Summit	Moderate: slope.	Moderate: hard to pack, wetness.	Percs slowly, slope.	Percs slowly, slope.	Wetness, percs slowly, erodes easily.	Erodes easily, percs slowly.
54D2*:						
Newnata	Moderate: depth to rock.	Moderate: thin layer, hard to pack, large stones.	Deep to water	Percs slowly, slope, erodes easily.	Slope, large stones, erodes easily.	Slope, large stones, erodes easily.
Summit	Severe: slope.	Moderate: hard to pack, wetness.	Percs slowly, slope.	Percs slowly, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
54E2*:						
Newnata	Severe: slope.	Moderate: thin layer, hard to pack, large stones.	Deep to water	Percs slowly, slope, erodes easily.	Slope, large stones, erodes easily.	Slope, large stones, erodes easily.
Summit	Severe: slope.	Moderate: hard to pack, wetness.	Percs slowly, slope.	Percs slowly, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
56CD*:						
Newnata	Moderate: depth to rock.	Moderate: thin layer, hard to pack, large stones.	Deep to water	Percs slowly, slope, erodes easily.	Slope, large stones, erodes easily.	Slope, large stones, erodes easily.
Eden	Moderate: depth to rock.	Severe: hard to pack, large stones.	Deep to water	Large stones, droughty.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Moko	Severe: depth to rock.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones, depth to rock.	Large stones, slope, droughty.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
56EF*:						
Newnata	Severe: slope.	Moderate: thin layer, hard to pack, large stones.	Deep to water	Percs slowly, slope, erodes easily.	Slope, large stones, erodes easily.	Slope, large stones, erodes easily.
Eden	Severe: slope.	Severe: hard to pack, large stones.	Deep to water	Large stones, droughty.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Moko	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
58C---Nixa	Slight	Moderate: seepage, piping, thin layer.	Deep to water	Slope, droughty, percs slowly.	Slope, rooting depth, percs slowly.	Slope, droughty, rooting depth.
62C---Noark	Moderate: seepage.	Slight	Deep to water	Droughty, slope.	Favorable	Droughty.
62DE---Noark	Moderate: seepage.	Slight	Deep to water	Droughty, slope.	Slope	Slope, droughty.
62EF---Noark	Severe: slope.	Slight	Deep to water	Droughty, slope.	Slope	Slope, droughty.
66C---Peridge	Moderate: seepage.	Moderate: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
68C---Portia	Moderate: seepage.	Moderate: piping.	Deep to water	Slope	Favorable	Favorable.
68D---Portia	Moderate: seepage.	Moderate: piping.	Deep to water	Slope	Slope	Slope.
70---Razort	Severe: seepage.	Severe: piping.	Deep to water	Erodes easily, flooding.	Erodes easily	Erodes easily.
72*. Riverwash						
73*. Rock outcrop						
74B---Samba	Slight	Severe: wetness.	Percs slowly	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
76---Secesh	Severe: seepage.	Slight	Deep to water	Favorable	Favorable	Favorable.
78C---Sidon	Moderate: depth to rock, seepage.	Severe: thin layer, wetness.	Percs slowly, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness, rooting depth.	Erodes easily, rooting depth, percs slowly.
80B---Spadra	Moderate: seepage.	Severe: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
82C2---------- Summit	Moderate: slope.	Moderate: hard to pack, wetness.	Percs slowly, slope.	Percs slowly, slope.	Wetness, percs slowly, erodes easily.	Erodes easily, percs slowly.
84---------- Wideman	Severe: seepage.	Severe: piping, seepage.	Deep to water	Droughty, fast intake.	Too sandy------	Droughty.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--ENGINEERING INDEX PROPERTIES

(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		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
2CD*, 2EF*:											
Arkana	0-14	Very cherty silt loam.	GC, GM-GC	A-4, A-2, A-6	0-40	25-50	25-50	25-50	20-45	20-40	7-20
	14-20	Cherty silty clay, cherty clay.	GC, SC, CH	A-2, A-7	0-30	55-90	55-90	25-90	25-80	55-85	30-55
	20-42	Clay, cherty clay	CH	A-7	0-10	60-100	50-100	50-100	50-95	65-85	35-55
	42-44	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Moko	0-4	Very stony silt loam.	CL, GC, SC	A-6	35-60	65-90	60-85	55-80	40-75	25-35	10-15
	4-17	Very stony silty clay loam, very stony silt loam.	CL, GC, SC	A-6, A-7	35-60	65-90	60-85	55-80	40-80	25-45	10-20
	17-20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
8C	0-7	Silt loam	CL, CL-ML	A-4	0	95-100	92-100	85-100	65-90	<30	4-10
Captina	7-21	Silt loam, silty clay loam.	CL	A-6	0	95-100	92-100	85-100	65-95	20-40	10-20
	21-72	Silty clay loam	SC, CL	A-6	0-5	75-100	50-100	45-100	35-95	20-40	10-20
10	0-8	Very cobbly loam	SM, SM-SC, ML, CL-ML	A-2, A-4	10-50	70-95	60-90	40-90	25-80	22-29	2-7
Ceda	8-70	Cobbly loam, extremely cobbly loam, very gravelly fine sandy loam.	GP-GC, GP-GM, GM-GC, GC	A-2, A-4, A-6	5-20	15-50	15-50	10-50	5-45	25-40	7-18
12*:											
Ceda	0-8	Very cobbly loam	SM, SM-SC, ML, CL-ML	A-2, A-4	10-50	70-95	60-90	40-90	25-80	22-29	2-7
	8-70	Cobbly loam, extremely cobbly loam, very gravelly fine sandy loam.	GP-GC, GP-GM, GM-GC, GC	A-2, A-4, A-6	5-20	15-50	15-50	10-50	5-45	25-40	7-18
Kenn	0-14	Gravelly fine sandy loam.	SM, SM-SC	A-2, A-4 A-1	0-15	50-75	50-75	40-75	15-45	<26	NP-7
	14-38	Clay loam, sandy clay loam, gravelly clay loam.	CL, SC	A-2, A-4, A-6	0-15	50-90	50-90	35-90	15-80	25-40	8-18
	38-45	Very gravelly sandy clay loam, very gravelly clay loam, cobbly sandy clay loam.	GC, GP-GC	A-2, A-4, A-6	0-55	25-50	25-50	20-50	10-45	25-40	8-18
	45-60	Very cobbly loam, extremely gravelly loam, very gravelly fine sandy loam.	GC, GM, GP-GC, GP-GM	A-1, A-2, A-4	15-65	15-50	15-50	10-50	5-45	<31	NP-10

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
14F---------- Clarksville	0-10	Very cherty silt loam.	GC, SC, SM-SC, GP-GC	A-2-4, A-2-6, A-1-a	5-30	30-70	10-60	5-50	5-35	20-40	5-15
	10-48	Very cherty silt loam, extremely cherty silty clay loam.	GC, SC, SP-SC, GP-GC	A-2-6, A-6	5-20	30-70	10-60	10-50	5-45	30-40	15-25
	48-80	Very cherty silty clay, extremely cherty silty clay.	GC, SC, GP-GC, SP-SC	A-7, A-2-7	5-20	30-70	20-60	10-50	10-45	55-75	35-55
18---------- Elsah	0-8	Cherty silt loam	CL-ML, CL, SM-SC, SC	A-4, A-6	10-15	75-90	55-70	40-65	35-60	20-35	5-15
	8-80	Very cherty loam, very cherty silt loam, extremely cherty loam.	SM, ML, SC, CL	A-4, A-2-4, A-6, A-2-6	10-65	45-85	30-70	25-65	20-60	<25	NP-15
20C, 20DE-------- Enders	0-3	Gravelly loam----	CL-ML, GM-GC, SC, CL	A-2, A-4, A-6, A-1	0-10	50-75	50-75	30-70	20-60	20-35	5-14
	3-8	Gravelly fine sandy loam, loam, gravelly silt loam.	CL-ML, GM-GC, SC, CL	A-4, A-2, A-6, A-1	0-10	50-100	50-100	30-90	20-90	20-35	5-14
	8-40	Silty clay, clay, gravelly silty clay loam.	CH, CL, SC	A-7	0	95-100	50-100	45-100	35-95	40-65	20-40
	40-54	Silty clay, channery silty clay, clay.	CH, GC, CL, SC	A-7	0-10	55-100	35-90	35-90	35-90	45-65	25-40
	54-58	Weathered bedrock, unweathered bedrock.	---	---	---	---	---	---	---	---	---
22CD, 22EF------- Enders	0-3	Stony loam-------	SC, CL, SM-SC, CL-ML	A-2, A-4, A-6, A-1-b	15-35	80-95	75-95	35-70	20-60	20-35	5-14
	3-8	Stony loam, stony silt loam.	SC, CL, SM-SC, CL-ML	A-2, A-4, A-6, A-1-b	15-35	80-95	75-95	35-70	20-60	20-35	5-14
	8-40	Silty clay, clay, gravelly silty clay loam.	CH, CL, SC, GC	A-7	0-5	50-100	50-100	45-100	35-90	40-65	20-40
	40-54	Silty clay, channery silty clay, very channery clay.	CH, GC, SC, CL	A-7, A-2-7	0-10	55-100	25-90	25-90	25-90	45-65	25-40
	54-58	Weathered bedrock, unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--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	
24CD*, 24EF*:											
Enders	0-3	Stony loam	SC, CL, SM-SC, CL-ML	A-2, A-4, A-6, A-1-b	15-35	80-95	75-95	35-70	20-60	20-35	5-14
	3-8	Stony loam, stony silt loam.	SC, CL, SM-SC, CL-ML	A-2, A-4, A-6, A-1-b	15-35	80-95	75-95	35-70	20-60	20-35	5-14
	8-40	Silty clay, clay, gravelly silty clay loam.	CH, CL, SC, GC	A-7	0-5	50-100	50-100	45-100	35-90	40-65	20-40
	40-54	Silty clay, channery silty clay, very channery clay.	CH, GC, SC, CL	A-7, A-2-7	0-10	55-100	25-90	25-90	25-90	45-65	25-40
	54-58	Weathered bedrock, unweathered bedrock.	---	---	---	---	---	---	---	---	---
Nella	0-2	Stony loam	ML, CL, SM, SC	A-4	10-30	90-100	85-90	65-75	36-55	<30	NP-8
	2-6	Cobbly clay loam, clay loam.	CL, SC, CL-ML, SM-SC	A-4, A-6, A-2	0-30	75-95	60-90	45-70	30-60	25-40	6-20
	6-72	Clay loam, gravelly sandy clay loam, cobbly clay loam.	SC, SM, CL, ML	A-4, A-6, A-7	0-25	85-95	75-90	65-80	40-65	30-55	8-27
28CD*:											
Estate	0-2	Stony sandy loam	SM, SM-SC, SC	A-2, A-4	10-50	75-100	75-100	50-85	25-50	15-30	NP-10
	2-10	Gravelly sandy loam, cobbly fine sandy loam, stony sandy loam.	SM, SM-SC, SC, GM	A-2, A-4, A-1	0-45	50-95	50-95	35-75	20-50	15-30	NP-10
	10-17	Sandy loam, sandy clay loam, gravelly sandy clay loam.	CL, CL-ML, SC, SM-SC	A-2, A-4, A-6, A-1	0-35	60-100	60-100	40-80	20-70	20-40	5-20
	17-41	Cobbly clay, clay loam, gravelly sandy clay.	CH, CL, SC, GC	A-6, A-7	0-35	60-100	60-100	55-95	35-85	35-60	15-35
	41-45	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Lily	0-1	Stony sandy loam	SM, ML	A-2, A-4	15-40	90-95	85-90	55-90	25-75	<35	NP-7
	1-7	Sandy loam, stony sandy loam, loam.	SM, SC, ML, CL	A-4, A-6	5-20	90-95	85-90	60-85	40-80	<35	3-15
	7-26	Stony sandy clay loam, loam, gravelly clay loam.	SM, GC, ML, CL	A-2, A-4, A-6	5-20	65-95	60-90	50-85	20-75	<35	NP-15
	26-29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Udorthents.											

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
28EF*:											
Estate	0-2	Stony sandy loam	SM, SM-SC, SC	A-2, A-4	10-50	75-100	75-100	50-85	25-50	15-30	NP-10
	2-10	Gravelly sandy loam, cobbly fine sandy loam, stony sandy loam.	SM, SM-SC, SC, GM	A-2, A-4, A-1	0-45	50-95	50-95	35-75	20-50	15-30	NP-10
	10-17	Sandy loam, sandy clay loam, gravelly sandy clay loam.	CL, CL-ML, SC, SM-SC	A-2, A-4, A-6, A-1	0-35	60-100	60-100	40-80	20-70	20-40	5-20
	17-41	Cobbly clay, clay loam, gravelly sandy clay.	CH, CL, SC, GC	A-6, A-7	0-35	60-100	60-100	55-95	35-85	35-60	15-35
	41-45	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Lily	0-1	Stony sandy loam	SM, ML	A-2, A-4	15-40	90-95	85-90	55-90	25-75	<35	NP-7
	1-7	Sandy loam, stony sandy loam, loam.	SM, SC, ML, CL	A-4, A-6	5-20	90-95	85-90	60-85	40-80	<35	3-15
	7-26	Stony sandy clay loam, loam, gravelly clay loam.	SM, GC, ML, CL	A-2, A-4, A-6	5-20	65-95	60-90	50-85	20-75	<35	NP-15
	26-29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Udorthents.											
30	0-14	Silt loam	ML, CL-ML, CL	A-4	0	90-100	90-100	90-100	70-90	<30	3-10
Healing	14-72	Silt loam, silty clay loam.	CL	A-4, A-6	0	90-100	90-100	90-100	70-95	25-38	8-15
32C	0-6	Fine sandy loam	SM, SM-SC, SC	A-4, A-2	0	75-100	75-100	55-85	30-50	<30	NP-10
Linker	6-13	Gravelly fine sandy loam, gravelly loam, fine sandy loam.	SM-SC, SC, CL, CL-ML	A-4, A-2, A-6, A-1	0-5	55-100	50-100	40-95	20-75	20-40	4-20
	13-31	Sandy clay loam, loam, gravelly clay loam.	CL, SC, GC	A-6, A-2	0-10	55-100	55-100	40-95	20-80	30-40	10-20
	31-34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
34C, 34D	0-6	Gravelly fine sandy loam.	GM, SM, SM-SC, GM-GC	A-2, A-4, A-1-b	0-5	50-75	50-75	35-70	20-50	<25	NP-7
Linker	6-13	Gravelly fine sandy loam, gravelly loam, fine sandy loam.	SC, CL, CL-ML, SM-SC	A-4, A-2, A-1	0-5	50-100	50-100	40-95	20-75	20-35	5-15
	13-31	Sandy clay loam, loam, gravelly clay loam.	CL, SC, GC, CL-ML	A-4, A-6, A-2	0-10	50-100	50-100	40-95	20-80	23-38	6-15
	31-34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
36C*, 36DE*:											
Linker	0-6	Gravelly fine sandy loam.	GM, SM, SM-SC, GM-GC	A-2, A-4, A-1-b	0-5	50-75	50-75	35-70	20-50	<25	NP-7
	6-13	Gravelly fine sandy loam, gravelly loam, fine sandy loam.	SC, CL, CL-ML, SM-SC	A-4, A-2, A-1	0-5	50-100	50-100	40-95	20-75	20-35	5-15
	13-31	Sandy clay loam, loam, gravelly clay loam.	CL, SC, GC, CL-ML	A-4, A-6, A-2	0-10	50-100	50-100	40-95	20-80	23-38	6-15
	31-34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Mountainburg	0-3	Stony fine sandy loam.	SM, SM-SC, SC, ML	A-1, A-2, A-4	15-45	75-95	75-95	40-85	20-65	<25	NP-9
	3-8	Cobbly fine sandy loam, stony sandy loam, very cobbly loam.	SM, SM-SC, SC, ML	A-1, A-2, A-4	15-60	80-95	75-95	35-85	20-65	<25	NP-9
	8-16	Very gravelly fine sandy loam, very stony loam, very cobbly sandy clay loam.	GC, GM-GC, SC, GP-GC	A-1, A-2, A-4, A-6	15-70	35-85	30-85	10-60	05-45	25-35	5-15
	16-18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
38EF*:											
Moko	0-4	Very stony silt loam.	CL, GC, SC	A-6	35-60	65-90	60-85	55-80	40-75	25-35	10-15
	4-17	Very stony silty clay loam, very stony silt loam.	CL, GC, SC	A-6, A-7	35-60	65-90	60-85	55-80	40-80	25-45	10-20
	17-20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
39G*:											
Moko	0-4	Very stony silty clay loam.	CL, GC, SC	A-6, A-7	35-60	65-90	60-85	55-85	45-80	35-45	15-20
	4-17	Very stony silty clay loam, very stony silt loam.	CL, GC, SC	A-6, A-7	35-60	65-90	60-85	55-80	40-80	25-45	10-20
	17-20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
Eden	0-5	Flaggy silty clay loam.	CL, CH	A-7, A-6	25-40	75-95	70-95	70-95	65-95	35-65	12-35
	5-36	Flaggy silty clay, channery clay, silty clay.	CH, CL	A-7	10-45	75-100	55-100	50-100	50-95	45-75	20-45
	36-45	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
42C--------- Mountainburg	0-3	Gravelly fine sandy loam.	GM, SM, CL-ML, GM-GC	A-1, A-2, A-4	0-10	60-80	50-75	30-70	15-55	<25	NP-9
	3-8	Very gravelly fine sandy loam, gravelly sandy loam, gravelly loam.	SM, GM, CL-ML, GM-GC	A-1, A-2, A-4	0-10	40-80	30-70	20-70	10-55	<25	NP-9
	8-16	Very cobbly sandy clay loam, very gravelly sandy loam, very gravelly loam.	GC, GP-GC, GM-GC, SC	A-1, A-2, A-4, A-6	15-70	35-85	30-85	10-60	5-45	25-35	5-15
	16-18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
45C--------- Nauvoo	0-8	Fine sandy loam	SM-SC, CL-ML, SC, CL	A-4, A-2	0-3	90-100	85-100	55-93	30-60	<30	NP-8
	8-40	Loam, sandy clay loam, clay loam.	SC, CL, ML	A-4, A-6, A-7	0-3	95-100	90-100	60-95	40-80	30-50	8-24
	40-50	Loam, sandy clay loam.	SM-SC, CL-ML, SC, CL	A-4, A-6	0-5	90-100	85-100	55-90	35-65	18-34	4-15
	50-56	Weathered bedrock	---	---	---	---	---	---	---	---	---
46C, 46DE--------- Nella	0-2	Gravelly loam----	ML, CL, GM, SM	A-4, A-2	0-10	65-90	60-80	55-65	30-55	<30	NP-8
	2-6	Cobbly clay loam, gravelly clay loam, cobbly sandy clay loam.	CL, SC, CL-ML, SM-SC	A-4, A-6, A-2	0-25	75-95	60-90	45-70	30-60	25-40	6-20
	6-72	Cobbly clay loam, gravelly sandy clay loam, clay loam.	SC, SM, CL, ML	A-4, A-6, A-7	0-25	85-95	75-90	65-80	40-65	30-55	8-27
48CD--------- Nella	0-2	Stony loam-------	ML, CL, SM, SC	A-4	20-45	90-100	85-90	65-75	36-55	<30	NP-8
	2-6	Cobbly clay loam, clay loam.	CL, SC, CL-ML, SM-SC	A-4, A-6, A-2	5-30	75-95	60-90	45-70	30-60	25-40	6-20
	6-72	Clay loam, gravelly sandy clay loam, cobbly clay loam.	SC, SM, CL, ML	A-4, A-6, A-7	5-25	85-95	75-90	65-80	40-65	30-55	8-27
49CD*: Nella---------	0-2	Stony loam-------	ML, CL, SM, SC	A-4	20-45	90-100	85-90	65-75	36-55	<30	NP-8
	2-6	Cobbly clay loam, clay loam.	CL, SC, CL-ML, SM-SC	A-4, A-6, A-2	5-30	75-95	60-90	45-70	30-60	25-40	6-20
	6-72	Clay loam, gravelly sandy clay loam, cobbly clay loam.	SC, SM, CL, ML	A-4, A-6, A-7	5-25	85-95	75-90	65-80	40-65	30-55	8-27

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
49CD*:											
Steprock--------	0-4	Very stony sandy loam.	SM, SM-SC, ML, CL-ML	A-2, A-4, A-1	25-45	70-90	65-85	30-80	20-80	<25	NP-7
	4-10	Very flaggy sandy loam, very flaggy loam, gravelly fine sandy loam.	ML, GM, CL-ML, GM-GC	A-2, A-4, A-1	25-45	40-75	40-75	30-75	12-70	<25	NP-7
	10-22	Very flaggy sandy clay loam, very gravelly loam, very gravelly clay loam.	GM-GC, GC, SC, GP-GC	A-1, A-2, A-4, A-6	5-55	35-85	35-85	30-50	12-40	25-40	5-20
	22-53	Weathered bedrock	---	---	---	---	---	---	---	---	---
50EF*, 50G*:											
Nella----------	0-2	Very stony loam	SM, SM-SC, SC, CL-ML	A-4, A-2	45-65	85-95	80-90	55-75	30-55	<30	NP-8
	2-6	Cobbly clay loam, clay loam.	CL, SC, CL-ML, SM-SC	A-4, A-6, A-2	5-30	75-95	60-90	45-70	30-60	25-40	6-20
	6-72	Clay loam, gravelly sandy clay loam, cobbly clay loam.	SC, SM, CL, ML	A-4, A-6, A-7	5-25	85-95	75-90	65-80	40-65	30-55	8-27
Steprock--------	0-4	Very stony sandy loam.	SM, SM-SC, ML, CL-ML	A-2, A-4, A-1	45-60	70-90	65-85	30-80	20-80	<25	NP-7
	4-10	Very flaggy sandy loam, very flaggy loam, gravelly fine sandy loam.	ML, GM, CL-ML, GM-GC	A-2, A-4, A-1	5-45	40-75	40-75	30-75	12-70	<25	NP-7
	10-22	Very flaggy sandy clay loam, very gravelly loam, very gravelly clay loam.	GM-GC, GC, SC, GP-GC	A-1, A-2, A-4, A-6	5-55	35-85	35-85	30-50	12-40	25-40	5-20
	22-53	Weathered bedrock	---	---	---	---	---	---	---	---	---
Mountainburg----	0-3	Very stony fine sandy loam.	SM, SM-SC, SC, ML	A-1, A-2, A-4	35-50	70-95	65-95	35-80	20-65	<25	NP-9
	3-8	Cobbly fine sandy loam, stony sandy loam, very cobbly loam.	SM, SM-SC, SC, ML	A-1, A-2, A-4	15-60	80-95	75-95	35-85	20-65	<25	NP-9
	8-16	Very gravelly fine sandy loam, very stony loam, very cobbly sandy clay loam.	GC, GM-GC, SC, GP-GC	A-1, A-2, A-4, A-6	15-70	35-85	30-85	10-60	05-45	25-35	5-15
	16-18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
54C2*:											
Newnata	0-4	Silty clay loam	CL	A-6	0-5	95-100	80-100	80-95	70-85	35-40	15-20
	4-18	Silty clay loam, gravelly silty clay, flaggy silty clay loam.	CL, CH, SC	A-6, A-7	0-30	90-100	50-100	45-100	35-95	35-55	15-30
	18-48	Silty clay, clay, flaggy silty clay.	CL, CH, SC	A-7	0-30	95-100	50-100	45-100	40-95	41-60	20-35
	48-50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Summit	0-5	Silty clay loam	CL, CH	A-6, A-7	0	90-100	85-100	80-100	70-99	35-60	11-30
	5-14	Silty clay, silty clay loam.	CL, CH	A-7, A-6	0	85-100	85-100	75-100	60-99	37-65	15-35
	14-81	Clay, silty clay, shaly silty clay.	CH, CL	A-7	0	85-100	75-100	70-100	55-98	41-70	18-40
54D2*, 54E2*:											
Newnata	0-4	Flaggy silty clay loam.	CL, CL-ML, SC, SM-SC	A-4, A-6	20-50	80-95	75-90	65-85	45-85	25-40	5-20
	4-18	Gravelly silty clay loam, flaggy silty clay, silty clay.	CL, CH, SC	A-6, A-7	0-30	90-100	50-100	45-100	35-95	35-55	15-30
	18-48	Silty clay, clay, flaggy silty clay.	CL, CH, SC	A-7	0-30	95-100	50-100	45-100	40-95	41-60	20-35
	48-50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Summit	0-5	Silty clay loam	CL, CH	A-6, A-7	0	90-100	85-100	80-100	70-99	35-60	11-30
	5-14	Silty clay, silty clay loam.	CL, CH	A-7, A-6	0	85-100	85-100	75-100	60-99	37-65	15-35
	14-81	Clay, silty clay, shaly silty clay.	CH, CL	A-7	0	85-100	75-100	70-100	55-98	41-70	18-40
56CD*, 56EF*:											
Newnata	0-4	Stony silty clay loam.	CL, CL-ML, SC, SM-SC	A-4, A-6	20-40	80-95	75-90	65-85	45-85	25-40	5-20
	4-18	Gravelly silty clay loam, flaggy silty clay, silty clay.	CL, CH, SC	A-6, A-7	0-30	90-100	50-100	45-100	35-95	35-55	15-30
	18-48	Silty clay, clay, flaggy silty clay.	CL, CH, SC	A-7	0-30	95-100	50-100	45-100	40-95	41-60	20-35
	48-50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Eden	0-5	Flaggy silty clay loam.	CL, CH	A-7, A-6	25-40	75-95	70-95	70-95	65-95	35-65	12-35
	5-36	Flaggy silty clay, channery clay, silty clay.	CH, CL	A-7	10-45	75-100	55-100	50-100	50-95	45-75	20-45
	36-45	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--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	
56CD*, 56EF*:											
Moko	0-4	Very stony silty clay loam.	CL, GC, SC	A-6, A-7	35-60	65-90	60-85	55-85	45-80	35-45	15-20
	4-17	Very stony silty clay loam, very stony silt loam.	CL, GC, SC	A-6, A-7	35-60	65-90	60-85	55-80	40-80	25-45	10-20
	17-20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
58C	0-14	Very cherty silt loam.	GC, GM-GC	A-2, A-2, A-4, A-6	0-10	30-55	25-50	25-50	15-45	25-35	6-15
Nixa	14-23	Very cherty silt loam, very cherty loam.	CL, SC, SM-SC, GM-GC	A-2, A-4, A-6	0-10	30-75	25-75	25-75	15-70	25-35	6-15
	23-37	Very cherty silt loam, very cherty silty clay loam.	SC, GC	A-2	0-10	25-60	15-45	15-45	13-15	30-40	11-20
	37-72	Very cherty silty clay, very cherty silty clay loam.	GC, GP-GC, GW-GC	A-2	0-20	15-45	10-35	10-35	5-30	40-55	20-30
62C, 62DE, 62EF--	0-11	Very cherty silt loam.	GM, GM-GC, GC	A-2, A-1, A-4, A-6	0-10	30-50	25-50	25-50	20-45	<30	3-11
Noark	11-16	Very cherty silt loam, very cherty silty clay loam.	GC	A-2, A-4, A-6	0-10	30-50	25-50	25-50	20-45	25-40	8-18
	16-35	Very cherty clay, very cherty silty clay.	GC	A-2, A-7	0-10	30-50	25-50	25-50	25-45	41-70	18-33
	35-72	Very cherty clay, extremely cherty clay, very cherty silty clay.	GC, GP-GC	A-2, A-7	0-15	10-50	10-50	10-50	10-45	45-70	20-38
66C	0-17	Silt loam	CL-ML, CL	A-4, A-6	0	95-100	90-100	85-100	70-90	<30	4-11
Peridge	17-37	Silty clay loam, silt loam.	CL	A-6, A-4, A-7	0	95-100	90-100	85-95	70-95	28-43	9-21
	37-84	Silty clay, silty clay loam.	CL, CH	A-7, A-6	0	55-100	50-100	50-95	50-95	39-66	18-39
68C, 68D	0-5	Fine sandy loam	SM, SM-SC	A-4, A-2	0	0-100	85-100	50-85	25-50	<25	NP-7
Portia	5-14	Loam, fine sandy loam.	ML, CL-ML, SM, SM-SC	A-4, A-2	0	90-100	85-100	50-95	25-75	<30	3-10
	14-38	Loam, sandy clay loam.	CL, CL-ML, SC, SM-SC	A-4, A-6, A-2	0	90-100	85-100	65-95	30-75	23-38	7-15
	38-72	Clay loam, sandy clay loam.	CL, SC	A-4, A-6, A-2	0	100	85-100	65-100	30-80	25-43	8-18

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
70---------- Razort	0-8	Loam----------	ML, CL-ML, CL	A-4	0	80-100	75-100	70-95	50-90	<30	3-10
	8-54	Silt loam, clay loam, gravelly loam.	CL, CL-ML, SC, SM-SC	A-4, A-6	0	60-100	60-100	55-95	40-85	<40	6-15
	54-68	Gravelly silt loam, very gravelly loam, sandy loam.	GM, SM, ML, CL-ML	A-2, A-4, A-1	0	30-100	25-100	25-95	20-85	<30	3-10
72*. Riverwash											
73*. Rock outcrop											
74B---------- Samba	0-15	Silty clay loam	CL	A-6, A-7	0	100	90-100	85-100	85-95	35-45	17-22
	15-72	Silty clay, clay, silty clay loam.	CH, CL	A-7	0	100	90-100	90-100	75-95	45-65	20-40
76---------- Secesh	0-6	Silt loam--------	ML	A-4	0-10	85-100	80-100	75-95	60-90	20-30	NP-7
	6-30	Silty clay loam, silt loam, cherty silty clay loam.	CL, CL-ML	A-4, A-6	0-10	80-100	50-90	50-90	50-90	25-35	5-12
	30-72	Cherty silty clay loam, cherty clay loam, very cherty silty clay loam.	CL, GC, SC	A-6	0-10	50-90	25-75	25-75	20-65	30-40	11-20
78C---------- Sidon	0-6	Loam----------	ML, CL-ML, CL	A-4	0	90-100	85-100	65-100	50-90	15-25	2-10
	6-22	Silty clay loam, clay loam, loam.	CL-ML, CL, GC, SC	A-4, A-6	0	85-100	85-100	55-100	40-95	20-35	5-15
	22-72	Clay loam, loam, gravelly sandy clay loam.	CL, SC, GC	A-4, A-6, A-2	0	70-100	60-100	45-95	20-95	20-35	8-15
80B---------- Spadra	0-6	Loam----------	CL-ML, CL	A-4	0	90-100	90-100	75-95	50-90	<30	4-10
	6-28	Loam, sandy clay loam, clay loam.	CL, SC, SM-SC, ML	A-4, A-6	0	90-100	90-100	80-95	40-95	20-38	3-15
	28-65	Loam, sandy loam, gravelly fine sandy loam.	CL, SM-SC, SC, CL-ML	A-4, A-2, A-1	0	70-100	70-100	40-95	20-75	<30	NP-10
82C2---------- Summit	0-5	Silty clay loam	CL, CH	A-6, A-7	0	90-100	85-100	80-100	70-99	35-60	11-30
	5-14	Silty clay, silty clay loam.	CL, CH	A-7, A-6	0	85-100	85-100	75-100	60-99	37-65	15-35
	14-81	Clay, silty clay, shaly silty clay.	CH, CL	A-7	0	85-100	75-100	70-100	55-98	41-70	18-40
84---------- Wideman	0-6	Loamy fine sand	SM	A-2	0	100	90-100	50-85	15-35	---	NP
	6-51	Sandy loam, loamy fine sand, loamy sand.	SM	A-2	0	100	95-100	50-80	15-35	---	NP
	51-72	Fine sandy loam, sandy loam, loamy fine sand.	SM, ML, SP-SM	A-2, A-4, A-1	0	90-100	70-100	35-85	10-55	<20	NP-3

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
2CD*, 2EF*:										
Arkana	0-14	15-27	1.25-1.50	0.6-2.0	0.08-0.12	6.1-7.3	Low	0.24	2	2-5
	14-20	50-85	1.20-1.45	0.06-0.2	0.06-0.10	5.1-7.3	High	0.24		
	20-42	60-85	1.25-1.55	<0.06	0.07-0.12	5.1-7.3	High	0.32		
	42-44	---	---	---	---	---	---	---		
Moko	0-4	18-27	1.25-1.60	0.6-2.0	0.08-0.13	6.6-7.8	Low	0.24	1	2-4
	4-17	18-35	1.25-1.60	0.6-2.0	0.09-0.14	6.6-7.8	Low	0.28		
	17-20	---	---	---	---	---	---	---		
8C	0-7	8-20	1.25-1.45	0.6-2.0	0.14-0.20	4.5-6.0	Low	0.43	3	1-3
Captina	7-21	20-35	1.40-1.50	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.43		
	21-72	27-40	1.45-1.60	0.06-0.2	0.08-0.12	4.5-5.5	Low	0.37		
10	0-8	10-18	1.30-1.55	6.0-20	0.06-0.13	5.6-6.5	Low	0.24	---	.5-2
Ceda	8-70	15-27	1.40-1.70	6.0-20	0.06-0.13	5.6-6.5	Low	0.28		
12*:										
Ceda	0-8	10-18	1.30-1.55	6.0-20	0.06-0.13	5.6-6.5	Low	0.24	---	.5-2
	8-70	15-27	1.40-1.70	6.0-20	0.06-0.13	5.6-6.5	Low	0.28		
Kenn	0-14	10-20	1.30-1.60	0.6-2.0	0.06-0.11	5.1-6.5	Low	0.17	5	.5-2
	14-38	20-30	1.45-1.70	0.6-2.0	0.06-0.18	4.5-5.5	Moderate	0.28		
	38-45	20-30	1.45-1.70	0.6-2.0	0.02-0.10	4.5-5.5	Moderate	0.28		
	45-60	10-25	1.40-1.70	0.6-2.0	0.02-0.05	4.5-5.5	Low	0.32		
14F	0-10	14-20	1.20-1.40	2.0-6.0	0.07-0.12	4.5-6.0	Low	0.28	3	.5-2
Clarksville	10-48	25-35	1.30-1.45	2.0-6.0	0.06-0.10	4.5-5.5	Low	0.32		
	48-80	40-75	1.20-1.40	0.6-2.0	0.05-0.08	4.5-5.5	Moderate	0.20		
18	0-8	10-20	1.40-1.60	2.0-6.0	0.13-0.18	5.6-6.5	Low	0.28	3	1-2
Elsah	8-80	5-18	1.50-1.75	2.0-6.0	0.05-0.10	5.6-6.5	Low	0.28		
20C, 20DE	0-3	10-25	1.25-1.50	0.6-2.0	0.07-0.15	3.6-5.5	Low	0.32	3	2-4
Enders	3-8	10-25	1.25-1.50	0.6-2.0	0.10-0.20	3.6-5.5	Low	0.37		
	8-40	35-60	1.15-1.45	<0.06	0.12-0.18	3.6-5.5	High	0.37		
	40-54	40-60	1.20-1.45	<0.06	0.08-0.10	3.6-5.5	Moderate	0.37		
	54-58	---	---	---	---	---	---	---		
22CD, 22EF	0-3	10-25	1.25-1.60	0.6-2.0	0.07-0.15	3.6-5.5	Low	0.32	3	2-4
Enders	3-8	10-25	1.25-1.60	0.6-2.0	0.07-0.15	3.6-5.5	Low	0.32		
	8-40	35-60	1.25-1.45	<0.06	0.12-0.18	3.6-5.5	High	0.24		
	40-54	40-60	1.25-1.45	<0.06	0.10-0.17	3.6-5.5	High	0.24		
	54-58	---	---	---	---	---	---	---		
24CD*, 24EF*:										
Enders	0-3	10-25	1.25-1.60	0.6-2.0	0.07-0.15	3.6-5.5	Low	0.32	3	2-4
	3-8	10-25	1.25-1.60	0.6-2.0	0.07-0.15	3.6-5.5	Low	0.32		
	8-40	35-60	1.25-1.45	<0.06	0.12-0.18	3.6-5.5	High	0.24		
	40-54	40-60	1.25-1.45	<0.06	0.10-0.17	3.6-5.5	High	0.24		
	54-58	---	---	---	---	---	---	---		
Nella	0-2	12-25	1.30-1.45	2.0-6.0	0.08-0.15	4.5-5.5	Low	0.15	5	1-3
	2-6	22-35	1.35-1.55	0.6-2.0	0.07-0.14	4.5-5.5	Low	0.15		
	6-72	27-45	1.35-1.55	0.6-2.0	0.08-0.15	4.5-5.5	Low	0.15		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
28CD*:										
Estate	0-2	5-20	1.40-1.55	0.6-6.0	0.07-0.15	5.1-7.3	Low	0.20	3	.5-3
	2-10	5-20	1.40-1.55	0.6-2.0	0.07-0.15	5.1-7.3	Low	0.24		
	10-17	15-35	1.30-1.50	0.6-2.0	0.10-0.18	5.1-7.3	Low	0.32		
	17-41	35-55	1.20-1.40	0.06-0.2	0.12-0.18	5.6-7.3	Moderate	0.28		
	41-45	---	---	---	---	---	---	---		
Lily	0-1	5-25	1.20-1.40	0.6-6.0	0.09-0.16	3.6-5.5	Low	0.24	2	.5-4
	1-7	18-35	1.25-1.55	2.0-6.0	0.12-0.18	3.6-5.5	Low	0.24		
	7-26	18-35	1.25-1.55	2.0-6.0	0.08-0.17	3.6-5.5	Low	0.17		
	26-29	---	---	---	---	---	---	---		
Udorthents.										
28EF*:										
Estate	0-2	5-20	1.40-1.55	0.6-6.0	0.07-0.15	5.1-7.3	Low	0.20	3	.5-3
	2-10	5-20	1.40-1.55	0.6-2.0	0.07-0.15	5.1-7.3	Low	0.24		
	10-17	15-35	1.30-1.50	0.6-2.0	0.10-0.18	5.1-7.3	Low	0.32		
	17-41	35-55	1.20-1.40	0.06-0.2	0.12-0.18	5.6-7.3	Moderate	0.28		
	41-45	---	---	---	---	---	---	---		
Lily	0-1	5-25	1.20-1.40	0.6-6.0	0.09-0.16	3.6-5.5	Low	0.24	2	.5-4
	1-7	18-35	1.25-1.55	2.0-6.0	0.12-0.18	3.6-5.5	Low	0.24		
	7-26	18-35	1.25-1.55	2.0-6.0	0.08-0.17	3.6-5.5	Low	0.17		
	26-29	---	---	---	---	---	---	---		
Udorthents.										
30	0-14	10-25	1.35-1.50	0.6-2.0	0.16-0.24	5.6-6.5	Low	0.37	5	2-4
Healing	14-72	20-35	1.35-1.45	0.6-2.0	0.16-0.24	5.6-6.5	Low	0.37		
32C	0-6	5-20	1.30-1.60	0.6-2.0	0.10-0.12	3.6-5.5	Low	0.28	2	.5-3
Linker	6-13	10-27	1.30-1.60	0.6-2.0	0.08-0.18	3.6-5.5	Low	0.28		
	13-31	18-35	1.30-1.60	0.6-2.0	0.10-0.18	3.6-5.5	Low	0.32		
	31-34	---	---	---	---	---	---	---		
34C, 34D	0-6	5-20	1.30-1.60	0.6-2.0	0.08-0.14	3.6-5.5	Low	0.24	2	.5-3
Linker	6-13	10-25	1.30-1.60	0.6-2.0	0.08-0.18	3.6-5.5	Low	0.28		
	13-31	18-35	1.30-1.60	0.6-2.0	0.11-0.18	3.6-5.5	Low	0.28		
	31-34	---	---	---	---	---	---	---		
36C*, 36DE*:										
Linker	0-6	5-20	1.30-1.60	0.6-2.0	0.08-0.14	3.6-5.5	Low	0.24	2	.5-3
	6-13	10-25	1.30-1.60	0.6-2.0	0.08-0.18	3.6-5.5	Low	0.28		
	13-31	18-35	1.30-1.60	0.6-2.0	0.11-0.18	3.6-5.5	Low	0.28		
	31-34	---	---	---	---	---	---	---		
Mountainburg	0-3	5-18	1.30-1.55	2.0-6.0	0.05-0.10	4.5-6.0	Low	0.17	1	1-3
	3-8	5-18	1.30-1.50	2.0-6.0	0.05-0.10	4.5-6.0	Low	0.15		
	8-16	10-30	1.30-1.55	2.0-6.0	0.05-0.10	4.5-5.5	Low	0.24		
	16-18	---	---	---	---	---	---	---		
38EF*:										
Moko	0-4	18-27	1.25-1.60	0.6-2.0	0.08-0.13	6.6-7.8	Low	0.24	1	2-4
	4-17	18-35	1.25-1.60	0.6-2.0	0.09-0.14	6.6-7.8	Low	0.28		
	17-20	---	---	---	---	---	---	---		
Rock outcrop.										

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
39G*:										
Moko	0-4	27-35	1.25-1.50	0.6-2.0	0.09-0.14	6.6-7.8	Low	0.24	1	2-4
	4-17	18-35	1.25-1.60	0.6-2.0	0.09-0.14	6.6-7.8	Low	0.28		
	17-20	---	---	---	---	---	---	----		
Rock outcrop.										
Eden	0-5	27-40	1.45-1.65	0.06-0.6	0.11-0.17	5.6-8.4	Moderate	0.17	3	.5-3
	5-36	40-60	1.45-1.65	0.06-0.2	0.08-0.13	5.6-8.4	Moderate	0.28		
	36-45	---	---	---	---	---	---	----		
42C	0-3	5-18	1.40-1.55	2.0-6.0	0.05-0.10	4.5-6.0	Low	0.20	1	.5-3
Mountainburg	3-8	5-18	1.30-1.50	2.0-6.0	0.05-0.10	4.5-6.0	Low	0.15		
	8-16	15-25	1.50-1.70	2.0-6.0	0.05-0.10	4.5-5.5	Low	0.17		
	16-18	---	---	---	---	---	---	----		
45C	0-8	10-25	1.30-1.60	2.0-6.0	0.13-0.17	4.5-5.5	Low	0.28	3	.5-2
Nauvoo	8-40	18-35	1.30-1.60	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.32		
	40-50	15-30	1.30-1.60	0.6-2.0	0.11-0.17	4.5-5.5	Low	0.32		
	50-56	---	---	---	---	---	---	----		
46C, 46DE	0-2	12-25	1.30-1.45	2.0-6.0	0.08-0.15	4.5-5.5	Low	0.15	5	1-3
Nella	2-6	22-35	1.35-1.55	0.6-2.0	0.08-0.15	4.5-5.5	Low	0.15		
	6-72	27-45	1.30-1.45	0.6-2.0	0.07-0.14	4.5-5.5	Low	0.15		
48CD	0-2	12-25	1.30-1.45	2.0-6.0	0.08-0.15	4.5-5.5	Low	0.15	5	1-3
Nella	2-6	22-35	1.35-1.55	0.6-2.0	0.07-0.14	4.5-5.5	Low	0.15		
	6-72	27-45	1.35-1.55	0.6-2.0	0.08-0.15	4.5-5.5	Low	0.15		
49CD*:										
Nella	0-2	12-25	1.30-1.45	2.0-6.0	0.08-0.15	4.5-5.5	Low	0.15	5	1-3
	2-6	22-35	1.35-1.55	0.6-2.0	0.07-0.14	4.5-5.5	Low	0.15		
	6-72	27-45	1.35-1.55	0.6-2.0	0.08-0.15	4.5-5.5	Low	0.15		
Steprock	0-4	8-18	1.30-1.60	2.0-6.0	0.04-0.13	4.5-5.5	Low	0.17	2	.5-2
	4-10	8-18	1.30-1.60	0.6-2.0	0.04-0.17	4.5-5.5	Low	0.17		
	10-22	10-35	1.30-1.60	0.6-2.0	0.03-0.13	4.5-5.5	Low	0.17		
	22-53	---	---	---	---	---	---	----		
50EF*, 50G*:										
Nella	0-2	12-25	1.30-1.45	2.0-6.0	0.06-0.14	4.5-5.5	Low	0.15	5	1-3
	2-6	22-35	1.35-1.55	0.6-2.0	0.07-0.14	4.5-5.5	Low	0.15		
	6-72	27-45	1.35-1.55	0.6-2.0	0.08-0.15	4.5-5.5	Low	0.15		
Steprock	0-4	8-18	1.30-1.60	2.0-6.0	0.04-0.13	4.5-5.5	Low	0.17	2	.5-2
	4-10	8-18	1.30-1.60	0.6-2.0	0.04-0.17	4.5-5.5	Low	0.17		
	10-22	10-35	1.30-1.60	0.6-2.0	0.03-0.13	4.5-5.5	Low	0.17		
	22-53	---	---	---	---	---	---	----		
Mountainburg	0-3	5-18	1.30-1.55	2.0-6.0	0.05-0.10	4.5-6.0	Low	0.15	1	1-3
	3-8	5-18	1.30-1.50	2.0-6.0	0.05-0.10	4.5-6.0	Low	0.15		
	8-16	10-30	1.30-1.55	2.0-6.0	0.05-0.10	4.5-5.5	Low	0.24		
	16-18	---	---	---	---	---	---	----		
54C2*:										
Newnata	0-4	27-35	1.25-1.60	0.6-2.0	0.17-0.18	5.1-6.5	Low	0.43	3	2-6
	4-18	27-50	1.25-1.55	0.2-0.6	0.12-0.18	5.1-7.8	Moderate	0.37		
	18-48	30-55	1.15-1.50	0.06-0.2	0.12-0.18	5.1-7.8	High	0.32		
	48-50	---	---	---	---	---	---	----		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
54C2*:										
Summit	0-5	27-45	1.25-1.50	0.2-0.6	0.16-0.20	5.1-7.3	Moderate	0.37	5	1-4
	5-14	32-45	1.35-1.65	0.2-0.6	0.10-0.18	5.6-7.3	High	0.37		
	14-81	40-60	1.35-1.60	0.06-0.2	0.10-0.18	5.6-8.4	High	0.32		
54D2*, 54E2*:										
Newnata	0-4	27-35	1.25-1.60	0.6-2.0	0.10-0.16	5.1-6.5	Low	0.37	3	2-6
	4-18	27-50	1.25-1.55	0.2-0.6	0.12-0.18	5.1-7.8	Moderate	0.37		
	18-48	30-55	1.15-1.50	0.06-0.2	0.12-0.18	5.1-7.8	High	0.32		
	48-50	---	---	---	---	---		----		
Summit	0-5	27-45	1.25-1.50	0.2-0.6	0.16-0.20	5.1-7.3	Moderate	0.37	5	1-4
	5-14	32-45	1.35-1.65	0.2-0.6	0.10-0.18	5.6-7.3	High	0.37		
	14-81	40-60	1.35-1.60	0.06-0.2	0.10-0.18	5.6-8.4	High	0.32		
56CD*, 56EF*:										
Newnata	0-4	27-35	1.25-1.60	0.6-2.0	0.10-0.18	5.1-6.5	Low	0.37	3	2-6
	4-18	27-50	1.25-1.55	0.2-0.6	0.12-0.18	5.1-7.8	Moderate	0.37		
	18-48	30-55	1.15-1.50	0.06-0.2	0.12-0.18	5.1-7.8	High	0.32		
	48-50	---	---	---	---	---		----		
Eden	0-5	27-40	1.45-1.65	0.06-0.6	0.11-0.17	5.6-8.4	Moderate	0.17	3	.5-3
	5-36	40-60	1.45-1.65	0.06-0.2	0.08-0.13	5.6-8.4	Moderate	0.28		
	36-45	---	---	---	---	---		----		
Moko	0-4	27-35	1.25-1.50	0.6-2.0	0.09-0.14	6.6-7.8	Low	0.24	1	2-4
	4-17	18-35	1.25-1.60	0.6-2.0	0.09-0.14	6.6-7.8	Low	0.28		
	17-20	---	---	---	---	---		----		
58C	0-14	12-25	1.30-1.50	0.6-2.0	0.08-0.11	4.5-5.5	Low	0.32	3	1-3
Nixa	14-23	12-25	1.30-1.50	0.6-2.0	0.08-0.16	4.5-5.5	Low	0.32		
	23-37	20-35	1.40-1.65	<0.06	0.07-0.12	4.5-5.5	Low	0.32		
	37-72	30-50	1.30-1.45	<0.06	0.07-0.12	4.5-5.5	Moderate	0.32		
62C, 62DE, 62EF--	0-11	10-25	1.35-1.55	0.6-2.0	0.10-0.14	4.5-6.5	Low	0.28	3	1-3
Noark	11-16	20-40	1.35-1.55	0.6-2.0	0.10-0.14	4.5-5.5	Low	0.28		
	16-35	45-75	1.25-1.40	0.6-2.0	0.08-0.12	4.5-5.5	Low	0.24		
	35-72	45-75	1.25-1.40	0.6-2.0	0.06-0.12	4.5-5.5	Moderate	0.24		
66C	0-17	10-20	1.35-1.45	0.6-2.0	0.16-0.20	4.5-6.0	Low	0.37	5	1-3
Peridge	17-37	18-35	1.30-1.45	0.6-2.0	0.16-0.20	4.5-6.0	Low	0.32		
	37-84	30-60	1.15-1.35	0.6-2.0	0.12-0.22	4.5-6.0	Moderate	0.24		
68C, 68D	0-5	7-20	1.35-1.60	0.6-2.0	0.11-0.15	5.1-6.0	Low	0.24	5	.5-3
Portia	5-14	10-25	1.35-1.60	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.28		
	14-38	18-35	1.35-1.60	0.6-2.0	0.15-0.24	4.5-5.5	Low	0.32		
	38-72	20-40	1.35-1.60	0.6-2.0	0.10-0.17	4.5-5.5	Low	0.32		
70	0-8	10-25	1.35-1.60	0.6-2.0	0.10-0.22	6.1-7.3	Low	0.37	5	2-3
Razort	8-54	18-35	1.35-1.60	0.6-2.0	0.13-0.22	5.6-6.5	Low	0.32		
	54-68	10-25	1.35-1.50	2.0-6.0	0.08-0.12	5.6-6.5	Low	0.32		
72*.										
Riverwash										
73*.										
Rock outcrop										
74B	0-15	27-40	1.45-1.55	0.2-0.6	0.18-0.22	5.6-6.5	Moderate	0.43	5	2-4
Samba	15-72	35-60	1.20-1.50	<0.06	0.12-0.22	5.1-7.3	High	0.37		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
76----------	0-6	15-25	1.10-1.30	0.6-2.0	0.16-0.20	5.6-6.5	Low----------	0.32	4	1-3
Secesh	6-30	20-30	1.20-1.40	0.6-2.0	0.13-0.19	5.1-6.0	Low----------	0.32		
	30-72	25-35	1.20-1.40	0.6-2.0	0.09-0.14	5.1-6.0	Low----------	0.32		
78C----------	0-6	10-27	1.25-1.40	0.6-2.0	0.14-0.18	4.5-5.5	Low----------	0.37	3	.5-2
Sidon	6-22	18-35	1.25-1.40	0.6-2.0	0.13-0.18	4.5-5.5	Low----------	0.32		
	22-72	18-35	1.40-1.60	0.06-0.2	0.11-0.18	4.5-5.5	Low----------	0.32		
80B----------	0-6	10-25	1.30-1.60	0.6-2.0	0.11-0.24	4.5-6.0	Low----------	0.37	5	1-3
Spadra	6-28	10-35	1.30-1.60	0.6-2.0	0.12-0.20	4.5-6.0	Low----------	0.32		
	28-65	15-25	1.30-1.60	0.6-2.0	0.10-0.15	4.5-6.0	Low----------	0.24		
82C2----------	0-5	27-45	1.25-1.50	0.2-0.6	0.16-0.20	5.1-7.3	Moderate-----	0.37	5	1-4
Summit	5-14	32-45	1.35-1.65	0.2-0.6	0.10-0.18	5.6-7.3	High---------	0.37		
	14-81	40-60	1.35-1.60	0.06-0.2	0.10-0.18	5.6-8.4	High---------	0.32		
84----------	0-6	2-12	1.40-1.60	>6.0	0.05-0.11	5.1-6.0	Low----------	0.17	5	.5-1
Wideman	6-51	2-15	1.40-1.60	>6.0	0.06-0.14	5.1-6.5	Low----------	0.17		
	51-72	5-18	1.30-1.50	2.0-6.0	0.06-0.15	5.1-6.5	Low----------	0.17		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "very brief," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
2CD*, 2EF*: Arkana	C	None	---	---	>6.0	---	---	20-45	Hard	High	Moderate.
Moko	D	None	---	---	>6.0	---	---	6-20	Hard	Low	Low.
8C--- Captina	C	None	---	---	2.0-3.0	Perched	Dec-Apr	>60	---	Moderate	High.
10--- Ceda	B	Frequent	Very brief	Dec-Apr	>6.0	---	---	>60	---	Low	Moderate.
12*: Ceda	B	Frequent	Very brief	Dec-Apr	>6.0	---	---	>60	---	Low	Moderate.
Kenn	B	Frequent	Very brief	Dec-Apr	>6.0	---	---	>60	---	Moderate	Moderate.
14F--- Clarksville	B	None	---	---	>6.0	---	---	>60	---	Low	High.
18--- Elsah	B	Frequent	Very brief	Dec-May	>6.0	---	---	>60	---	Low	Moderate.
20C, 20DE, 22CD, 22EF--- Enders	C	None	---	---	>6.0	---	---	40-60	Soft	High	High.
24CD*, 24EF*: Enders	C	None	---	---	>6.0	---	---	40-60	Soft	High	High.
Nella	B	None	---	---	>6.0	---	---	>60	---	Low	Moderate.
28CD*: Estate	C	None	---	---	>6.0	---	---	40-60	Hard	Moderate	Moderate.
Lily--- Udorthents.	B	None	---	---	>6.0	---	---	20-40	Hard	Moderate	High.
28EF*: Estate	C	None	---	---	>6.0	---	---	40-60	Hard	Moderate	Moderate.
Lily--- Udorthents.	B	None	---	---	>6.0	---	---	20-40	Hard	Moderate	High.
30--- Healing	B	Occasional	Very brief to brief.	Dec-Apr	>6.0	---	---	>60	---	Low	Moderate.
32C, 34C, 34D--- Linker	B	None	---	---	>6.0	---	---	20-40	Hard	Low	High.
36C*, 36DE*: Linker	B	None	---	---	>6.0	---	---	20-40	Hard	Low	High.
Mountainburg	D	None	---	---	>6.0	---	---	12-20	Hard	Low	Moderate.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
38EF*:											
Moko	D	None	---	---	>6.0	---	---	6-20	Hard	Low	Low.
Rock outcrop.											
39G*:											
Moko	D	None	---	---	>6.0	---	---	6-20	Hard	Low	Low.
Rock outcrop.											
Eden	C	None	---	---	>6.0	---	---	20-40	Soft	Moderate	Low.
42C	D	None	---	---	>6.0	---	---	12-20	Hard	Low	High.
Mountainburg											
45C	B	None	---	---	>6.0	---	---	40-60	Soft	Low	High.
Nauvoo											
46C, 46DE	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Nella											
48CD	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Nella											
49CD*:											
Nella	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Steprock	B	None	---	---	>6.0	---	---	20-40	Soft	Low	High.
50EF*, 50G*:											
Nella	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Steprock	B	None	---	---	>6.0	---	---	20-40	Soft	Low	High.
Mountainburg	D	None	---	---	>6.0	---	---	12-20	Hard	Low	Moderate.
54C2*, 54D2*, 54E2*:											
Newnata	C	None	---	---	>6.0	---	---	40-60	Hard	High	Moderate.
Summit	C	None	---	---	2.0-3.0	Perched	Dec-Apr	>60	---	High	Low.
56CD*, 56EF*:											
Newnata	C	None	---	---	>6.0	---	---	40-60	Hard	High	Moderate.
Eden	C	None	---	---	>6.0	---	---	20-40	Soft	Moderate	Low.
Moko	D	None	---	---	>6.0	---	---	6-20	Hard	Low	Low.
58C	C	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Nixa											
62C, 62DE, 62EF	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
Noark											
66C	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Peridge											
68C, 68D	C	None	---	---	>6.0	---	---	>60	---	High	High.
Portia											

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
70--Razort	B	Frequent	Very brief to brief.	Jan-Apr	>6.0	---	---	>60	---	Low	Low.
72*. Riverwash											
73*. Rock outcrop											
74B--Samba	D	Rare	---	---	0.5-1.5	Perched	Dec-Apr	>60	---	High	Moderate.
76--Secesh	B	Frequent	Very brief	Dec-Apr	>6.0	---	---	>60	---	Low	Moderate.
78C--Sidon	C	None	---	---	2.0-3.0	Perched	Dec-Apr	40-60	Hard	Moderate	Moderate.
80B--Spadra	B	Rare	---	---	>6.0	---	---	>60	---	Low	High.
82C2--Summit	C	None	---	---	2.0-3.0	Perched	Dec-Apr	>60	---	High	Low.
84--Wideman	A	Frequent	Very brief	Dec-May	>6.0	---	---	>60	---	Low	Low.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
*Arkana	Very fine, mixed, mesic Mollic Hapludalfs
Captina	Fine-silty, siliceous, mesic Typic Fragiudults
Ceda	Loamy-skeletal, siliceous, nonacid, thermic Typic Udifluvents
Clarksville	Loamy-skeletal, siliceous, mesic Typic Paleudults
Eden	Fine, mixed, mesic Typic Hapludalfs
Elsah	Loamy-skeletal, mixed, nonacid, mesic Typic Udifluvents
Enders	Clayey, mixed, thermic Typic Hapludults
Estate	Fine, mixed, mesic Typic Hapludalfs
Healing	Fine-silty, mixed, mesic Typic Argiudolls
Kenn	Fine-loamy, siliceous, thermic Ultic Hapludalfs
Lily	Fine-loamy, siliceous, mesic Typic Hapludults
Linker	Fine-loamy, siliceous, thermic Typic Hapludults
Moko	Loamy-skeletal, mixed, mesic Lithic Hapludolls
Mountainburg	Loamy-skeletal, siliceous, thermic Lithic Hapludults
Nauvoo	Fine-loamy, siliceous, thermic Typic Hapludults
Nella	Fine-loamy, siliceous, thermic Typic Paleudults
Newnata	Fine, mixed, mesic Typic Hapludalfs
Nixa	Loamy-skeletal, siliceous, mesic Glossic Fragiudults
Noark	Clayey-skeletal, mixed, mesic Typic Paleudults
Peridge	Fine-silty, mixed, mesic Typic Paleudalfs
Portia	Fine-loamy, siliceous, mesic Typic Paleudalfs
Razort	Fine-loamy, mixed, mesic Mollic Hapludalfs
Samba	Fine, mixed, thermic Typic Umbraqualfs
*Secesh	Fine-loamy, siliceous, mesic Ultic Hapludalfs
Sidon	Fine-loamy, siliceous, thermic Typic Fragiudults
Spadra	Fine-loamy, siliceous, thermic Typic Hapludults
Steprock	Loamy-skeletal, siliceous, thermic Typic Hapludults
*Summit	Fine, montmorillonitic, thermic Vertic Argiudolls
Wideman	Sandy, siliceous, mesic Typic Udifluvents

NRCS Accessibility Statement

This document is not accessible by screen-reader software. The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at 1-800-457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at http://offices.sc.egov.usda.gov/locator/app.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.