United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
Tennessee Agricultural
Experiment Station

Soil Survey of Fentress and Pickett Counties, Tennessee

How To Use This Soil Survey

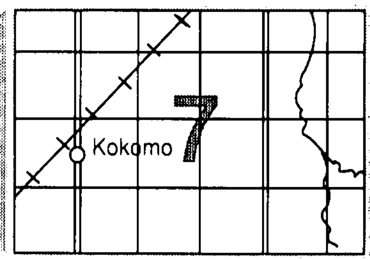
General Soil Map

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.

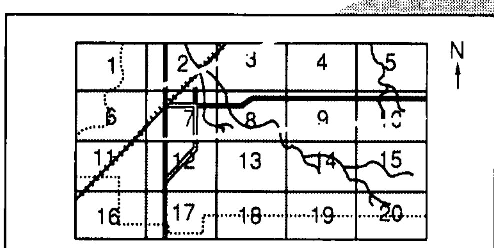
Detailed Soil Maps

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



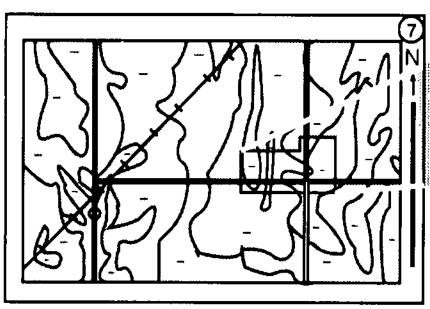
MAP SHEET

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.

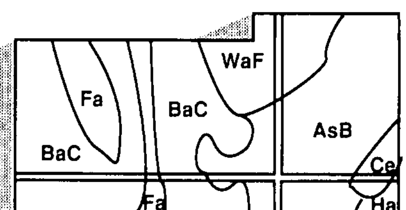


INDEX TO MAP SHEETS

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 1977. Soil names and descriptions were approved in 1985. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1991. This survey was made cooperatively by the Soil Conservation Service and the Tennessee Agricultural Experiment Station. It is part of the technical assistance furnished to the Fentress County Soil Conservation District and the Pickett County Soil Conservation District.

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

All programs of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: An area of the Cumberland Plateau in Fentress County. This area is in the Grimsley-Jefferson-Bouldin general soil map unit.

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BeB—Bewleyville-Dickson complex, 2 to 6 percent slopes 11
BoF—Bouldin stony loam, 25 to 70 percent slopes 12
CbD2—Christian-Baxter complex, 5 to 20 percent slopes, eroded 13
GeF—Grimsley-Jefferson-Rock outcrop complex, 20 to 60 percent slopes 14
GpD2—Gilpin silt loam, 5 to 20 percent slopes, eroded 14
Gu—Guthrie silt loam, 0 to 3 percent slopes, depressional 15
JeE—Jefferson-Ramsey complex, 15 to 35 percent slopes 16
LeC2—Leadvale-Holston complex, 3 to 12 percent slopes, eroded 17
LlC—Lily loam, 3 to 8 percent slopes 18
LoC—Lonewood-Clarkrange complex, 2 to 6 percent slopes 18
OeE—Orthents, steep and very steep 19
RaD—Ramsey-Alticrest-Rock outcrop complex, 5 to 20 percent slopes 19
SaD2—Sequoia silt loam, 5 to 20 percent slopes, eroded 20
Se—Sewanee loam, 0 to 2 percent slopes, occasionally flooded 21
SlE—Shelocta-Sequoia-Petros complex, 10 to 35 percent slopes 21
SnB—Sullivan-Sequatchie-Egam complex, 1 to 6 percent slopes, rarely to occasionally flooded 22
SuF—Sulphura channery silt loam, 20 to 75 percent slopes 23
TaE—Talbott-Rock outcrop complex, 10 to 35 percent slopes 24
WaC2—Waynesboro-Etowah complex, 5 to 12 percent slopes, eroded 25
WaD2—Waynesboro-Etowah complex, 12 to 20 percent slopes, eroded 26
ZeF—Zenith gravelly loam, 20 to 60 percent slopes 27

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Foreword

This soil survey contains information that can be used in land-planning programs in Fentress and Pickett Counties. 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.

Jerry S. Lee
State Conservationist
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Soil Survey of Fentress and Pickett Counties, Tennessee

By Jessie F. Campbell and Darwin L. Newton, Soil Conservation Service

Fieldwork by Jessie F. Campbell and Roy K. Moore, Soil Conservation Service

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

FENTRESS AND PICKETT COUNTIES are in the north-central part of Tennessee (fig. 1). They have a total land area of 419,800 acres, or about 656 square miles. Fentress County has a total land area of 318,700 acres, or about 498 square miles, and Pickett County has a total land area of 101,100 acres, or about 158 square miles. Jamestown, the county seat of Fentress County and its principal town, is about 130 miles northeast of Nashville. Byrdstown, the county seat and only town in Pickett County, is about 15 miles northwest of Jamestown.

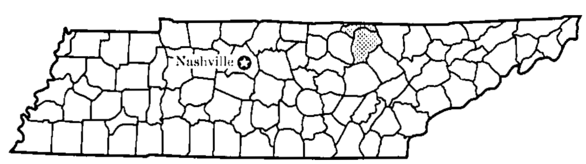

Figure 1.—Location of Fentress and Pickett Counties in Tennessee.

General Nature of the Counties

This section gives general information about Fentress and Pickett Counties. It describes settlement, natural resources, farming, industry, transportation facilities, physiography, and climate.

Settlement

Fentress County was established in 1823 from parts of Overton and Morgan Counties. It was named for James Fentress, the Speaker of the Tennessee House of Representatives from 1823 to 1845. The first settlement was in the valley of the Wolf River. In 1837, the legislature passed an act establishing Jamestown, the county seat. Jamestown, which is near the center of the county, was originally called "Sand Springs" because it once had many natural springs. John Clemens, the father of Mark Twain, began a law practice in Jamestown in 1827. The first courthouse was built in 1828. Jamestown and Allardt are currently the only incorporated municipalities in the county.

By 1920, the population of Fentress County had reached about 10,500 and that of Jamestown about 700. In 1970, the population of the county was 12,593.

Pickett County was established in 1879 from parts of Overton and Fentress Counties. It was named for Howell L. Pickett, who was a State Representative from

Wilson County at that time. Byrdstown, the county seat, was named for Senator Robert K. Byrd, one of the early settlers. By 1920, the population of Pickett County had reached about 5,200 and that of Byrdstown 125. In 1970, the population of the county was 3,774.

Natural Resources

Mining is important in Fentress and Pickett Counties. Coal, stone, and petroleum are the major minerals in the counties. Coal is by far the most abundant. Limestone, sand, and building stone are quarried in the two counties. Fentress County was the first county in Tennessee to produce profitable quantities of crude oil. Coal and oil production has grown considerably since 1970 because of a great number of exploratory mines and wells.

Soil is an important natural resource in the counties. It is a growing medium for cultivated crops, hay, and pasture plants.

In most areas of the two counties, the water supply is adequate for domestic uses and for livestock. The major sources of water are wells, springs, ponds, and lakes. Many farm ponds provide water for farm animals, wildlife, and recreation. Dale Hollow Lake, which has 27,700 acres of surface water and 620 miles of shoreline, provides opportunities for boating, fishing, and other recreational activities.

A large acreage in the counties is forested. The timber resource is used for lumbering, furniture fabrication, charcoal production, and recreation.

Farming

In 1969, farms made up about 26 percent of Fentress County and 52 percent of Pickett County. Fentress County had 691 farms, which averaged 122 acres in size, and Pickett County had 613 farms, which averaged 85 acres in size.

The farms are mainly the general type. Livestock farming and crop production are the most important farm enterprises. In 1976, there were 17,300 head of cattle in Fentress County and 12,000 head in Pickett County. Most of the farmland in the counties is used for pasture or hay. The main pasture plants are tall fescue, lespedeza, and orchardgrass. Snap beans and tobacco are the most important cash crops, but corn, wheat, soybeans, and vegetables also are grown as cash crops. In 1975, tobacco was grown on 190 acres in Fentress County and on 430 acres in Pickett County.

Industry

The major industries in Fentress and Pickett Counties manufacture lumber, apparel, and metal products and process food. Most of these are located in Jamestown and Byrdstown. Lumbering is one of the most important industries in the counties, accounting for 50 percent of all industrial establishments. The largest number of industries employing more than 100 persons are those that manufacture apparel and process food.

Transportation Facilities

The major highways in Fentress County are U.S. Highway 127, which runs north-south through Jamestown; State Highway 52, which runs east-west through Allardt and Jamestown; and State Highway 62, which runs east-west through Clarkrange. The major highways in Pickett County are U.S. Highway 127, which runs north-south through the northern part of the county; State Highway 52, which runs east-west through the southern part of the county; and State Highway 42, which runs north-south through Byrdstown. U.S. Highway 127 connects with Interstate 40 in Crossville, and State Highway 42 connects with Interstate 40 in Cookeville. As a result, Nashville, Knoxville, and Chattanooga are easily accessible.

Two large motor freight lines serve the businesses in the counties. Both provide interstate and intrastate service. Along with other private trucking firms, these freight lines are the most widely used and easily available means of transporting commercial, industrial, and other goods in the two counties.

Physiography

Fentress and Pickett Counties are on the Highland Rim and the Cumberland Plateau. About 15 percent of Fentress County is on the Highland Rim, and 85 percent is on the Cumberland Plateau. About 50 percent of Pickett County is on the Highland Rim, and 50 percent is on the Cumberland Plateau.

The Highland Rim, which is also called the Rimlands and Highlands, is west of the Cumberland Plateau. It extends around and encloses the Central Basin, in which Nashville is located. The Highland Rim is highly diversified with low, rolling hills; upland flats; and wide valleys. For the most part, it appears originally to have been a flat plain, which through long periods of time has been moderately dissected by the many streams flowing through it. Much of the eastern edge of the Highland Rim in Fentress and Pickett Counties is deeply pitted by limestone sinks and marked by some outcrops of limestone. Most of the surface water in this area flows into the sinks and disappears underground. The general elevation of the Highland Rim is about 960 feet above sea level.

The Highland Rim is underlain almost entirely by limestone. Most of the soils on the rim formed in material weathered from the limestone. In the more nearly level areas, however, 1 to 3 feet of loess has been deposited, and the eastern part has thick deposits of alluvium. Most of the soils are well drained, rich in clay, deep over bedrock, low in natural fertility, and responsive to management.

The Cumberland Plateau, which is commonly called the Cumberland Tableland, is an elevated plateau rising to a height of about 2,000 feet above sea level. The general elevation of the plateau is about 1,840 feet above sea level, or about 1,000 feet above the Highland Rim. The plateau is separated from the Highland Rim by rough, steep, rocky slopes, called the Cumberland Plateau Escarpment. The plateau is dominantly undulating and rolling.

All of the Cumberland Plateau is underlain by sandstone and shale. Most of the soils on the plateau formed in material weathered from these rocks. Generally, the soils are well drained, pale colored, loamy, and low in natural fertility. The depth to bedrock ranges from about 1 foot on short hillsides to about 4 to 5 feet on broad, smooth interstream divides. Because of favorable soil properties and a favorable climatic setting, the soils are highly responsive to management. Some of the highest crop yields in the State have been obtained on these soils.

The Cumberland Plateau has deposits of coal and is extensively strip-mined.

Climate

In winter, the valleys in Fentress and Pickett Counties are very cool and have occasional cold and warm spells and the upper slopes and mountaintops are generally cold. In summer, the valleys are usually very warm and are frequently hot and the mountains are warm during the day and cool at night. Precipitation is heavy and is evenly distributed throughout the year. Summer precipitation falls chiefly during thunderstorms. Winter precipitation in the valleys falls mostly as rain but occasionally as snow. Winter precipitation in the mountains generally falls as snow, although rains are frequent. The snow remains on the surface only at the highest elevations.

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

In winter, the average temperature is 37 degrees F and the average daily minimum temperature is 27 degrees. The lowest temperature on record, which occurred at Allardt on January 23, 1963, is -19 degrees. In summer, the average temperature is 72 degrees and the average daily maximum temperature is 84 degrees. The highest recorded temperature, which occurred at Allardt on July 28, 1952, is 102 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 54 inches. Of this, nearly 27 inches, or about 50 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 23 inches. The heaviest 1-day rainfall during the period of record was 4.37 inches at Allardt on December 30, 1969. Thunderstorms occur on about 55 days each year. Heavy rains can occur at any time of the year. They are followed by severe flooding in the valleys.

The average seasonal snowfall is about 20 inches. The greatest snow depth at any one time during the period of record was 15 inches. On an average of 8 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 65 percent of the time possible in summer and 40 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 10 miles per hour, in March.

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 generally devoid of roots and other living organisms and has been little changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and 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 two or three 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.

The soils at the boundaries of the general soil map of this survey area do not in all instances match those of adjacent counties. Differences result from variations in soil patterns or map scales or from recent advances in soil classification.

Soil Descriptions

Undulating to Very Steep Soils That Have a Loamy or Clayey Subsoil; on the Cumberland Plateau

1. Lily-Lonewood-Clarkrange

Moderately deep and very deep, undulating, well drained and moderately well drained soils that have a loamy subsoil

This unit is on undulating uplands in scattered areas throughout Fentress County and in the northeastern part of Pickett County. It is on the smoother part of the Cumberland Plateau. It is marked by many shallow, crooked, V-shaped drainageways, which interrupt an otherwise smooth plateau. Slopes range from 2 to 8 percent.

This unit makes up about 23 percent of the survey area. It is about 60 percent Lily soils, 10 percent Lonewood soils, 10 percent Clarkrange soils, and 20 percent soils of minor extent.

The well drained Lily soils are loamy and have sandstone bedrock at a depth of 20 to 40 inches. They generally are in broad areas dissected by shallow drainageways. Slopes range from 3 to 8 percent.

The well drained Lonewood soils are loamy and have sandstone bedrock at a depth of 40 to 72 inches. They generally are on broad, smooth plateaus. Slopes range from 2 to 6 percent.

The moderately well drained Clarkrange soils are loamy and have a fragipan at a depth of about 2 to 4 feet and sandstone or shale bedrock at a depth of 40 to 90 inches. They generally are on broad, smooth uplands. Slopes range from 2 to 6 percent.

The soils of minor extent in this unit include the shallow, somewhat excessively drained Ramsey soils on short, steep side slopes and the deep, moderately well drained Sewanee soils on flood plains along narrow drainageways.

About 50 percent of this unit has been cleared, and the rest is forested. The cleared areas are used mainly for cultivated crops or pasture.

This unit is suited or well suited to most cultivated crops. It is well suited to pasture and hay. The slope and the hazard of erosion are the main management concerns.

This unit is well suited to woodland.

This unit is suited or poorly suited to most urban uses. The slope, the depth to bedrock, and restricted permeability are the major limitations affecting building site development and septic tank absorption fields.

2. Ramsey-Alticrest-Lily

Shallow and moderately deep, undulating to steep, somewhat excessively drained and well drained soils that have a loamy subsoil

This unit is on undulating to steep uplands in scattered areas throughout Fentress County and in the northeastern part of Pickett County. It is on the steeper part of the Cumberland Plateau, along the larger U-shaped drainageways. Slopes range from 3 to 20 percent.

This unit makes up about 23 percent of the survey area. It is about 35 percent Ramsey soils, 15 percent Alticrest soils, 15 percent Lily soils, and 35 percent soils of minor extent.

The somewhat excessively drained Ramsey soils are loamy and have sandstone bedrock at a depth of 8 to 20 inches. They generally are on the sides of ridges along drainageways and near outcrops of sandstone. Slopes range from 5 to 35 percent.

The well drained Alticrest soils are loamy and have sandstone bedrock at a depth of 20 to 40 inches. They are on steep side slopes along the more prominent drainageways. Slopes range from 5 to 20 percent.

The well drained Lily soils are loamy and have sandstone bedrock at a depth of 20 to 40 inches. They generally are on broad uplands dissected by shallow drainageways. Slopes range from 3 to 8 percent.

The soils of minor extent in this unit include the very deep, well drained Jefferson soils on toe slopes and in concave areas and the deep, moderately well drained Sewanee soils on flood plains along narrow drainageways.

About 25 percent of this unit has been cleared, and the rest is forested. The cleared areas are used mainly for pasture or hay.

This unit is poorly suited to cultivated crops but is suited to pasture and hay. The slope, the hazard of erosion, and the depth to bedrock are the major management concerns.

This unit is suited or poorly suited to woodland. The depth to bedrock is the major limitation.

This unit is poorly suited to most urban uses. The slope and the depth to bedrock are the major limitations affecting building site development and septic tank absorption fields.

3. Grimsley-Jefferson-Bouldin

Deep and very deep, hilly to very steep, well drained, stony soils that have a loamy subsoil

This unit is on hilly to very steep uplands in scattered areas throughout the western half of Fentress County and in the eastern part of Pickett County. It is in deep mountain gorges and on the steep and very steep side slopes of the Cumberland Plateau Escarpment. Slopes range from 15 to 70 percent.

This unit makes up about 21 percent of the survey area. It is about 30 percent Grimsley soils, 30 percent Jefferson soils, 15 percent Bouldin soils, and 25 percent soils of minor extent.

The Grimsley soils are loamy and have shale bedrock at a depth of 40 to 60 inches. They are on the upper half of the mountainsides. Slopes range from 20 to 60 percent.

The Jefferson soils are loamy and have bedrock at a depth of more than 5 feet. They are on the middle part of the mountainsides, below the Grimsley soils. Slopes range from 15 to 60 percent.

The Bouldin soils are loamy and have bedrock at a depth of more than 5 feet. They are on the lower half of the mountainsides, below the Grimsley soils. Slopes range from 25 to 70 percent.

The soils of minor extent in this unit include the deep, well drained Zenith soils on northern exposures and the moderately deep, well drained Talbott soils near outcrops of limestone bedrock on the lowermost slopes. Zenith soils have a dark surface layer.

Nearly all of this unit is forested, except for a few old fields that have been abandoned. The forest consists of mixed hardwoods and pine.

This unit is generally unsuited to most agricultural uses. The slope and large stones are the major management concerns.

This unit is suited to woodland. The slope and large stones are the major limitations.

This unit is poorly suited to most urban uses. The slope and large stones are the major limitations affecting building site development and septic tank absorption fields.

4. Gilpin-Shelocta

Moderately deep and deep, rolling to steep, well drained soils that have a loamy subsoil

This unit is on rolling to steep uplands in areas on the Cumberland Plateau in the western and eastern parts of Fentress County and in the eastern part of Pickett County. It is on low hills and side slopes underlain by shale bedrock. The hilltops generally are rounded, and the side slopes are steep. Slopes range from 5 to 35 percent.

This unit makes up about 5 percent of the survey area. It is about 50 percent Gilpin soils, 20 percent Shelocta soils, and 30 percent soils of minor extent.

The Gilpin soils are loamy and have sandstone bedrock at a depth of 20 to 40 inches. They generally are higher in elevation than the Shelocta soils and are less steep. They are mainly on ridgetops. Slopes range from 5 to 20 percent.

The Shelocta soils are loamy and have bedrock at a depth of more than 48 inches. They are on hilly side slopes. Slopes range from 10 to 35 percent.

The soils of minor extent in this unit include the shallow, excessively drained Petros soils on convex slopes and the moderately deep, well drained Sequoia soils on ridgetops and short side slopes.

About 20 percent of this unit has been cleared, and the rest is forested. The cleared areas are used mainly as pasture, but a few are used for cultivated crops.

This unit is poorly suited to cultivated crops but is suited to pasture and hay. The slope and the hazard of erosion are the major management concerns.

This unit is suited to woodland.

This unit is poorly suited to most urban uses. The slope and the depth to bedrock are the major limitations affecting building site development and septic tank absorption fields.

5. Talbott-Rock Outcrop

Rock outcrop and moderately deep, rolling to steep, well drained soils that have a clayey subsoil

This unit is on rolling to steep uplands in scattered areas throughout the northwestern part of Fentress County and the central part of Pickett County. It is on the steep foot slopes of the Cumberland Mountain and the rolling, low hills that are above the surrounding Highland Rim. Slopes range from 10 to 35 percent.

This unit makes up about 7 percent of the survey area. It is about 35 percent Talbott soils, 35 percent outcrops of limestone, and 30 percent soils of minor extent.

The Talbott soils are clayey and have limestone bedrock at a depth of 20 to 40 inches. They are between ledges of limestone and along the side of limestone exposures in hilly areas. Slopes range from 10 to 35 percent.

The Rock outcrop consists of limestone bedrock that is nearly level with the surface to about 3 feet high.

The soils of minor extent in this unit include the very deep, well drained Bouldin soils on concave slopes and the very deep, well drained Etowah and Waynesboro soils on the less sloping parts of the landscape.

About 20 percent of this unit has been cleared, and the rest is forested. The cleared areas are used mainly as pasture.

This unit is generally unsuited to most cultivated crops. It is poorly suited to pasture and hay. The slope and the Rock outcrop are the major management concerns.

This unit is suited or poorly suited to woodland. The Rock outcrop in the major limitation.

This unit is poorly suited to most urban uses. The slope, the depth to bedrock, and slow permeability are the major limitations affecting building site development and septic tank absorption fields.

Undulating to Very Steep Soils That Have a Loamy or Clayey Subsoil; on the Highland Rim

6. Waynesboro-Etowah-Christian

Very deep, undulating to hilly, well drained soils that have a loamy or clayey subsoil

This unit is on undulating to hilly uplands in scattered areas throughout the northwestern part of Fentress County and in the central part of Pickett County. It is on the more rolling part of the Highland Rim. It is marked by many shallow potholes and sinks. Slopes range from 5 to 20 percent.

This unit makes up about 11 percent of the survey area. It is about 25 percent Waynesboro soils, 25 percent Etowah soils, 15 percent Christian soils, and 35 percent soils of minor extent.

The Waynesboro soils are loamy and clayey and have bedrock at a depth of more than 5 feet. They are on convex slopes. Slopes range from 5 to 20 percent.

The Etowah soils are loamy and clayey and have bedrock at a depth of more than 5 feet. They generally have a few more chert fragments than the Waynesboro soils. Also, they typically are slightly higher in elevation. They are mainly on concave slopes. Slopes range from 5 to 20 percent.

The Christian soils are loamy and clayey and have bedrock at a depth of more than 5 feet. They are on side slopes adjacent to and generally below areas of the Waynesboro and Etowah soils. Slopes range from 5 to 20 percent.

The soils of minor extent in this unit include the very deep, moderately well drained Dickson soils on undulating ridgetops and the very deep, well drained Sullivan soils on flood plains along drainageways.

About 80 percent of this unit has been cleared, and the rest occurs as small tracts of forest. The cleared areas are used mainly for pasture or cultivated crops.

This unit is suited or poorly suited to row crops. It is suited or well suited to pasture and hay. The slope and the hazard of erosion are the major management concerns.

This unit is well suited to woodland.

This unit is suited or poorly suited to most urban uses. The slope and the clayey subsoil are the major limitations affecting building site development and septic tank absorption fields.

7. Sulphura-Christian-Baxter

Moderately deep and very deep, rolling to very steep, somewhat excessively drained and well drained soils that have a loamy or clayey subsoil

This unit is on rolling to very steep uplands in the northwestern part of Fentress County and in the central part of Pickett County. It is on the most dissected part of the Highland Rim. It parallels the major streams that drain into Dale Hollow Lake. Slopes range from 5 to 75 percent.

This unit makes up about 9 percent of the survey area. It is about 35 percent Sulphura soils, 30 percent Christian soils, 15 percent Baxter soils, and 20 percent soils of minor extent.

The somewhat excessively drained Sulphura soils are loamy and have shale bedrock at a depth of 20 to 40 inches. They are on the steeper, lower side slopes along major drainageways. Slopes range from 20 to 75 percent.

The well drained Christian soils are loamy and clayey and have limestone bedrock at a depth of more than 5 feet. They are higher in elevation than the Sulphura soils and are less steep. They are on hills, the upper short side slopes, and narrow ridgetops. Slopes range from 5 to 20 percent.

The well drained Baxter soils are loamy and clayey and have limestone bedrock at a depth of more than 6 feet. They are on hills, the upper short side slopes, and narrow ridgetops. Slopes range from 5 to 20 percent.

The soils of minor extent in this unit include the very deep, well drained Waynesboro soils on ridgetops; the very deep, moderately well drained Leadvale soils on toe slopes; and the very deep, well drained Sullivan soils on narrow flood plains.

About 40 percent of this unit has been cleared, and the rest is forested. The cleared areas are used mainly for pasture or hay. A few small areas are used for cultivated crops.

This unit is poorly suited or unsuited to cultivated crops. It is suited, poorly suited, or unsuited to pasture and hay. The slope of all the major soils and a low available water capacity in the Sulphura soils are the major management concerns.

This unit is poorly suited or suited to woodland. The slope is the main limitation.

This unit is suited or poorly suited to most urban uses. The slope is the major limitation affecting building site development and septic tank absorption fields.

Nearly Level to Undulating Soils That Have a Loamy Subsoil; on Flood Plains and Low Terraces

8. Sullivan-Sequatchie-Egam

Very deep, nearly level to undulating, well drained and moderately well drained soils that have a loamy subsoil

This unit is on nearly level to undulating flood plains and low terraces in the valley of the Wolf River in Fentress and Pickett Counties. It is along the Wolf River and its tributaries. Slopes range from 1 to 6 percent.

This unit makes up about 1 percent of the survey area. It is about 40 percent Sullivan soils, 25 percent Sequatchie soils, 25 percent Egam soils, and 10 percent soils of minor extent.

The well drained Sullivan soils are loamy and have bedrock at a depth of more than 6 feet. They are on flood plains. Slopes are 1 to 2 percent.

The well drained Sequatchie soils are loamy and have bedrock at a depth of more than 5 feet. They are on low terraces. They generally are slightly higher in elevation and more rolling than the Sullivan soils. Slopes range from 1 to 6 percent.

The moderately well drained Egam soils are clayey and have bedrock at a depth of more than 6 feet. They are on toe slopes and flood plains. Slopes range from 1 to 3 percent.

The soils of minor extent in this unit include the very deep, well drained Waynesboro and Etowah soils on the higher terraces.

Most of the acreage in this unit has been cleared and is used for cultivated crops or hay. Some areas are used as pasture.

This unit is well suited to cultivated crops, pasture, and hay. Flooding is the major hazard.

This unit is well suited to woodland.

This unit is poorly suited to most urban uses. Flooding is the major hazard.

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 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 the heading "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, 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, Lily loam, 3 to 8 percent slopes, is a phase of the Lily 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. Lonewood-Clarkrange complex, 2 to 6 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. An example is the Rock outcrop in the Grimsley-Jefferson-Rock outcrop complex, 20 to 60 percent slopes. 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.

The soils at the boundaries of the detailed soil maps of this survey area do not in all instances match those of adjacent counties. Differences result from variations in soil patterns or map scales or from recent advances in soil classification.

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 suitability for many uses. The "Glossary" defines many of the terms used in describing the soils.

Soil Descriptions

ArD—Arents, loamy, 2 to 20 percent slopes. These soils are in areas where material above coal seams was removed before open pit mining. These areas have been restored to approximately the contour that existed before mining. They occur as a network of narrow, rolling ridgetops and side slopes, dominantly south and east of Jamestown, in Fentress County. The soils are underlain by acid sandstone and shale bedrock. They generally have been seeded to a grass-legume mixture. Hardwoods are beginning to grow in some areas because of natural forest seeding.

No capability subclass is assigned.

BeB—Bewleyville-Dickson complex, 2 to 6 percent slopes. This unit consists of a very deep, well drained Bewleyville soil and a very deep, moderately well drained Dickson soil. The unit is on broad, undulating ridges on the Highland Rim, dominantly in the western part of Pickett County. The Bewleyville soil is in the more sloping areas, and the Dickson soil is on the smoother slopes. Both soils formed in a mantle of loess and in the underlying old alluvium or limestone residuum. The Dickson soil has a fragipan. Individual areas are about 40 percent Bewleyville soil and 40 percent Dickson soil. The two soils occur as areas so intermingled that mapping them separately is not practical at the scale used.

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

Surface layer:
0 to 7 inches, brown silt loam

Subsoil:
7 to 15 inches, strong brown silt loam
15 to 30 inches, yellowish red silty clay loam
30 to 36 inches, red silty clay loam
36 to 72 inches, dark red clay

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

Surface layer:
0 to 7 inches, brown silt loam

Subsoil:
7 to 28 inches, yellowish brown silt loam that has pale brown and light brownish gray mottles at a depth of about 24 inches
28 to 38 inches, mottled light brownish gray, yellowish brown, and strong brown silt loam
38 to 60 inches, yellowish red clay

Included in this unit in mapping are a few small areas of the poorly drained Guthrie and well drained Waynesboro soils. Guthrie soils are in depressions, and Waynesboro soils are in scattered areas throughout the unit.

Important soil properties—

Permeability: Bewleyville—moderate; Dickson—moderate above the fragipan and slow or moderately slow in the fragipan
Available water capacity: Bewleyville—high; Dickson—moderate
Soil reaction: Strongly acid or very strongly acid throughout the profile, except for the surface layer in limed areas
Flooding: None
Hazard of erosion: Moderate
Water table: Bewleyville—none; Dickson—perched at a depth of 2 to 3 feet
Depth to bedrock: More than 6 feet

Most areas have been cleared and are used for cultivated crops or pasture.

These soils are suited or well suited to row crops, pasture, and hay. The hazard of erosion is the major management concern. High yields can be obtained on the Bewleyville soil and moderate or high yields on the Dickson soil. Most of the cultivated areas are used for corn or tobacco. The suitability for alfalfa and tobacco is limited on the Dickson soil because the fragipan perches water during wet periods and restricts root growth. Minimum tillage, crop residue management, and cover crops increase the rate of water infiltration, slow runoff, and help to control erosion. Contour terraces, grassed waterways, and contour farming help to control erosion in clean-cultivated areas.

These soils are suited or well suited to woodland. The dominant overstory is oak-hickory, including white, black, southern red, northern red, scarlet, and chestnut oaks. Other overstory trees are shortleaf pine, Virginia pine, white pine, loblolly pine, and yellow-poplar. Most of the wooded areas are too small to stimulate much management interest. Because the fragipan in the Dickson soil restricts root growth, the hazard of windthrow is the major management concern. The hazard generally is highest during wet periods. Managing for an uneven-aged stand or harvesting by area selection methods can reduce this hazard.

These soils are suited or poorly suited to most urban uses. The clayey subsoil in the Bewleyville soil and the wetness caused by the fragipan in the Dickson soil are limitations affecting building site development and septic tank absorption fields. These limitations generally can be overcome by proper design and careful construction.

The capability subclass is IIe.

BoF—Bouldin stony loam, 25 to 70 percent slopes. This very deep, well drained soil is on the steep and very steep lower side slopes of gorges in the Cumberland Mountains, dominantly in the northern and eastern parts of Fentress County. The soil formed in colluvium derived from acid sandstone.

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

Surface layer:
0 to 9 inches, very dark grayish brown and brown stony loam

Subsoil:
9 to 14 inches, strong brown very stony loam
14 to 25 inches, yellowish red very stony clay loam
25 to 60 inches, yellowish red extremely stony clay loam
60 to 90 inches, yellowish red extremely stony loam

Included in this unit in mapping are scattered areas of a soil that has more clay than the Bouldin soil, has a redder subsoil, and is 20 to 40 inches deep over bedrock. Also included are scattered small areas of a soil that is red, loamy, and virtually free of rock fragments and a few areas of limestone outcrops.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: Low
Soil reaction: Strongly acid or very strongly acid
Flooding: None
Hazard of erosion: Severe in exposed areas
Water table: None within a depth of 6 feet
Depth to bedrock: More than 5 feet

Almost all areas support mixed hardwoods. Because of the slope and the stoniness, this soil is generally unsuited to row crops, pasture, and hay. It is suited to woodland. Many areas have good stands of high-quality trees. The dominant overstory trees are yellow-poplar and northern red oak. Other overstory trees are shortleaf pine, Virginia pine, chinkapin oak, cucumber magnolia, basswood, beech, shagbark hickory, black walnut, white oak, sugar maple, and southern red oak. Understory trees and shrubs include dogwood, redbud, grapevine, greenbrier, and eastern redcedar. The major management concern is large stones on the surface, which limit the use of equipment. Operating wheeled equipment on the steep and very steep, stony slopes is hazardous. The hazard of erosion and plant competition are additional management concerns.

This soil is poorly suited to most urban uses. Building site development, septic tank absorption fields, and road construction are limited by the slope and the hazard of slippage.

The capability subclass is VIIs.

CbD2—Christian-Baxter complex, 5 to 20 percent slopes, eroded. These very deep, well drained soils are on narrow, rolling and hilly ridgetops and side slopes on the Highland Rim, dominantly in the central and western parts of Pickett County. The Christian soil is on the more sloping parts of the unit, and the Baxter soil is generally on the highest parts, near the crest of the ridges. Both soils formed in material weathered from limestone that has some seams and pockets of siltstone, sandstone, shale, and chert. Individual areas are about 60 percent Christian soil and 30 percent Baxter soil. The two soils occur as areas so intermingled that mapping them separately is not practical at the scale used.

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

Surface layer:
0 to 5 inches, brown silt loam

Subsoil:
5 to 14 inches, yellowish red silty clay loam
14 to 48 inches, yellowish red clay

Substratum:
48 to 65 inches, mottled red, brownish yellow, and pale yellow clay

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

Surface layer:
0 to 5 inches, brown gravelly silt loam

Subsoil:
5 to 15 inches, strong brown gravelly silty clay loam
15 to 70 inches, red gravelly clay

Included in this unit in mapping are scattered areas where the soils are not eroded and scattered areas where they are severely eroded and have a surface layer of reddish silty clay loam or silty clay or of yellowish red cherty silty clay loam or cherty clay. Also included are some areas where limestone crops out around depressions and sinks.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Soil reaction: Strongly acid or very strongly acid throughout the profile, except for the surface layer in limed areas
Flooding: None
Hazard of erosion: Severe
Water table: None
Depth to bedrock: Christian—more than 70 inches; Baxter—more than 5 feet

Most areas have been cleared and are used for pasture or hay. Some areas on narrow ridge crests and the steepest parts of the unit are forested, mainly with mixed stands of oaks and hickory.

These soils are poorly suited or unsuited to row crops but are suited to pasture and hay. The slope, the clayey subsoil, and the hazard of erosion are the major management concerns. Minimum tillage, crop residue management, cover crops, and inclusion of grasses and legumes in the cropping system increase the rate of water infiltration and help to control runoff and erosion. Contour terraces, grassed waterways, debris basins, and contour farming help to control erosion in clean-cultivated areas.

These soils are suited to woodland. The dominant overstory trees are white oak, black oak, southern red oak, northern red oak, scarlet oak, and chestnut oak. Other overstory trees are shortleaf pine, Virginia pine, white pine, loblolly pine, eastern redcedar, and some yellow-poplar. Many cull trees are in the oak-hickory forests on this unit because of continuous high grading and past fires. The hazard of erosion, the equipment limitation, and plant competition are the major management concerns. Minimizing disturbance of the forest litter reduces the hazard of erosion. Operating wheeled vehicles in the steeper areas is hazardous. Site preparation and maintenance can help to control competing vegetation.

These soils are suited or poorly suited to most urban uses. Building site development, septic tank absorption fields, and road construction are limited by the slope and the clayey subsoil.

The Baxter soil is in capability subclass IVe. The Christian soil is in capability subclass VIe.

GeF—Grimsley-Jefferson-Rock outcrop complex, 20 to 60 percent slopes. This unit consists of a deep, well drained Grimsley soil; a very deep, well drained Jefferson soil; and sandstone cliffs. It is in steep and very steep mountain gorges that formed when streams cut into the Cumberland Plateau from the Highland Rim. The unit is dominantly in the eastern part of Fentress County. The Grimsley soil is in areas directly below the sandstone bluffs, which are on the uppermost parts of the unit. The Jefferson soil is on the lower slopes below the Grimsley soil. Both soils formed in colluvium derived from acid sandstone. Individual areas are about 60 percent Grimsley soil, 30 percent Jefferson soil, and 5 percent Rock outcrop. The two soils and the Rock outcrop occur as areas so intermingled that mapping them separately is not practical at the scale used.

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

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

Subsoil:
8 to 17 inches, brown very cobbly loam
17 to 26 inches, strong brown very cobbly loam
26 to 39 inches, strong brown very cobbly clay loam
39 to 47 inches, strong brown very cobbly loam
47 to 57 inches, strong brown very cobbly clay loam

Bedrock:
57 inches, soft shale

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

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

Subsoil:
6 to 24 inches, strong brown clay loam
24 to 60 inches, strong brown and yellowish brown gravelly clay loam

The Rock outcrop consists of nearly vertical sandstone cliffs that are 40 to 50 feet thick. It is nearly bare of vegetation, except for a few small trees in the cracks of the rock.

Included in this unit in mapping are a few small areas of a soil that has more sand than the Grimsley and Jefferson soils. This soil is in scattered areas throughout the unit. Also included are areas of the shallow, somewhat excessively drained Ramsey soils near the Grimsley soil.

Important properties of the Grimsley and Jefferson soils—

Permeability: Moderately rapid
Available water capacity: Grimsley—low; Jefferson—moderate
Soil reaction: Strongly acid or very strongly acid
Flooding: None
Hazard of erosion: Severe in exposed areas
Water table: None
Depth to bedrock: Grimsley—40 to 60 inches; Jefferson—more than 6 feet

Virtually all areas support mixed hardwoods. Mainly because of the slope and the Rock outcrop, this unit is generally unsuited to row crops, pasture, and hay. It is suited to woodland. The dominant overstory trees are northern red oak, scarlet oak, yellow-poplar, white oak, shagbark hickory, black oak, elm, red maple, mockernut hickory, and some shortleaf pine and hemlock. Where the overstory canopy is dense, old fields are naturally seeded to yellow-poplar and shortleaf pine. Because of the slope, the hazard of erosion and the equipment limitation are the major management concerns. Minimizing disturbance of the forest litter reduces the hazard of erosion. Operating wheeled equipment on the steep and very steep slopes is hazardous. Seedling mortality is an additional management concern.

The Grimsley and Jefferson soils are poorly suited to most urban uses because of the slope and the stoniness.

The Grimsley soil is in capability subclass VIIs. The Jefferson soil is in capability subclass VIIe.

GpD2—Gilpin silt loam, 5 to 20 percent slopes, eroded. This moderately deep, well drained soil is on small, rounded hills and narrow ridges on the Cumberland Plateau. It is on a network of rolling and hilly ridges and hills dissected by streams that have cut back from the deep mountain gorges scattered dominantly throughout the western and central parts of Fentress County. The soil formed in material weathered from acid shale, siltstone, and sandstone.

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

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

Subsoil:
6 to 13 inches, yellowish brown channery silt loam
13 to 30 inches, yellowish brown channery silty clay loam

Bedrock:
30 inches, shale and siltstone

Included in this unit in mapping are a few areas of a soil that is more than 40 inches deep over bedrock. Also included are areas of a soil that has more sand in the subsoil than the Gilpin soil. Included soils are in scattered areas throughout the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Soil reaction: Strongly acid to extremely acid throughout the profile, except for the surface layer in limed areas
Flooding: None
Hazard of erosion: Severe in exposed areas
Water table: None
Depth to bedrock: 20 to 40 inches

Most areas support hardwoods. A few small areas have been cleared and are used mainly as pasture. A few of the cleared areas are used for truck crops.

This soil is poorly suited to row crops but is suited to pasture and hay. The slope, the depth to bedrock, and the hazard of erosion are the major management concerns. As soil is removed by erosion, the depth to bedrock and the rooting depth are reduced. Minimum tillage, crop residue management, cover crops, and inclusion of grasses and legumes in the cropping system increase the rate of water infiltration and help to control runoff and erosion. Contour terraces, grassed waterways, debris basins, and contour farming help to control erosion in clean-cultivated areas.

This soil is suited to woodland. The dominant forest overstory consists of mixed pine and hardwoods or of hardwoods alone. A few old fields have pure stands of shortleaf pine. The dominant species are shortleaf pine, Virginia pine, white oak, scarlet oak, chestnut oak, northern red oak, yellow-poplar, mockernut hickory, pignut hickory, blackgum, and red maple. Understory trees and shrubs include dogwood, huckleberry, greenbrier, and seedlings of the overstory trees. The ground cover is very limited because of a dense forest canopy. The hazard of erosion, the equipment limitation, and plant competition are the major management concerns. Minimizing disturbance of the forest litter reduces the hazard of erosion. Operating wheeled equipment in the steeper areas is hazardous. Site preparation and maintenance can help to control competing vegetation.

This soil is poorly suited to most urban uses. Building site development and septic tank absorption fields are limited by the depth to bedrock and the slope.

The capability subclass is IVe.

Gu—Guthrie silt loam, 0 to 3 percent slopes, depressional. This very deep, poorly drained soil is in depressions on the Highland Rim, dominantly in the western part of Pickett County. The soil formed loess or alluvium.

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

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

Subsoil:
7 to 42 inches, gray silt loam that has yellowish brown, brownish yellow, and yellowish red mottles
42 to 52 inches, mottled gray, pale brown, and yellowish red silt loam
52 to 65 inches, gray and mottled gray, yellowish brown, dark gray, and yellowish red silty clay loam

Included in this unit in mapping are areas of a soil that is somewhat poorly drained. This soil is in scattered areas throughout the unit.

Important soil properties—

Permeability: Slow
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid throughout the profile, except for the surface layer in limed areas
Flooding: None
Ponding: Likely to occur after periods of heavy rainfall
Hazard of erosion: None
Water table: At or above the surface
Depth to bedrock: More than 6 feet

About half of the areas have been cleared and are used mainly for pasture or hay. The rest are forested with mixed stands of oaks, gum, and red maple.

This soil is generally unsuited to row crops because of the high water table and the ponding. Most areas do not have suitable outlets for drainage. Where suitable outlets are available, the soil responds fairly well to surface drainage systems and other management practices and is suited to pasture and hay.

This soil is suited to woodland. The dominant overstory is oak-maple, including white, black, scarlet, and willow oaks. Many cull trees are in the oak forest on this unit because of continuous high grading. Because of the high water table, the equipment limitation, seedling mortality, and plant competition are the major management concerns. Using heavy equipment during wet periods can result in rutting and compaction. Harvesting only during dry periods and using low-pressure ground equipment minimize damage to the surface layer. The seedling mortality rate may be high because of the poor aeration resulting from wetness. Special site preparation, such as installing a surface drainage system and bedding, can increase the seedling survival rate and the rate of early plant growth. Site preparation and maintenance can help to control competing vegetation. The hazard of windthrow is an additional management concern.

This soil is poorly suited to urban uses. Building site development, septic tank absorption fields, and road construction are limited mainly by the ponding.

The capability subclass is Vw.

JeE—Jefferson-Ramsey complex, 15 to 35 percent slopes. This unit consists of a very deep, well drained Jefferson soil and a shallow, somewhat excessively drained Ramsey soil. The unit is on long, hilly and steep slopes that form V-shaped valleys and the upper gorges of the Cumberland Plateau. It is in scattered areas throughout Fentress County and in the western part of Pickett County. The Jefferson soil is on the lower slopes below the Ramsey soil. The Jefferson soil formed in colluvium weathered from acid sandstone, and the Ramsey soil formed in material weathered from acid sandstone. Individual areas are about 65 percent Jefferson soil and 30 percent Ramsey soil. The two soils occur as areas so intermingled that mapping them separately is not practical at the scale used.

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

Surface layer:

0 to 6 inches, very dark grayish brown and brown loam

Subsoil:

6 to 24 inches, strong brown clay loam

24 to 60 inches, strong brown and yellowish brown gravelly clay loam

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

Surface layer:

0 to 6 inches, very dark grayish brown and brown loam

Subsoil:

6 to 18 inches, yellowish brown channery loam

Bedrock:

18 inches, hard sandstone

Included in this unit in mapping are a few scattered areas of a soil that has bedrock at a depth of 20 to 40 inches. Also included are scattered areas of soils that have a high content of stones and a few areas of rock outcrop.

Important soil properties—

Permeability: Jefferson—moderately rapid; Ramsey—rapid
Available water capacity: Jefferson—moderate; Ramsey—very low
Soil reaction: Strongly acid or very strongly acid
Flooding: None
Hazard of erosion: Severe in exposed areas
Water table: None
Depth to bedrock: Jefferson—more than 6 feet; Ramsey—8 to 20 inches

Most areas support mixed hardwoods. A few areas of the Jefferson soil on the lower slopes have been cleared and are used as pasture. Many of the cleared areas have reverted to trees, dominantly yellow-poplar.

These soils are generally unsuited to row crops. The slope of both soils and the depth to bedrock in the Ramsey soil are the major limitations. The Jefferson soil is suited to pasture and hay, but the Ramsey soil is poorly suited.

The Jefferson soil is well suited to woodland, but the Ramsey soil is poorly suited. The dominant overstory trees on the Jefferson soil include yellow-poplar, northern red oak, shagbark hickory, white oak, black oak, mockernut hickory, sugar maple, and red maple. They also include some black walnut and hemlock on the lowest part of the slopes. The understory consists of small trees of the overstory species. Areas where the overstory is dense support very little herbaceous vegetation. Old fields are naturally seeded to yellow-poplar, shortleaf pine, and Virginia pine.

The dominant overstory trees on the Ramsey soil are mixed shortleaf pine, Virginia pine, scarlet oak, chestnut oak, white oak, and red maple. Mountain laurel and huckleberry are dominant in the understory. Because of the depth to bedrock in the Ramsey soil, the hazard of windthrow is the major management concern. The hazard generally is highest during wet periods. Managing for an uneven-aged stand or harvesting by area selection methods can reduce this hazard. The hazard of erosion, the equipment limitation, seedling mortality, and plant competition are additional management concerns.

These soils are poorly suited to most urban uses. Building site development, septic tank absorption fields, and road construction are limited by the slope of the Jefferson soil and the depth to bedrock in the Ramsey soil.

The Jefferson soil is in capability subclass VIe. The Ramsey soil is in capability subclass VIIe.

LeC2—Leadvale-Holston complex, 3 to 12 percent slopes, eroded. This unit consists of a very deep, moderately well drained Leadvale soil and a very deep, well drained Holston soil. The unit is on undulating to rolling toe slopes and stream terraces around Dale Hollow Lake, in Pickett County. It is below the steep escarpment of the Highland Rim. The Leadvale soil is on the smoother slopes, and the Holston soil is in the more sloping areas. Both soils formed in old alluvium or colluvium derived from uplands underlain mainly by acid shale, siltstone, and sandstone. The Leadvale soil has a fragipan. Individual areas are about 40 percent Leadvale soil and 40 percent Holston soil. The two soils occur as areas so intermingled that mapping them separately is not practical at the scale used.

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

Surface layer:
0 to 6 inches, brown silt loam

Subsoil:
6 to 24 inches, yellowish brown silt loam
24 to 32 inches, mottled yellowish brown, strong brown, and light brownish gray silty clay loam
32 to 54 inches, mottled pale brown, light brownish gray, and yellowish brown silty clay loam

Substratum:
54 to 75 inches, brownish yellow silty clay loam that has yellowish brown and gray mottles

Bedrock:
75 inches, soft shale

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

Surface layer:
0 to 7 inches, brown loam

Subsoil:
7 to 12 inches, yellowish brown loam
12 to 30 inches, yellowish brown clay loam
30 to 60 inches, strong brown clay loam

Included in this unit in mapping are a few areas of soils that are not eroded and some areas of soils that are severely eroded. Included soils are in scattered areas throughout the unit.

Important soil properties—

Permeability: Leadvale—moderately slow or slow; Holston—moderate
Available water capacity: Leadvale—moderate; Holston—high
Soil reaction: Strongly acid or very strongly acid throughout the profile, except for the surface layer in limed areas
Flooding: None
Hazard of erosion: Severe
Water table: Leadvale—perched at a depth of 2 to 3 feet; Holston—none
Depth to bedrock: Leadvale—4 to more than 8 feet; Holston—more than 5 feet

Most areas have been cleared and are used as recreational areas around Dale Hollow Lake. Some of the cleared areas have reverted to forest. A few small areas are used for row crops or pasture.

These soils are suited to row crops, pasture, and hay. The slope and the hazard of erosion in the steeper areas are the major management concerns. Erosion is a severe hazard if cultivated crops are grown. Minimum tillage, crop residue management, cover crops, and inclusion of grasses and legumes in the cropping system increase the rate of water infiltration and help to control runoff and erosion. Contour terraces help to control erosion in clean-cultivated areas.

These soils are suited to woodland. The dominant overstory is oak-hickory, including white, black, southern red, northern red, scarlet, and chestnut oaks. Other overstory trees are Virginia pine, shortleaf pine, white pine, loblolly pine, and some yellow-poplar. Because the fragipan in the Leadvale soil restricts root growth, the hazard of windthrow is the major management concern. The hazard generally is highest during wet periods. Managing for an uneven-aged stand or harvesting by area selection methods can reduce this hazard. The hazard of erosion and plant competition are additional management concerns.

The Holston soil is well suited to most urban uses, but the Leadvale soil is poorly suited. Building site development and septic tank absorption fields are limited by the perched water table above the fragipan in the Leadvale soil. Areas of this unit generally are small and cannot be easily accessed.

The capability subclass is IIIe.

LlC—Lily loam, 3 to 8 percent slopes. This moderately deep, well drained soil is on narrow, undulating ridgetops and side slopes on the Cumberland Plateau. It is in scattered areas, dominantly throughout Fentress County. The soil formed in material weathered from acid sandstone.

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

Surface layer:
0 to 6 inches, dark grayish brown and brown loam

Subsoil:
6 to 22 inches, yellowish brown loam
22 to 31 inches, yellowish brown clay loam
31 to 36 inches, yellowish brown sandy clay loam

Bedrock:
36 inches, hard sandstone

Included in this unit in mapping are a few areas of a soil that has a fragipan at a depth of about 24 inches. Also included is a soil that has a dark surface layer and is more sandy throughout the subsoil than the Lily soil. Included soils are in scattered areas throughout the unit.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: Moderate
Soil reaction: Strongly acid to extremely acid throughout the profile, except for the surface layer in limed areas
Flooding: None
Hazard of erosion: Severe
Water table: None
Depth to bedrock: 20 to 40 inches

About half of the areas have been cleared and are used for corn, snap beans, pasture, or hay. The rest support mixed hardwoods and pine.

This soil is suited to row crops, pasture, and hay. The hazard of erosion and the depth to bedrock are the major management concerns. Erosion is a severe hazard if cultivated crops are grown. Minimum tillage, crop residue management, cover crops, and inclusion of grasses and legumes in the cropping system increase the rate of water infiltration and help to control runoff and erosion. Contour terraces, grassed waterways, debris basins, and contour farming help to control erosion in clean-cultivated areas.

This soil is suited to woodland. The dominant overstory trees are shortleaf pine, red maple, blackgum, Virginia pine, black oak, white oak, scarlet oak, mockernut hickory, and pignut hickory. Understory trees and shrubs include dogwood, sourwood, huckleberry, and other acid-tolerant plants. Several species of Andropogon and Desmodium are common herbaceous plants when openings are made in the overstory. No significant hazards or limitations affect woodland management.

This soil is suited or poorly suited to most urban uses. Building site development, septic tank absorption fields, and road construction are limited by the slope and the depth to bedrock.

The capability subclass is IIe.

LoC—Lonewood-Clarkrange complex, 2 to 6 percent slopes. This unit consists of a very deep, well drained Lonewood soil and a very deep, moderately well drained Clarkrange soil. The unit is on broad, undulating ridges on the Cumberland Plateau. It is in scattered areas, dominantly throughout Fentress County. The Lonewood soil is on the more sloping parts of the unit, and the Clarkrange soil is in the smoother areas. The Lonewood soil formed in a mantle of loess and in the underlying material weathered from acid shale and sandstone. The Clarkrange soil formed in material weathered from acid shale and sandstone. It has a fragipan. Individual areas are about 40 percent Lonewood soil and 40 percent Clarkrange soil. The two soils occur as areas so intermingled that mapping them separately is not practical at the scale used.

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

Surface layer:
0 to 9 inches, very dark grayish brown and brown silt loam

Subsoil:
9 to 35 inches, yellowish brown silt loam that has strong brown, light yellowish brown, and pale brown mottles below a depth of 30 inches
35 to 42 inches, strong brown silty clay loam
42 to 62 inches, yellowish red clay loam

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

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

Subsoil:
6 to 11 inches, brown silt loam
11 to 24 inches, yellowish brown silt loam
24 to 32 inches, yellowish brown silt loam that has light gray, pale brown, and strong brown mottles below a depth of about 24 inches

32 to 45 inches, mottled yellowish brown, pale brown, and strong brown silt loam
45 to 65 inches, strong brown clay loam

Included in this unit in mapping are a few small severely eroded areas, generally of the Lonewood soil. These areas are mainly on the steeper parts of the unit.

Important soil properties—

Permeability: Lonewood—moderate; Clarkrange—moderate above the fragipan and slow in the fragipan
Available water capacity: High
Soil reaction: Strongly acid or very strongly acid throughout the profile, except for the surface layer in limed areas
Flooding: None
Hazard of erosion: Moderate
Water table: Lonewood—none; Clarkrange—perched at a depth of 1.5 to 2.5 feet
Depth to bedrock: Lonewood—40 to 72 inches; Clarkrange—40 to 90 inches

About 60 percent of the areas have been cleared and are used for cultivated crops or for pasture. These are some of the most intensively farmed areas in the survey area. Most of the cultivated areas are used for corn or snap beans. The rest of the areas in the unit support mixed hardwoods and pine.

These soils are suited or well suited to row crops, pasture, and hay. The slope of both soils and the fragipan in the Clarkrange soil are the major limitations. The growth of alfalfa is limited on the Clarkrange soil because the fragipan restricts root growth. Minimum tillage, crop residue management, cover crops, and inclusion of grasses and legumes in the cropping system increase the rate of water infiltration and help to control runoff and erosion. Contour terraces, grassed waterways, debris basins, and contour farming help to control erosion in clean-cultivated areas.

These soils are suited to woodland. The dominant overstory consists of pure or mixed stands of shortleaf pine, Virginia pine, loblolly pine, black oak, white oak, scarlet oak, red maple, pignut hickory, mockernut hickory, and blackgum. Some yellow-poplar grows in depressions. Shortleaf pine is susceptible to little-leaf disease because of the perched seasonal high water table above the fragipan in the Clarkrange soil. This disease generally is not a problem until the stands are 25 to 30 years old. The soils support a fairly dense understory and ground cover of acid-tolerant trees, shrubs, and herbaceous plants. The hazard of windthrow on the Clarkrange soil is the major management concern. The hazard generally is highest during wet periods. Managing for an uneven-aged stand or harvesting by area selection methods can reduce this hazard. Plant competition is an additional management concern.

These soils are suited or poorly suited to most urban uses. Building site development and septic tank absorption fields are limited by the perched water table above the fragipan in the Clarkrange soil.

The capability subclass is IIe.

OeE—Orthents, steep and very steep. These soils are in areas where material above coal seams was removed before open pit mining. These areas generally have high vertical walls and spoil banks. Ponded areas are common between the vertical walls and spoil banks. The high walls are the vertical faces on the upper side of the mining pits, above the coal seams. Sloughing from the walls is common. The spoil banks consist of soil material, shale, waste coal, and sandstone, which were excavated when the coal seams were exposed. This mixture has been spilled downhill or deposited downslope from the pits.

Most of the acreage is idle land that supports little, if any, vegetation. In some of the older mines, some natural revegetation has occurred, and some areas have pine seedlings. Because the soil characteristics vary considerably, onsite investigation is needed to determine the suitability for specific uses.

This unit is not assigned to a capability subclass.

RaD—Ramsey-Alticrest-Rock outcrop complex, 5 to 20 percent slopes. This unit consists of a shallow, somewhat excessively drained Ramsey soil; a moderately deep, well drained Alticrest soil; and sandstone ledges and outcrops. The unit is on short, rolling and hilly hillsides on the Cumberland Plateau. It is in scattered areas throughout Fentress County and in the western part of Pickett County. The Ramsey soil is near the Rock outcrop, and the Alticrest soil is in areas that generally have no Rock outcrop. Both soils formed in material weathered from acid sandstone. Individual areas are about 40 percent Ramsey soil, 30 percent Alticrest soil, and 20 percent Rock outcrop. The two soils and the Rock outcrop occur as areas so intermingled that mapping them separately is not practical at the scale used.

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

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

Subsoil:
6 to 18 inches, yellowish brown channery loam

Bedrock:
18 inches, hard sandstone

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

Surface layer:
0 to 10 inches, dark brown and brown sandy loam

Subsoil:
10 to 15 inches, dark yellowish brown sandy loam
15 to 23 inches, strong brown loam
23 to 31 inches, brown loam

Substratum:
31 to 32 inches, pale brown sand

Bedrock:
32 inches, hard sandstone

The Rock outcrop is in scattered areas throughout the unit. It generally is nearly level with the surface or only a few feet high.

Included in this unit in mapping are a few areas of a soil that is more than 40 inches deep over bedrock. Also included are small areas of a soil that has a high content of stones. Included soils are in scattered areas throughout the unit.

Important properties of the Ramsey and Alticrest soils—

Permeability: Ramsey—rapid; Alticrest—moderately rapid
Available water capacity: Ramsey—very low; Alticrest—moderate or low
Soil reaction: Strongly acid or very strongly acid
Flooding: None
Hazard of erosion: Severe in exposed areas
Water table: None
Depth to bedrock: Ramsey—7 to 20 inches; Alticrest—20 to 40 inches

Most areas are forested with mixed hardwoods and Virginia pine. A few small areas have been cleared and are used as pasture.

This unit is poorly suited or unsuited to row crops, pasture, and hay. The Ramsey soil is generally unsuited because of the depth to bedrock and the very low available water capacity. Moderate yields can be obtained on the Alticrest soil.

This unit is suited or poorly suited to woodland. The dominant overstory trees are mixed Virginia pine, loblolly pine, shortleaf pine, pignut hickory, chestnut oak, scarlet oak, post oak, white oak, black oak, and red maple. The Rock outcrop supports very few trees but has dense stands of mountain laurel. The hazard of windthrow on the shallow Ramsey soil is the major management concern. Managing for an uneven-aged stand or harvesting by area selection methods can reduce this hazard. The hazard of erosion, the equipment limitation, seedling mortality, and plant competition are additional management concerns.

The Ramsey and Alticrest soils are poorly suited to urban uses. Building site development, septic tank absorption fields, and road construction are limited by the depth to bedrock and the slope.

The Ramsey soil is in capability subclass VIe. The Alticrest soil is in capability subclass IVe.

SaD2—Sequoia silt loam, 5 to 20 percent slopes, eroded. This moderately deep, well drained soil is on narrow, rolling and hilly ridgetops and short side slopes on the Cumberland Plateau. Almost all areas are near the Armithwaite Community, in Fentress County. The soil formed in material weathered from acid shale and siltstone.

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

Surface layer:
0 to 5 inches, brown silt loam

Subsoil:
5 to 11 inches, yellowish brown silty clay loam
11 to 20 inches, strong brown silty clay
20 to 36 inches, yellowish red silty clay

Bedrock:
36 to 60 inches, soft, acid shale

Included in this unit in mapping are scattered areas of a soil that is less clayey in the subsoil than the Sequoia soil and contains more rock fragments throughout and a few small areas on the upper part of short hillsides and on convex points where the soil is less than 20 inches deep over bedrock. Also included, in few of the smoother areas, is a soil that has a fragipan.

Important soil properties—

Permeability: Moderately slow
Available water capacity: Moderate
Soil reaction: Strongly acid or very strongly acid throughout the profile, except for the surface layer in limed areas
Flooding: None
Hazard of erosion: Severe
Water table: None
Depth to bedrock: 20 to 40 inches

Most areas have been cleared and are used for pasture or hay. Some of the cleared areas are used for row crops.

This soil is suited or poorly suited to row crops, pasture, and hay. The slope, the hazard of erosion, and the depth to bedrock are the major limitations. Minimum tillage, crop residue management, cover crops, and inclusion of grasses and legumes in the cropping system increase the rate of water infiltration and help to control runoff and erosion. Contour terraces, grassed waterways, debris basins, and contour farming help to control erosion in clean-cultivated areas.

This soil is suited to woodland. The dominant overstory trees are shortleaf pine, Virginia pine, white oak, black oak, northern red oak, pignut hickory, red maple, blackgum, and some yellow-poplar. Understory trees and shrubs include dogwood, redbud, huckleberry, and small trees of the overstory species. Various legumes, grasses, and herbs provide a good ground cover where the woodland is not grazed. Abandoned fields support dense stands of Virginia pine. The hazard of erosion, the equipment limitation, and plant competition are the major management concerns. Minimizing disturbance of the forest litter reduces the hazard of erosion. Operating wheeled equipment on the dissected slopes is hazardous. Site preparation and maintenance can help to control competing vegetation.

This soil is poorly suited to urban uses. Building site development, septic tank absorption fields, and road construction are limited by the slope, the depth to bedrock, the clayey subsoil, and the moderately slow permeability.

The capability subclass is IVe.

Se—Sewanee loam, 0 to 2 percent slopes, occasionally flooded. This deep, moderately well drained soil is in nearly level areas on long, narrow flood plains on the Cumberland Plateau. The soil is dominantly in Fentress County. It formed in alluvium derived from acid sandstone and shale.

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

Surface layer:
0 to 6 inches, brown loam

Subsoil:
6 to 29 inches, brown loam
29 to 36 inches, mottled brown, yellowish brown, and light brownish gray loam

Substratum:
36 to 50 inches, light brownish gray loam

Bedrock:
50 inches, hard sandstone

Included in this unit in mapping are a few small areas of a well drained soil near streams. Also included are a few small areas of a poorly drained soil near the base of slopes in depressions.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate or high
Soil reaction: Strongly acid or very strongly acid throughout the profile, except for the surface layer in limed areas
Flooding: Occasional
Hazard of erosion: None
Water table: At a depth of 1 to 2 feet during wet periods
Depth to bedrock: 40 to 60 inches

Most areas have been cleared and are used for row crops or pasture.

This soil is suited to row crops, pasture, and hay. The hazard of flooding is the major management concern.

This soil is well suited to woodland. The dominant overstory trees are yellow-poplar, white oak, sweetgum, sycamore, black walnut, loblolly pine, shortleaf pine, white pine, hemlock, red oak, and red maple. Plant competition is the major management concern. It can be controlled by site preparation and maintenance. The equipment limitation and seedling mortality are additional management concerns.

This soil is poorly suited to most urban uses. The high water table and the hazard of flooding are the major management concerns.

The capability subclass is IIw.

SlE—Shelocta-Sequoia-Petros complex, 10 to 35 percent slopes. This unit consists of a deep, well drained Shelocta soil; a moderately deep, well drained Sequoia soil; and a shallow, excessively drained Petros soil. The unit is on long, rolling and steep slopes in areas of narrow ridgetops and side slopes on the Cumberland Plateau, dominantly in the eastern and western parts of Fentress County. The Shelocta soil is on the lower side slopes, the Sequoia soil is on narrow ridgetops, and the Petros soil is on the upper side slopes. The Shelocta soil formed in colluvium derived from acid sandstone, siltstone, and shale. The Sequoia and Petros soils formed in material weathered from acid sandstone, siltstone, and shale. Individual areas are about 50 percent Shelocta soil, 25 percent Sequoia soil, and 15 percent Petros soil. The three soils occur as areas so intermingled that mapping them separately is not practical at the scale used.

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

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

Subsoil:
6 to 25 inches, strong brown silty clay loam
25 to 52 inches, yellowish brown channery silty clay loam that has pale brown and strong brown mottles below a depth of about 30 inches

Bedrock:
52 inches, shale and siltstone

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

Surface layer:
0 to 5 inches, brown silt loam

Subsoil:
5 to 11 inches, yellowish brown silty clay loam
11 to 20 inches, strong brown silty clay
20 to 36 inches, yellowish red silty clay

Bedrock:
36 to 60 inches, soft, acid shale

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

Surface layer:
0 to 7 inches, very dark grayish brown and dark brown channery silt loam

Subsoil:
7 to 18 inches, yellowish brown very channery silt loam

Bedrock:
18 to 26 inches, soft shale and siltstone

Included in this unit in mapping are scattered areas of a soil that has a high content of rock fragments throughout and some scattered areas where sandstone crops out.

Important soil properties—

Permeability: Shelocta—moderate; Sequoia—moderately slow; Petros—moderate or moderately rapid
Available water capacity: Shelocta and Sequoia—moderate; Petros—very low
Soil reaction: Strongly acid or very strongly acid throughout the profile, except for the surface layer in limed areas
Flooding: None
Hazard of erosion: Severe in exposed areas
Water table: None
Depth to bedrock: Shelocta—48 to more than 90 inches; Sequoia—20 to 40 inches; Petros—10 to 20 inches

Most areas support mixed hardwoods. A few small areas have been cleared and are used for pasture or cultivated crops.

These soils are generally unsuited to row crops. The slope of the Shelocta and Sequoia soils and the depth to bedrock in the Petros soil are the major limitations. The Shelocta and Sequoia soils are suited to pasture and hay, but the Petros soil is poorly suited.

These soils are suited to woodland. The dominant overstory trees on the Shelocta and Sequoia soils are white oak, black oak, northern red oak, blackgum, yellow-poplar, sugar maple, red maple, loblolly pine, shagbark hickory, and mockernut hickory. Understory trees and shrubs include dogwood, sourwood, greenbrier, tickclover, and a wide variety of herbaceous plants. The dominant trees on the Petros soil are chestnut oak, scarlet oak, white oak, and some shortleaf pine and Virginia pine. Huckleberry and mountain laurel are the main understory plants. The hazard of windthrow is the major management concern. Managing for an uneven-aged stand or harvesting by area selection methods can reduce this hazard. The hazard of erosion, the equipment limitation, seedling mortality, and plant competition are additional management concerns.

These soils are poorly suited to most urban uses. Building site development and road construction are limited by the slope of the Shelocta soil and the slope and depth to bedrock in areas of the Sequoia and Petros soils.

The Shelocta and Sequoia soils are in capability subclass VIe. The Petros soil is in capability subclass VIIs.

SnB—Sullivan-Sequatchie-Egam complex, 1 to 6 percent slopes, rarely to occasionally flooded. This unit consists of very deep, well drained Sullivan and Sequatchie soils and a very deep, moderately well drained Egam soil. The unit is in small, nearly level to undulating areas on long, narrow flood plains and low terraces on the Highland Rim, dominantly in Pickett County. The Sullivan and Egam soils are on the flood plains, and the Sequatchie soil is on the adjacent low terraces. All three soils formed in alluvium. Individual areas are about 40 percent Sullivan soil, 25 percent Sequatchie soil, and 25 percent Egam soil. The three soils occur as areas so intermingled that mapping them separately is not practical at the scale used.

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

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

Subsoil:
8 to 42 inches, dark yellowish brown silt loam
42 to 51 inches, brown loam

Substratum:
51 to 65 inches, brown sandy loam

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

Surface layer:
0 to 10 inches, dark brown loam

Subsoil:
10 to 45 inches, brown clay loam
45 to 55 inches, brown sandy loam

Substratum:
55 to 70 inches, yellowish brown sandy loam

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

Surface layer:
0 to 8 inches, dark brown silty clay loam

Subsoil:
8 to 22 inches, very dark grayish brown silty clay loam
22 to 50 inches, dark brown silty clay loam

Substratum:
50 to 68 inches, brown sandy loam

Included in this unit in mapping are areas of a somewhat poorly drained soil on the flood plains. Also included, on the low terraces, are small areas of a soil that is similar to the Sequatchie soil but does not have a dark surface layer.

Important soil properties—

Permeability: Sullivan and Sequatchie—moderate; Egam—moderately slow
Available water capacity: High
Soil reaction: Sullivan—strongly acid to neutral; Sequatchie—strongly acid or very strongly acid throughout the profile, except for the surface layer in limed areas; Egam—medium acid to neutral
Flooding: Sullivan and Egam—occasional; Sequatchie—rare
Hazard of erosion: Sullivan and Egam—none; Sequatchie—slight or moderate
Water table: Sullivan—at a depth of 4 to 6 feet during wet periods; Sequatchie—none within a depth of 6 feet; Egam—at a depth of 3 to 4 feet during wet periods
Depth to bedrock: More than 5 feet

Virtually all areas have been cleared and are used for row crops or pasture. This is one of the most productive units in the survey area.

These soils are well suited to row crops, pasture (fig. 2), and hay. The hazard of flooding is the major management concern.

These soils are well suited to woodland. The dominant overstory trees are bottom-land hardwoods, including sweetgum, yellow-poplar, black walnut, cherry, sycamore, cottonwood, white oak, white ash, and northern red oak. Plant competition is the major management concern. It can be controlled by site preparation and maintenance. Seedling mortality is an additional management concern.

The Sequatchie soil is suited to most urban uses, but the Sullivan and Egam soils are poorly suited because of the hazard of flooding in early spring and the high water table. Flooding occurs in a few areas of the Sequatchie soil during periods of extremely heavy rainfall.

The Sullivan and Egam soils are in capability subclass IIw. The Sequatchie soil is in capability subclass IIe.

SuF—Sulphura channery silt loam, 20 to 75 percent slopes. This moderately deep, somewhat excessively drained soil is on steep and very steep, long slopes bordering the major streams on the Highland Rim. Most areas are along Dale Hollow Lake, in Pickett County. The soil formed in cherty colluvium and to some extent in material weathered from shale.

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

Surface layer:
0 to 6 inches, very dark grayish brown and yellowish brown channery silt loam

Subsoil:
6 to 20 inches, dark yellowish brown channery silty clay loam
20 to 28 inches, dark yellowish brown very channery silty clay loam

Bedrock:
28 inches, hard, dark shale

Included in this unit in mapping are a few areas of a soil that is more than 40 inches deep over bedrock. This soil generally is on the lower parts of the slopes. Also included are a few small areas, mainly on ridgetops, where the soil is 10 to 20 inches deep over bedrock and a few scattered areas where bedrock is exposed.

Important soil properties—

Permeability: Moderate
Available water capacity: Low
Soil reaction: Strongly acid to medium acid in the upper

Figure 2.—A pastured area of Sullivan-Sequatchie-Egam complex, 1 to 6 percent slopes, rarely to occasionally flooded.

part of the profile and strongly acid to slightly acid in the lower part
Flooding: None
Hazard of erosion: Severe in exposed areas
Water table: None
Depth to bedrock: 20 to 40 inches

Virtually all areas support mixed hardwoods. Recreational facilities are in few small areas around Dale Hollow Lake.

This soil is generally unsuited to row crops, pasture, and hay. The slope and the depth to bedrock are the major limitations.

This soil is poorly suited to woodland. The dominant overstory trees are chestnut oak, scarlet oak, red maple, loblolly pine, shortleaf pine, eastern redcedar, and sourwood. The trees grow slowly because of the low available water capacity. The understory vegetation consists of huckleberry, mountain laurel, and other drought-tolerant plants. Seedling mortality is the major management concern. The hazard of erosion, the equipment limitation, the hazard of windthrow, and plant competition are additional management concerns.

This soil is poorly suited to most urban uses. The slope and the depth to bedrock are the major limitations.

The capability subclass is VIIe.

TaE—Talbott-Rock outcrop complex, 10 to 35 percent slopes. This unit occurs as areas of a moderately deep, well drained Talbott soil intermingled with areas of Rock outcrop. The unit is on the rolling and steep lower slopes in the Cumberland Mountains and on outlying knobs and hills in the northern and central parts of Fentress County and in the central part of Pickett County. The Rock outcrop is in scattered areas throughout the unit. The Talbott soil formed in material weathered from limestone. Individual areas are about 40 percent Talbott soil and 40 percent Rock outcrop. The Talbott soil and Rock outcrop occur as areas so intermingled that mapping them separately is not practical at the scale used.

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

Surface layer:
0 to 5 inches, brown silt loam

Subsoil:
5 to 34 inches, yellowish red clay
34 to 36 inches, strong brown clay

Bedrock:
36 inches, hard limestone

The Rock outcrop occurs as limestone ledges and protruding limestone bedrock.

Included in this unit in mapping are areas of a soil that is less than 20 inches deep over bedrock. This soil is generally near the Rock outcrop. Also included are some severely eroded areas, which generally have been cleared.

Important properties of the Talbott soil—

Permeability: Moderately slow
Available water capacity: Moderate
Soil reaction: Generally strongly acid to slightly acid, but ranging to mildly alkaline in the layer directly above the bedrock
Flooding: None
Hazard of erosion: Severe
Water table: None
Depth to bedrock: 20 to 40 inches

Most areas are forested or pastured. Many of the cleared areas are idle and have reverted to eastern redcedar and Virginia pine.

This unit is generally unsuited to row crops. It is poorly suited to pasture and hay. The clayey subsoil, the slope, and the Rock outcrop are the major limitations.

This unit is suited or poorly suited to woodland. Many areas have been cleared and have reverted to nearly pure stands of eastern redcedar and Virginia pine. Areas that have not been cleared support shagbark hickory, mockernut hickory, chinkapin oak, white oak, American elm, winged elm, white ash, Virginia pine, loblolly pine, shortleaf pine, eastern redcedar, and some yellow-poplar, black walnut, and red oak. The hazard of erosion, the equipment limitation, and plant competition are the major management concerns. Minimizing disturbance of the forest litter reduces the hazard of erosion. Operating wheeled equipment on the dissected slopes is hazardous. Site preparation and maintenance can help to control competing vegetation.

The Talbott soil is poorly suited to urban uses. Building site development, septic tank absorption fields, and road construction are limited by the slope, the clayey subsoil, and the Rock outcrop.

The Talbott soil is in capability subclass VIe.

WaC2—Waynesboro-Etowah complex, 5 to 12 percent slopes, eroded. These very deep, well drained soils are on rolling, narrow ridges in areas on the Highland Rim in the central part of Pickett County and the eastern part of Fentress County. The Waynesboro soil is on the uppermost, smoother parts of the unit, and the Etowah soil is on the lower foot slopes. Both soils formed in old alluvium. Individual areas are about 40 percent Waynesboro soil and 40 percent Etowah soil. The two soils occur as areas so intermingled that mapping them separately is not practical at the scale used.

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

Surface layer:
0 to 6 inches, brown loam

Subsoil:
6 to 24 inches, yellowish red and red clay loam
24 to 70 inches, dark red clay

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

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

Subsoil:
7 to 14 inches, brown silt loam
14 to 50 inches, yellowish red silty clay loam
50 to 70 inches, red clay

Included in this unit in mapping are small areas of a red soil that has less clay than the Waynesboro soil. This soil is in scattered areas throughout the unit. Also included are small areas of a moderately well drained soil in depressions.

Important soil properties—

Permeability: Moderate
Available water capacity: Waynesboro—moderate; Etowah—high
Natural fertility: Low
Soil reaction: Strongly acid or very strongly acid throughout the profile, except for the surface layer in limed areas
Flooding: None

Figure 3.—An area of Waynesboro-Etowah complex, 5 to 12 percent slopes, eroded, which is well suited to pasture and hay.

Hazard of erosion: Severe
Water table: None
Depth to bedrock: More than 6 feet

Most areas have been cleared and are used for pasture or hay. Some of the smoother slopes are used for row crops. A small acreage supports mixed hardwoods.

These soils are suited to row crops. They are well suited to pasture and hay (fig. 3). The complex slopes and the hazard of erosion are the major management concerns.

These soils are well suited to woodland. Less than 20 percent of the unit is forested. Most of the woodland is in old fields that support pure or mixed stands of shortleaf pine, Virginia pine, eastern redcedar, or yellow-poplar. A small acreage of woodland that has never been cleared supports chinkapin oak, black walnut, yellow-poplar, white oak, sugar maple, and other hardwoods. Plant competition is the major management concern. It can be controlled by site preparation and maintenance.

These soils are suited to most urban uses. The slope is the major limitation affecting building site development and road construction.

The capability subclass is IIIe.

WaD2—Waynesboro-Etowah complex, 12 to 20 percent slopes, eroded. These very deep, well drained soils are in hilly areas on uplands that have short side slopes and foot slopes. The soils are in areas on the Highland Rim in the central part of Pickett County and the eastern part of Fentress County. The Waynesboro soil is on the smoother parts of the unit, and the Etowah soil is on the lower foot slopes. Many areas have numerous sinks. Both soils formed in old alluvium. Individual areas are about 40 percent Waynesboro soil and 40 percent Etowah soil. The two soils occur as areas so intermingled that mapping them separately is not practical at the scale used.

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

Surface layer:
0 to 6 inches, brown loam

Subsoil:
6 to 24 inches, yellowish red and red clay loam
24 to 70 inches, dark red clay

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

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

Subsoil:
7 to 14 inches, brown silt loam
14 to 50 inches, yellowish red silty clay loam
50 to 70 inches, red clay

Included in this unit in mapping are small areas of a red soil that has less clay than the Waynesboro soil. This soil is in scattered areas throughout the unit. Also included are small areas of a moderately well drained soil in depressions.

Important soil properties—

Permeability: Moderate
Available water capacity: Waynesboro—moderate; Etowah—high
Soil reaction: Strongly acid or very strongly acid, except for the surface layer in limed areas
Flooding: None
Hazard of erosion: Severe
Water table: None
Depth to bedrock: More than 6 feet

Most areas have been cleared and are used for pasture or hay. Some of the smoother slopes are used for row crops. A small acreage supports mixed hardwoods.

These soils are poorly suited to row crops but are suited to pasture and hay. The complex slopes and the hazard of erosion are the major management concerns.

These soils are well suited to woodland. Less than 20 percent of the unit is forested. Most of the woodland is in old fields that support pure or mixed stands of shortleaf pine, Virginia pine, eastern redcedar, or yellow-poplar. A small acreage of woodland that has never been cleared supports chinkapin oak, black walnut, yellow-poplar, white oak, sugar maple, and other hardwoods. The hazard of erosion, the equipment limitation, and plant competition are the major management concerns. Minimizing disturbance of the forest litter reduces the hazard of erosion. Operating wheeled equipment on the dissected slopes is hazardous. Site preparation and maintenance can help to control competing vegetation.

These soils are suited or poorly suited to most urban uses. The slope is the main limitation affecting building site development and road construction.

The capability subclass is IVe.

ZeF—Zenith gravelly loam, 20 to 60 percent slopes. This deep, well drained soil is on steep and very steep, east- and north-facing slopes in mountain coves on the Cumberland Plateau, dominantly in the eastern parts of Fentress and Pickett Counties. The soil is generally on long, concave talus slopes. It formed in colluvium derived from acid sandstone, siltstone, and shale.

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

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

Subsoil:
8 to 18 inches, brown gravelly loam
18 to 48 inches, brown cobbly loam

Substratum:
48 to 58 inches, strong brown silty clay loam

Bedrock:
58 inches, shale

Included in this unit in mapping are small areas of a soil that does not have a dark surface layer. Also included are soils that are more than 60 inches deep over bedrock. Included soils are in scattered areas throughout the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Soil reaction: Strongly acid or very strongly acid
Flooding: None
Hazard of erosion: Severe in exposed areas
Water table: None
Depth to bedrock: 40 to 60 inches

Most areas support mixed hardwoods. Mainly because of the slope and the hazard of erosion, this soil is generally unsuited to row crops, pasture, and hay. It is not easily accessible to machinery because it is below an almost vertical sandstone bluff that is generally 10 to more than 50 feet high.

This soil is well suited to woodland. The dominant overstory trees are yellow-poplar, northern red oak, and white ash. Other overstory trees are white oak, cherry, black walnut, basswood, buckeye, sugar maple, shagbark hickory, shortleaf pine, Virginia pine, beech, and black locust. The forest canopy is quite dense. As a result, the growth of understory trees and shrubs is limited and very little ground cover is evident, except for greenbrier. Tree roots can extend to bedrock in this moderately permeable soil. Because of the moderate permeability and the movement of water downslope, the soil provides enough moisture for high-quality trees to grow well. The equipment limitation is the major management concern. Operating wheeled equipment on the steep and very steep slopes is hazardous. The hazard of erosion and plant competition are additional management concerns.

This soil is poorly suited to most urban uses. Building site development, septic tank absorption fields, and road construction are limited by the slope and the depth to bedrock.

The capability subclass is VIIe.

Prime Farmland

In this section, prime farmland is defined and the soils in Fentress and Pickett Counties 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. The loss of prime farmland to other uses results in costly and environmentally undesirable utilization of marginal land.

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 5 percent.

About 104,300 acres in Fentress County and 8,050 acres in Pickett County meet the requirements for prime farmland. The prime farmland is in scattered areas throughout the counties. It is used mainly as cropland, pasture, or hayland.

The map units that are considered prime farmland in Fentress and Pickett Counties are listed in table 5. 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.

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 prevent 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 recreational 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

John L. Kazda, 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 are identified, the system of land capability classification used by the Soil Conservation Service is explained, and the estimated yields of the main crops 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 the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Cropland is a minor land use in the survey area. Approximately 35,500 acres in Fentress County and 20,000 in Pickett County were used for crops and pasture in 1974. Of this total, about 32,300 acres was used as permanent pasture; 7,600 acres for row crops, mainly corn, snap beans, and tobacco; 400 acres for close-growing crops, mainly wheat and soybeans; and 11,500 acres for rotation hay. The rest of the acreage was idle cropland *(7)*.

Water erosion is the major management concern on more than 50 percent of the cropland in the survey area. Much of the cropland is in areas of soils that are susceptible to erosion. These include most areas of Baxter, Bewleyville, Christian, Clarkrange, Dickson, Etowah, Holston, Lily, Lonewood, Sequatchie, and Waynesboro soils.

Loss of the original surface layer through erosion is damaging for three reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils that have a layer in the subsoil that limits the depth of the root zone. Such a layer includes the fragipan in Clarkrange, Dickson, and Leadvale soils.

Second, water erosion on uplands results in the sedimentation and pollution of streams and blockage of drainage ditches and stream channels. Control of erosion minimizes the pollution of streams by sediments and by chemicals, such as herbicides, that are attached to soil particles. It also minimizes the deposition of infertile sediments from severely eroded uplands onto productive bottom land.

Third, water erosion removes plant nutrients from the soil while contributing to the chemical and biological degradation of streams and lakes. The nutrients removed by erosion are replaced by applications of fertilizer only at considerable cost.

In many sloping fields, erosion has removed part of the original friable surface soil, leaving less workable subsoil material as part of the present plow layer. Under these conditions, tilling or preparing a good seedbed is difficult and crops can be affected by moisture deficits during dry periods.

Erosion-control practices provide a protective surface cover, help to control runoff, and increase the rate of water infiltration. A cropping system that includes high-residue crops and keeps a plant cover on the surface for extended periods can hold soil losses to amounts that will not reduce the productivity of the soils. In sloping areas on livestock farms, which require pasture and hay, including forage crops of grasses and legumes in the cropping system helps to control erosion, provides nitrogen, and improves tilth.

Maintaining crop residue on the surface increases the rate of water infiltration and reduces the hazards of runoff and erosion. This practice is effective on most of the soils in the survey area, but it is less successful on steep or severely eroded soils. In sloping areas that are used for row crops, no-till or minimum tillage systems are effective in controlling erosion. These systems are effective on many of the soils in the survey area.

Terraces and diversions reduce the length of slopes and thus help to control runoff and erosion. They are practical on very deep, well drained soils that have uniform slopes. Etowah and Waynesboro soils are suitable for terracing. Clarkrange, Dickson, and Leadvale soils are less well suited to terracing because they have a fragipan that would be exposed in the terrace channels.

Contour farming is most effective in areas where slopes are smooth and uniform. Examples are most areas of Etowah and Waynesboro soils.

Further information about the design of erosion-control measures for each kind of soil is available at the local office of the Soil Conservation Service.

Soil tilth, or workability, is an important factor affecting the germination of seeds and the infiltration of water into the soils. Soils with good tilth are granular and porous and can be easily worked. Most of the soils used as cropland in the survey area have a surface layer of silt loam that is low in content of organic matter. Generally, the structure of the plow layer is weak or moderate. A crust forms on the surface during periods of intensive rainfall. The crust is hard when dry and is somewhat impervious to water. As a result, it reduces the rate of water infiltration and increases the runoff rate. Regular additions of crop residue, manure, or other organic material improve soil structure and minimize crusting.

Most of the soils in the survey area are acid and are low or medium in content of plant nutrients. Applications of commercial fertilizer and lime are needed if the economically feasible yields of most crops are to be attained. The applications should be based on the results of soil tests and on the nutrient requirements of the crop to be grown. The type of soil, the desired level of yields, and the cropping practices used for the last 3 to 5 years also should be considered. Information about fertilizer recommendations can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Pasture and hayland make up a large percentage of the openland in the survey area. They support cool-season grasses and legumes. The main grasses are tall fescue and orchardgrass. The most common legumes are white clover, red clover, alfalfa, annual lespedeza, and sericea lespedeza. Legumes are included as part of the seed mixture when a pasture is to be established. They are commonly reintroduced in perennial grass stands when they make up less than about 30 percent of the plant composition.

The major management practices needed in areas of pasture are applications of lime and fertilizer, weed control, rotation grazing, and occasional renovation. Fertilizer should be applied according to the needs of the plants, the desired level of forage production, and the results of soil tests. Weeds can be controlled by applications of herbicide. They also can be controlled by mowing before the weeds reach maturity and produce seed. Weed control is easier on well managed pastures than on overgrazed, poorly managed pastures. Some annual grasses are used for supplemental grazing or for hay. Sudangrass-sorghum crosses, pearl millet, and sudangrass provide good forage in summer. Small grain and annual ryegrass provide good forage in late fall and early spring.

Most of the hay harvested in the survey area is the surplus growth on grass-legume pastures. Annual lespedeza, sericea lespedeza, alfalfa, and small grain also are grown as hay crops. The management requirements on hayland are generally the same as those in areas of pasture, but more fertilizer is needed. The hay should be cut at the stage of growth that provides the best quality feed and does not damage the grass-legume stand. Excessively close cutting of perennial hay crops can cause premature loss of the stand.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability of each map unit also is shown in the table.

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 6 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 *(4)*. 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 rangeland, for woodland, and for engineering purposes.

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

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.

There are no class I or VIII soils in this survey area.

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, rangeland, 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" and in table 6.

Woodland Management and Productivity

Joseph H. Paugh, forester, Soil Conservation Service, helped prepare this section.

Originally, all of Fentress and Pickett Counties was forested. As the counties were settled, however, much of the land was cleared for agricultural uses. Nearly 294,000 acres in the counties, or about 70 percent of the total acreage, currently is forested. Most of the forest land is in privately owned tracts, but the State owns about 18,000 acres of forest land in Pickett State Park and Forest and Scott State Forest.

The soils in the counties can produce good or excellent stands of commercial hardwoods. In most areas additional management is needed to achieve the potential productivity. Species conversion and increased stocking also are needed to improve production on some sites.

The common commercial species in the counties include yellow-poplar, upland and bottom-land oaks, black cherry, white ash, persimmon, blackgum, sweetgum, maple, hemlock, hickory, white pine, and loblolly pine. Some areas on bottom land support bottom-land oaks, sweetgum, and sycamore.

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.

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, some are more susceptible to landslides and erosion after roads are built and timber is harvested. Some 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. Table 7 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.

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* indicates limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, and 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 is needed. 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 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 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. Rating of moderate or severe indicate a need to choose the best suited 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 seedling 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 seedings. 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. The rooting depth can be restricted by a high water table, a fragipan, or bedrock or by a combination of such factors as 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.

Ratings of *plant competition* indicate the likelihood of the growth or invasion of undesirable plants. Plant competition is more severe on the more productive soils, on poorly drained soils, and on soils having a restricted root zone that holds moisture. The risk is *slight* if competition from undesirable plants hinders adequate natural or artificial reforestation but does not necessitate intensive site preparation and maintenance. The risk is *moderate* if competition from undesirable plants hinders natural or artificial reforestation to the extent that intensive site preparation and maintenance are needed. The risk is *severe* if competition from undesirable plants prevents adequate natural or artificial reforestation unless the site is intensively prepared and maintained. A moderate or severe rating indicates the need for site preparation to ensure the development of an adequately stocked stand. Managers must plan site preparation measure to ensure reforestation without delays.

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 *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 estimates of the productivity of the soils in this survey generally are based on published data *(5)*.

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

Joseph H. Paugh, forester, Soil Conservation Service, helped prepare this section.

Fentress and Pickett Counties have many outdoor recreational facilities. Pickett County has fewer facilities than Fentress County, but it has the largest acreage of recreational areas. Of the 52,700 acres of recreational areas in the two counties, nearly 49,000 acres is in Pickett County.

Sports fields and picnic areas are the most abundant recreational facilities in the survey area. Dale Hollow Lake provides opportunities for water sports. Fentress County has two wild boar hunting preserves.

The survey area has high potential for 10 to 21 major kinds of recreational development. The highest potential is for camp areas, shooting preserves, and other hunting areas. Recreational development is somewhat limited by the slope and the depth to bedrock in areas of the soils in the two counties. Attention should be given to such soil characteristics as depth, permeability, texture, slope, and drainage when recreational enterprises are developed.

In table 8, 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 uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, 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 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

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.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Gerald Montgomery, biologist, Soil Conservation Service, helped prepare this section.

Fentress and Pickett Counties have a varied population of wildlife and fish. The species that prefer openland habitat in areas of cropland, pasture, brushy fence rows, thickets, and scattered woodlots include cottontail rabbits, bobwhite quail, mourning dove, meadowlark, bluebird, groundhog, and coyote. These species are most abundant in areas where the plant cover is diverse.

The species that prefer upland woodlots and tracts of hardwoods on bottom land include white-tailed deer, gray squirrel, wild turkey, wild boar, raccoon, and a variety of nongame birds.

The shallow areas in the upper reaches of Dale Hollow Lake and the other wetlands along the major streams provide breeding habitat for wood ducks and resting and feeding areas for other migratory waterfowl. These wetlands also are important to furbearers, such as beaver, mink, and muskrat, and to aquatic nongame birds.

The streams, lakes, and ponds in the counties are inhabited by crappie, bream, largemouth bass, smallmouth bass, and catfish. Nongame species, such as gar, carp, buffalo, and drum, are in some areas. Siltation, contamination by pesticides, and drainage are some of the major problems that have resulted in a deterioration of the quality of the habitat for fish or have reduced the extent of the habitat.

In most areas the wildlife habitat in the two counties can be improved by increasing the amount of food, water, and cover. General soil map units 1 to 7 are well suited to the improvement of habitat for upland wildlife species. General soil map unit 8, which is on bottom land, can be developed as habitat for a variety of wildlife species, including waterfowl.

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 9, 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 flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, millet, and soybeans.

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, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are tall fescue, orchardgrass, annual lespedeza, and clover.

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 flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are beggarweed, perennial lespedeza, croton, and cheatgrass.

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, beech, cherry, and hickory. 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 Virginia pine, shortleaf pine, and eastern redcedar.

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, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, spikerush, and sedges.

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 wild boar.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, muskrat, and mink.

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. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or *for testing and analysis by personnel experienced in the design and construction of engineering works.*

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations 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 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. 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 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, and shrinking and swelling can cause the movement of footings. Depth to a high water table, depth to bedrock, 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 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, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, depth to a high water table, depth to bedrock or to a fragipan, and the available water capacity in the upper 40 inches affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 11 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 11 also shows the suitability of the soils for use as daily cover for landfill. 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, and flooding affect absorption of the effluent. Large stones and bedrock 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 11 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, 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. Slope and bedrock 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 should be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, soil reaction, and content of salts and sodium affect trench 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 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 soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock 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 12 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 estimated 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 have a water table at a depth of less than 1 foot. They 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 12, 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 13 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, 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 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 the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock, 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.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a fragipan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock affect the construction of grassed waterways. Low available water capacity, restricted rooting depth, low fertility, 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.

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 to 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 14 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 the heading "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, SC-SM.

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.

Rock fragments larger than 10 inches in diameter and 3 to 10 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.

The estimates of grain-size distribution are rounded to the nearest 5 percent. Thus, if the ranges of gradation extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

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.

Physical and Chemical Properties

Table 15 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 determine the ability of the soil to adsorb cations and to retain moisture. They influence 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 ⅓-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 and septic tank absorption fields.

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 classes are *low,* a change of less than 3 percent; *moderate,* 3 to 6 percent; and *high,* more than 6 percent.

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 15, 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 16 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 16 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. 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 little or no horizon development.

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 estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table, that is, *perched* or *apparent;* and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

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. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "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 results in a severe hazard of corrosion. 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 *(6)*. 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 17 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, nonacid, 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" *(3)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(6)*. Unless otherwise stated, matrix 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."

Alticrest Series

The Alticrest series consists of moderately deep, well drained soils that formed in material weathered from acid sandstone. These soils are on benches, narrow ridgetops, and short side slopes on the Cumberland Plateau. Slopes range from 5 to 20 percent.

Alticrest soils are geographically associated with Lily and Ramsey soils. Lily soils are on the higher ridgetops. They contain more clay than the Alticrest soils. Ramsey soils are on side slopes and benches. They are less than 20 inches deep over bedrock.

Typical pedon of Alticrest sandy loam, in an area of Ramsey-Alticrest-Rock outcrop complex, 5 to 20 percent slopes; 1.0 mile east of Jamestown on State Highway 52; after a left turn, 2.7 miles on a paved road; after a left turn, 0.8 mile on a gravel road toward a city lake; left of the road, 400 feet north of Yellow Creek, in Fentress County:

Oe—1 inch to 0; very dark gray (10YR 3/1), partially decomposed organic mat of pine needles, twigs, and hardwood leaves.

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

E—2 to 10 inches; brown (10YR 4/3) sandy loam; few fine faint dark brown (10YR 3/3) organic stains; weak fine granular structure; very friable; many fine and few coarse roots; very strongly acid; clear smooth boundary.

Bw1—10 to 15 inches; dark yellowish brown (10YR 4/4) sandy loam; few fine faint yellowish brown (10YR 5/4) and dark yellowish brown (10YR 3/4) mottles; weak medium subangular blocky structure; very friable; common fine roots; about 5 percent, by volume, fragments of sandstone less than 3 inches in diameter; very strongly acid; gradual smooth boundary.

Bw2—15 to 23 inches; strong brown (7.5YR 5/6) loam; weak medium subangular blocky structure; very friable; few fine roots; about 5 percent, by volume, fragments of sandstone less than 3 inches in diameter; very strongly acid; gradual smooth boundary.

Bw3—23 to 31 inches; brown (7.5YR 5/4) loam; weak medium subangular blocky structure; very friable; few fine roots; about 10 percent, by volume, fragments of sandstone less than 3 inches in diameter; very strongly acid; clear smooth boundary.

C—31 to 32 inches; pale brown (10YR 6/3) sand; common medium faint brown (10YR 5/3) and common medium distinct dark brown (10YR 3/3) mottles; single grain; loose; about 10 percent, by volume, fragments of sandstone less than 3 inches in diameter; very strongly acid; clear wavy boundary.

R—32 inches; hard sandstone bedrock.

The thickness of the solum and the depth to sandstone bedrock range from 20 to 40 inches. The content of sandstone fragments or quartzite pebbles less than 3 inches in diameter ranges, by volume, from 0 to 15 percent in each horizon. Reaction is very strongly acid or strongly acid in unlimed areas.

The A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4. The Ap and E horizons, if they occur, have hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 8. They are sandy loam, loam, or fine sandy loam.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8. It is loam, sandy loam, or fine sandy loam.

The C horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 3 to 6. It is sand, loamy sand, or sandy loam. In some pedons, the C horizon does not occur and the Bw horizon extends to the bedrock.

Baxter Series

The Baxter series consists of very deep, well drained soils that formed in material weathered from dolomitic limestone. These soils are on uplands on the Highland Rim. Slopes range from 5 to 20 percent.

Baxter soils are geographically associated with Christian and Waynesboro soils. Christian soils are on the slightly lower ridgetops. Their solum is thinner than that of the Baxter soils. Waynesboro soils are on the slightly higher ridgetops. They do not have fragments of chert.

Typical pedon of Baxter gravelly silt loam, in an area of Christian-Baxter complex, 5 to 20 percent slopes, eroded; 0.5 mile west of Byrdstown; 0.25 mile north of Scotch-Rich Cemetery, in Pickett County:

Ap—0 to 5 inches; brown (10YR 4/3) gravelly silt loam; weak fine granular structure; friable; many fine roots; about 20 percent, by volume, fragments of chert; strongly acid; clear smooth boundary.

Bt1—5 to 15 inches; strong brown (7.5YR 5/6) gravelly silty clay loam; weak fine subangular blocky structure; friable; many fine roots; few faint clay films; about 20 percent, by volume, fragments of chert; strongly acid; gradual smooth boundary.

Bt2—15 to 30 inches; red (2.5YR 4/6) gravelly clay; moderate medium subangular blocky structure; firm; common fine roots; common distinct clay films on faces of peds; about 25 percent, by volume, fragments of chert; strongly acid; gradual smooth boundary.

Bt3—30 to 50 inches; red (2.5YR 4/6) gravelly clay; moderate medium subangular blocky structure; firm; few fine roots; common faint clay films on faces of peds; about 25 percent, by volume, fragments of chert; strongly acid; gradual smooth boundary.

Bt4—50 to 70 inches; red (2.5YR 4/6) gravelly clay; common medium prominent strong brown (7.5YR 5/6) and dark red (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; few faint clay films on faces of peds; about 30 percent, by volume, fragments of chert; strongly acid.

The solum is more than 70 inches thick. The depth to limestone bedrock is more than 6 feet. Reaction is strongly acid or very strongly acid in unlimed areas. The content of chert fragments less than 1 inch to about 6 inches in diameter ranges from 15 to 35 percent.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4. In forested areas the A horizon is 1 to 5 inches thick. It has hue of 2.5YR to 7.5YR, value of 2 to 4, and chroma of 1 to 3. The Ap and A horizons are silt loam or gravelly silt loam.

The Bt horizon has hue of 5YR to 10R, value of 4 or 5, and chroma of 4 to 8. In some pedons it is mottled in shades of brown, olive, red, or gray in the lower part. It is silty clay loam, silty clay, clay, or the gravelly analogs of those textures.

The BC and C horizons, if they occur, generally are mottled in shades of red, brown, olive, or gray. They are silty clay, clay, or the gravelly analogs of those textures.

Bewleyville Series

The Bewleyville series consists of very deep, well drained soils that formed in 15 to 36 inches of loess and in the underlying old alluvium or material weathered from limestone. These soils are on uplands on the Highland Rim. Slopes range from 2 to 6 percent.

Bewleyville soils are geographically associated with Dickson and Waynesboro soils. Dickson soils are in the slightly higher areas on the more nearly level ridgetops. They have a fragipan. Waynesboro soils are on the slightly lower side slopes and ridgetops. They contain more clay than the Bewleyville soils.

Typical pedon of Bewleyville silt loam, in an area of Bewleyville-Dickson complex, 2 to 6 percent slopes; 2.0 miles south of Static and 0.25 miles east of State Highway 42, in Pickett County:

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

Bt1—7 to 15 inches; strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common fine roots; few faint clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—15 to 26 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt3—26 to 30 inches; yellowish red (5YR 4/6) silty clay loam; few fine distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; many distinct clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt4—30 to 36 inches; red (2.5YR 4/6) silty clay loam; few medium prominent brown (7.5YR 5/4) mottles; moderate medium subangular blocky structure; friable; many distinct clay films on faces of peds; strongly acid; gradual smooth boundary.

2Bt5—36 to 48 inches; dark red (2.5YR 3/6) clay; few medium prominent yellowish brown (10YR 5/4) and strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; many distinct clay films on faces of peds; strongly acid; gradual smooth boundary.

2Bt6—48 to 72 inches; dark red (2.5YR 3/6) clay; common medium prominent strong brown (7.5YR 5/6) and yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; firm; many faint clay films on faces of peds; strongly acid.

The thickness of the solum and the depth to limestone bedrock are more than 6 feet. Reaction is strongly acid or very strongly acid in unlimed areas.

The Ap horizon generally has hue 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4. In severely eroded areas, however, it has hue of 5YR and chroma of 6. It is dominantly silt loam but is silty clay loam in eroded areas.

The upper part of the Bt horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam or silty clay loam. The lower part has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8.

The 2Bt horizon has hue of 2.5YR or 5YR, value of 3 to 6, and chroma of 6 to 8. It is clay, clay loam, or silty clay loam.

Bouldin Series

The Bouldin series consists of very deep, well drained soils that formed in colluvium washed from the Cumberland Plateau Escarpment, which is underlain by sandstone. These soils are on long talus slopes on the sides of mountains on the Cumberland Plateau. Slopes range from 25 to 70 percent.

Bouldin soils are geographically associated with Grimsley and Talbott soils and with Rock outcrop. Grimsley soils are on the higher side slopes. Their solum is thinner than that of the Bouldin soils. Talbott soils and Rock outcrop are on the lower side slopes.

Talbott soils contain more clay than the Bouldin soils and are 20 to 40 inches deep over bedrock.

Typical pedon of Bouldin stony loam, 25 to 70 percent slopes; 100 feet south of a bridge over the Obey River; 25 feet east of Wilder Road, in Fentress County:

A—0 to 2 inches; very dark grayish brown (10YR 3/2) stony loam; weak medium and fine granular structure; very friable; many fine roots; about 20 percent, by volume, fragments of sandstone 5 to 18 inches in diameter; strongly acid; abrupt smooth boundary.

E—2 to 9 inches; brown (10YR 4/3) stony loam; weak medium granular structure; very friable; many fine roots; about 25 percent, by volume, angular fragments of sandstone 5 to 15 inches in diameter; strongly acid; clear smooth boundary.

BE—9 to 14 inches; strong brown (7.5YR 5/6) very stony loam; moderate fine and medium subangular blocky structure; friable; common fine roots; about 35 percent, by volume, angular fragments of sandstone 5 to 20 inches in diameter; strongly acid; clear smooth boundary.

Bt1—14 to 25 inches; yellowish red (5YR 4/6) very stony clay loam; moderate medium subangular blocky structure; friable; common fine roots; few faint clay films on faces of peds and in pores; about 50 percent, by volume, angular fragments of sandstone 5 to 20 inches in diameter; very strongly acid; gradual wavy boundary.

Bt2—25 to 60 inches; yellowish red (5YR 4/6) extremely stony clay loam; moderate medium and fine subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds and in pores; about 65 percent, by volume, angular fragments of sandstone 5 to 20 inches in diameter; very strongly acid; gradual wavy boundary.

BC—60 to 90 inches; yellowish red (5YR 4/6) extremely stony loam; common fine to coarse prominent yellowish brown (10YR 5/4) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds, in pores, and on rock fragments; about 65 percent, by volume, angular fragments of sandstone 10 to 20 inches in diameter; very strongly acid.

The thickness of the solum ranges from 60 to more than 100 inches. The depth to bedrock, mainly limestone, is more than 5 feet. Reaction is strongly acid or very strongly acid in unlimed areas. The content of sandstone fragments ranges, by volume, from 15 to 35 percent in the A horizon and from 35 to 65 percent in the B horizon. The size of the fragments ranges from 1 inch to several feet across. The dominant size is 10 to 20 inches in diameter.

The A and E horizons are loam or stony loam. The A horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. The E horizon has hue of 10YR, value of 4 to 6, and chroma of 3 or 4.

The BE horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. It is loam, sandy clay loam, or the stony or very stony analogs of those textures.

The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 6 to 8. It is loam, clay loam, sandy clay loam, or the very stony or extremely stony analogs of those textures.

The BC horizon has colors and textures similar to those of the Bt horizon. It is mottled in some pedons. The range in texture includes sandy loam.

Christian Series

The Christian series consists of very deep, well drained soils that formed in material weathered from limestone having pockets or seams of siltstone, sandstone, shale, and chert. These soils are on uplands on the Highland Rim. Slopes range from 5 to 20 percent.

Christian soils are geographically associated with Baxter, Sulphura, and Waynesboro soils. Baxter and Waynesboro soils are on the slightly higher ridgetops. Their solum is thicker than that of the Christian soils. Sulphura soils are on side slopes below the Christian soils. Their solum is thinner than that of the Christian soils.

Typical pedon of Christian silt loam, in an area of Christian-Baxter complex, 5 to 20 percent slopes, eroded; 5.0 miles west of Byrdstown and 0.5 mile north of Amonette Cemetery, in Pickett County:

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

Bt1—5 to 14 inches; yellowish red (5YR 5/6) silty clay loam; moderate fine and medium subangular blocky structure; friable; many fine roots; few faint clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—14 to 24 inches yellowish red (5YR 5/6) clay; strong fine and medium subangular blocky structure; firm, plastic; common fine roots; common distinct clay films on faces of peds; few streaks and fragments of brownish yellow (10YR 6/6), partially weathered sandstone; about 5 percent, by volume, fragments of chert; very strongly acid; gradual wavy boundary.

Bt3—24 to 48 inches; yellowish red (5YR 5/6) clay; many medium and coarse distinct red (2.5YR 5/6) and pale yellow (5YR 7/3) and many medium distinct brownish yellow (10YR 6/6) mottles; strong medium and coarse subangular blocky structure; very firm, plastic; few fine roots; common distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

C—48 to 65 inches; mottled red (2.5YR 5/6), brownish yellow (10YR 6/6), and pale yellow (5YR 7/3) clay; relict platy structure; very firm; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. The depth to bedrock is more than 5 feet. Reaction is strongly acid or very strongly acid in unlimed areas. Chert fragments 1 to 4 inches in diameter are in some pedons. The content of these fragments ranges from 0 to 20 percent in the upper horizons. A few pedons have cherty tongues that extend to the bedrock.

In most pedons the Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4 and is silt loam. In severely eroded areas, however, it has hue of 10YR, value of 4 to 6, and chroma of 3 to 6 and is silty clay loam or clay loam. The A horizon, if it occurs, is 1 to 6 inches thick. It has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is silt loam.

The Bt horizon has hue of 5YR or 2.5YR, value of dominantly 4 or 5, and chroma of 4 to 8. In some pedons, however, the lower part has value of 3. This horizon generally has mottles in shades of brown or yellow, but in some pedons it has mottles in shades of gray in the lower part. The horizon is silty clay, clay, silty clay loam, or the gravelly analogs of those textures.

The C horizon is mottled in shades or red, brown, yellow, olive, or gray. It is clay or silty clay.

Clarkrange Series

The Clarkrange series consists of very deep, moderately well drained soils that formed in material weathered from shale and sandstone. These soils have a fragipan. They are on broad, smooth ridgetops and hilltops on the Cumberland Plateau. Slopes range from 2 to 6 percent.

Clarkrange soils are geographically associated with Lonewood soils. Lonewood soils are on ridgetops and the slightly lower side slopes and are well drained. They do not have a fragipan.

Typical pedon of Clarkrange silt loam, in an area of Lonewood-Clarkrange complex, 2 to 6 percent slopes; 18 miles south of the courthouse in Jamestown, on U.S. Highway 127 to its junction with State Highway 62; east on State Highway 62 for 3.5 miles to a telephone pole on the north side of the highway; 25 feet north of the telephone pole, in Fentress County:

Oe—1 inch to 0; partially decomposed leaves and pine needles.

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

E—2 to 6 inches; brown (10YR 5/3) silt loam; weak fine granular structure; very friable; many fine roots; many fine discontinuous pores; very strongly acid; clear smooth boundary.

BE—6 to 11 inches; brown (10YR 5/3) silt loam; weak fine subangular blocky structure; very friable; common fine and medium roots; many fine discontinuous pores; very strongly acid; gradual smooth boundary.

Bt1—11 to 18 inches; yellowish brown (10YR 5/4) silt loam; weak fine and moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; common fine roots; few fine discontinuous pores; very strongly acid; gradual smooth boundary.

Bt2—18 to 24 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct pale brown (10YR 6/3) and common medium faint yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable; few distinct clay films on faces of peds; few fine roots; few fine discontinuous pores; very strongly acid; clear smooth boundary.

Btx1—24 to 32 inches; yellowish brown (10YR 5/4) silt loam; many medium distinct light gray (10YR 7/1) and pale brown (10YR 6/3) and many medium prominent strong brown (5YR 5/6) mottles; weak coarse prismatic structure parting to moderate thick platy and weak medium subangular blocky; vertical seams, ¼ to 1 inch thick, filled with grayish silt and silt loam; very firm; brittle in about 60 percent of the mass; few faint clay films on faces of peds; very strongly acid; gradual smooth boundary.

Btx2—32 to 45 inches; mottled yellowish brown (10YR 5/4), pale brown (10YR 6/3), and strong brown (7.5YR 5/6) silt loam; weak coarse prismatic structure parting to weak thick platy and weak medium angular blocky; vertical seams, one-quarter to one-half inch thick, filled with grayish silt loam and silt; brittle in 70 percent of the mass; few distinct clay films on faces of peds and on the sides of prisms; very strongly acid; gradual smooth boundary.

BC—45 to 65 inches; strong brown (7.5YR 5/8) clay loam; common medium prominent yellowish brown (10YR 5/6), yellowish red (5YR 5/6), and pale brown (10YR 6/3) mottles; weak medium subangular blocky structure, which resembles rock structure; firm; about 10 percent, by volume, fragments of shale; very strongly acid; clear smooth boundary.

R—65 inches; hard sandy shale bedrock.

The thickness of the solum ranges from 35 to 70 inches. The depth to hard shale, siltstone, or sandstone bedrock ranges from 40 to 90 inches. Reaction is strongly acid or very strongly acid in unlimed areas. The content of shale, siltstone, or sandstone fragments, mainly 1 to 3 inches across, ranges, by volume, from 0 to 10 percent in the solum and from 10 to 70 percent in the BC horizon and C horizons. A few small, soft, black and brown concretions are throughout the solum in some pedons.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 to 4. The E horizon has hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 2 to 4. It is silt loam or loam.

The BE horizon, if it occurs, has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 to 8. It is silt loam or loam.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 4 to 8. It is silt loam or silty clay loam.

The Bx or Btx horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 6. It has mottles with chroma of 2 or less, or it is light gray or grayish brown and has brownish or yellowish mottles. It is silt loam, loam, silty clay loam, or clay loam.

The BC horizon and the C horizon, if it occurs, have hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 2 to 8. They are clay loam, silt loam, loam, silty clay loam, silty clay, or the gravelly or very gravelly analogs of those textures.

Dickson Series

The Dickson series consists of very deep, moderately well drained soils that formed in a mantle of loess and in the underlying material weathered from dolomitic limestone. These soils have a fragipan. They are on broad ridges and plateaulike upland flats on the Highland Rim. Slopes range from 2 to 6 percent.

Dickson soils are geographically associated with Bewleyville and Waynesboro soils. Bewleyville and Waynesboro soils are on the slightly lower ridgetops. They do not have a fragipan. Also, Waynesboro soils contain more clay than the Dickson soils.

Typical pedon of Dickson silt loam, in an area of Bewleyville-Dickson complex, 2 to 6 percent slopes; 0.25 mile west of Plain Grove; 1,000 feet north of the Overton County line, in Pickett County:

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

BE—7 to 11 inches; yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure; friable; very strongly acid; clear smooth boundary.

Bt—11 to 24 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; very strongly acid; clear wavy boundary.

Btx/E—24 to 28 inches; yellowish brown ((10YR 5/4) silt loam; common medium distinct pale brown (10YR 6/3) and light brownish gray (10YR 6/2) and few fine prominent strong brown (7.5YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine angular blocky; firm; slightly brittle in 30 percent of the mass; very strongly acid; gradual wavy boundary.

Btx—28 to 38 inches; mottled light brownish gray (10YR 6/2), yellowish brown (10YR 5/4), and strong brown (7.5YR 5/6) silt loam; moderate medium and coarse prismatic structure parting to moderate medium subangular blocky; firm; brittle in more than 60 percent of the mass; few faint clay films; very strongly acid; gradual wavy boundary.

2Bt—38 to 60 inches; yellowish red (5YR 4/6) clay; common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium angular blocky structure; firm; few faint clay films on faces of peds; very strongly acid.

The solum is more than 60 inches thick. The depth to limestone bedrock is more than 6 feet. Depth to the fragipan ranges from 24 to 36 inches. Reaction is strongly acid or very strongly acid in unlimed areas.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The BE horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6.

The Bt, Btx/E, and Btx horizons are silt loam or silty clay loam. The Bt horizon has hue of 10YR or 2.5Y, value or 4 or 5, and chroma of 3 to 6. The Btx/E horizon has hue of 10YR, value of 5 or 6, and chroma of 2 to 4. The Btx horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 to 6, or it is mottled in shades of brown, yellow, red, or gray.

The 2Bt horizon has hue of 2.5YR to 7.5YR, value of 3 to 5, and chroma of 6 to 8. It has mottles in shades of brown, yellow, red, or gray. It is silty clay loam, silty clay, or clay.

Egam Series

The Egam series consists of very deep, moderately well drained soils that formed in alluvium on flood plains throughout the survey area. Slopes range from 1 to 3 percent.

Egam soils are geographically associated with Sequatchie and Sullivan soils. Sequatchie soils are in the slightly higher areas on low stream terraces. They have an argillic horizon. Sullivan soils are on flood plains and are well drained. They contain less clay than the Egam soils and do not have a dark surface layer.

Typical pedon of Egam silty clay loam, in an area of Sullivan-Sequatchie-Egam complex, 1 to 6 percent slopes, rarely to occasionally flooded; 500 feet north of the Wolf River; 8 miles west of Delk Creek, in Fentress County:

Ap—0 to 8 inches; dark brown (10YR 3/3) silty clay loam; moderate medium granular structure; friable; many fine roots; medium acid; clear smooth boundary.

Bw1—8 to 22 inches; very dark grayish brown (10YR 3/2) silty clay loam; moderate medium subangular blocky and fine granular structure; firm; many fine roots; medium acid; clear smooth boundary.

Bw2—22 to 32 inches; dark brown (10YR 3/3) silty clay loam; moderate medium subangular blocky and fine granular structure; firm; common roots; slightly acid; gradual smooth boundary.

Bw3—32 to 50 inches; dark brown (10YR 4/3) silty clay loam; moderate medium subangular blocky structure; firm; common fine roots; slightly acid; gradual smooth boundary.

C—50 to 68 inches; brown (10YR 4/3) sandy loam; massive; friable; medium acid.

The thickness of the solum ranges from 40 to 60 inches. The depth to limestone bedrock is more than 6 feet. Reaction is medium acid to neutral.

The A horizon and the part of the Bw horizon that is included in the mollic epipedon have hue of 10YR and value and chroma of 2 or 3. The part of the Bw horizon directly below the mollic epipedon has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 3 to 6. It is silty clay loam, silty clay, or clay.

The C horizon has hue of 10YR, value of 4 to 6, and chroma of 1 to 6. It is sandy loam to clay.

Etowah Series

The Etowah series consists of very deep, well drained soils that formed in alluvial sediments deposited by streams, in sediments that have moved downslope, and in the underlying material weathered from limestone. These soils are on terraces and foot slopes on the Highland Rim. Slopes range from 5 to 20 percent.

Etowah soils are geographically associated with Talbott and Waynesboro soils. Talbott and Waynesboro soils contain more clay than the Etowah soils. Talbott soils are on the slightly higher sides of hills. Waynesboro soils are on the more rolling ridges.

Typical pedon of Etowah silt loam, in an area of Waynesboro-Etowah complex, 5 to 12 percent slopes, eroded; 3.0 miles west of Jamestown, 0.5 mile west of a rock quarry along State Highway 52, and 25 feet south of a road near an oil well, in Fentress County:

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

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

Bt1—14 to 28 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; common fine roots; strongly acid; gradual wavy boundary.

Bt2—28 to 50 inches; yellowish red (5YR 4/6) silty clay loam; common medium distinct dark red (2.5YR 3/6) and pale brown (10YR 6/3) mottles; moderate medium angular and subangular blocky structure; few fine roots; friable; few faint clay films on faces of peds; about 5 percent rounded quartzite pebbles one-quarter to one-half inch in diameter; strongly acid; gradual wavy boundary.

Bt3—50 to 70 inches; red (2.5YR 4/6) clay; moderate medium and fine subangular blocky structure; firm; many distinct clay films on faces of peds; about 5 percent rounded quartzite pebbles one-quarter to one-half inch in diameter; strongly acid.

The solum is more than 60 inches thick. The depth to bedrock, commonly limestone, ranges from 6 to more than 15 feet. Reaction is strongly acid or very strongly acid in unlimed areas. Some pedons have as much as 15 percent quartzite pebbles or chert fragments ¼ inch to 3 inches in diameter in any horizon.

The A horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 to 4. The BA horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is dominantly silt loam. In eroded areas, however, it is silty clay loam or clay loam.

The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 6 to 8. It is dominantly silty clay loam or clay loam, but in some pedons the lower part is clay.

Gilpin Series

The Gilpin series consists of moderately deep, well drained soils that formed in material weathered from shale, siltstone, and sandstone. These soils are on hillsides and ridgetops on the Cumberland Plateau. Slopes range from 5 to 20 percent.

Gilpin soils are geographically associated with Jefferson, Lily, and Shelocta soils. Jefferson and Lily soils do not contain fragments of shale. Jefferson soils are on side slopes below the Gilpin soils. Lily soils are on the slightly higher ridgetops. Shelocta soils are on side slopes below the Gilpin soils. They are more than 40 inches deep over bedrock.

Typical pedon of Gilpin silt loam, in an area of Gilpin silt loam, 5 to 20 percent slopes, eroded; 0.5 mile west of Wilder on a gravel road, near a curve in the road, in Fentress County:

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

AE—2 to 6 inches; grayish brown (10YR 5/2) silt loam; weak fine granular structure; very friable; many fine roots; strongly acid; clear smooth boundary.

BE—6 to 13 inches; yellowish brown (10YR 5/6) channery silt loam; weak fine and medium subangular blocky structure; friable; common fine roots; about 15 percent, by volume, fragments of shale and siltstone; very strongly acid; gradual wavy boundary.

Bt—13 to 25 inches; yellowish brown (10YR 5/8) channery silty clay loam; moderate fine and medium angular and subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; about 20 percent, by volume, fragments of shale and siltstone; very strongly acid; gradual wavy boundary.

BC—25 to 30 inches; yellowish brown (10YR 5/4) channery silty clay loam; many medium distinct pale brown (10YR 6/3) and prominent red (2.5YR 4/8) mottles; weak medium subangular blocky structure; friable; about 30 percent, by volume, fragments of shale and siltstone; very strongly acid; clear wavy boundary.

R—30 inches; shale and siltstone bedrock.

The thickness of the solum ranges from 18 to 36 inches. The depth to rippable bedrock ranges from 20 to 40 inches. Reaction is strongly acid or very strongly acid in unlimed areas. The content of shale fragments ranges from 10 to about 40 percent, by volume, in individual horizons.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2. The E horizon, if it occurs, has hue of 10YR, value of 4 to 6, and chroma of 3 or 4. It is silt loam.

The Bt horizon has hue of 7.5YR to 2.5YR, value of 5, chroma of 4 to 8. It is silt loam, silty clay loam, or the gravelly or channery analogs of those textures. The BC horizon has colors and textures similar to those of the Bt horizon.

Grimsley Series

The Grimsley series consists of deep, well drained soils that formed in colluvium washed from mountain slopes. These soils are on the lower side slopes and benches below the Cumberland Plateau Escarpment. Slopes range from 20 to 60 percent.

Grimsley soils are geographically associated with Bouldin and Jefferson soils. Bouldin and Jefferson soils have a solum that is thicker than that of the Grimsley soils. Bouldin soils are on the lower side slopes and benches. Jefferson soils are on side slopes.

Typical pedon of Grimsley cobbly loam, in an area of Grimsley-Jefferson-Rock outcrop complex, 20 to 60 percent slopes; 1.0 mile west of the junction of Big Piney Creek and Long Branch, 200 feet downslope on the east side of a logging road, in Fentress County:

A—0 to 2 inches; very dark grayish brown (10YR 3/2) cobbly loam; moderate fine granular structure; very friable; many fine and medium roots; about 15 percent, by volume, sandstone cobbles; strongly acid; abrupt smooth boundary.

E—2 to 8 inches; brown (10YR 5/3) very cobbly loam; weak medium granular structure; very friable; many fine and medium roots and pores; about 40 percent, by volume, angular fragments of sandstone less than 1 inch to about 5 inches across and a few fragments 20 inches across; strongly acid; clear wavy boundary.

E2—8 to 17 inches; brown (7.5YR 5/4) very cobbly loam; weak fine and medium subangular blocky structure; very friable; common fine and medium roots and pores; about 40 percent, by volume, angular fragments of sandstone, most of which are 2 to 6 inches across; very strongly acid; gradual wavy boundary.

Bt1—17 to 26 inches; strong brown (7.5YR 5/6) very cobbly loam; weak medium and fine subangular blocky structure; friable; common fine and medium roots and pores; about 45 percent, by volume, angular fragments of sandstone 2 to 12 inches across; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—26 to 39 inches; strong brown (7.5YR 5/6) very cobbly clay loam; moderate medium subangular blocky structure; friable; few fine roots and pores; few faint clay films on faces of peds; about 50 percent, by volume, fragments of sandstone 2 to 12 inches across; very strongly acid; gradual wavy boundary.

BC1—39 to 47 inches; strong brown (7.5YR 5/6) very cobbly loam; weak medium and fine subangular blocky structure; friable; few fine roots and pores; about 45 percent, by volume, fragments of sandstone 2 to 12 inches across; very strongly acid; gradual wavy boundary.
BC2—47 to 57 inches; strong brown (7.5YR 5/6) very cobbly clay loam; few fine faint yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots and pores; about 40 percent, by volume, fragments of sandstone 2 to 10 inches across; very strongly acid; clear wavy boundary.
R—57 inches; soft shale bedrock.

The thickness of the solum and the depth to shale or sandstone bedrock range from 40 to 60 inches. The content of sandstone and shale fragments ranges from 15 to 50 percent in the A horizon and from 35 to 65 percent in the B and C horizons. Cobbles and stones have accumulated on the surface in some low areas. The rock fragments are dominantly 2 to 12 inches in size, but some are larger. Reaction is strongly acid or very strongly acid in unlimed areas.

The A and E horizons are loam or cobbly or very cobbly loam. The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2. The E horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 or 4.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. It is loam, clay loam, or the very cobbly or extremely cobbly analogs of those textures. The BC and C horizons have colors and textures similar to those of the Bt horizon.

Guthrie Series

The Guthrie series consists of very deep, poorly drained soils that formed in loess or alluvium. These soils are on upland flats and in depressions on the Highland Rim. Slopes range from 0 to 3 percent.

Guthrie soils are geographically associated with Dickson soils. Dickson soils are on the slightly higher upland flats and in depressions and are moderately well drained.

Typical pedon of Guthrie silt loam, 0 to 3 percent slopes, depressional; 0.5 mile west of Static; 200 feet south of the Kentucky State line, in Pickett County:

Ap—0 to 7 inches; grayish brown (10YR 5/2) silt loam; weak fine granular structure; very friable; many fine roots; strongly acid; abrupt smooth boundary.
Bg1—7 to 14 inches; gray (10YR 6/1) silt loam; common fine and medium faint light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable; common fine roots; strongly acid; gradual smooth boundary.
Bg2—14 to 30 inches; gray (10YR 6/1) silt loam; common fine and medium faint light yellowish brown (10YR 6/4) and distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; very strongly acid; gradual smooth boundary.
Btx1—30 to 42 inches; gray (10YR 6/1) silt loam; many medium distinct brownish yellow (10YR 6/6), faint pale brown (10YR 6/3), and prominent yellowish red (5YR 4/6) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; slightly brittle in more than 60 percent of the mass; firm; few fine roots; very strongly acid; gradual irregular boundary.
Btx2—42 to 52 inches; mottled gray (10YR 6/1), pale brown (10YR 6/3), and yellowish red (5YR 4/6) silt loam; moderate coarse prismatic structure parting to moderate medium subangular blocky; brittle in more than 60 percent of the mass; hard; a few vertical veins or streaks of gray silty clay extending through the horizon; few faint clay films on faces of some peds and in pores; very strongly acid; gradual irregular boundary.
Btx3—52 to 65 inches; mottled gray (10YR 6/1), yellowish brown (10YR 5/6), dark gray (10YR 4/1), and yellowish red (5YR 4/6) silty clay loam; weak coarse prismatic structure parting to weak medium subangular blocky, grading toward massive; firm; brittle in more than 60 percent of the mass; few distinct clay films on faces of some peds; veins of dark gray silty clay as much as one-quarter inch wide; few chert fragments; very strongly acid.

The solum is more than 60 inches thick. The depth to limestone bedrock is more than 6 feet. Reaction is strongly acid or very strongly acid in unlimed areas. Depth to the fragipan ranges from 20 to 40 inches.

The Ap horizon has hue of 10YR, value of 5, and chroma of 2 or 3. The Bg and Btx horizons are silt loam or silty clay loam. The Bg horizon has hue of 10YR or 2.5Y, value of 5 to 7, chroma of 1 or 2. The Btx horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. It is mottled in some pedons.

Holston Series

The Holston series consists of very deep, well drained soils that formed in alluvium or local slope wash derived from soils that formed in material weathered from shale, siltstone, or sandstone. The Holston soils are on toe slopes and terraces along Dale Hollow Lake. Slopes range from 3 to 12 percent.

Holston soils are geographically associated with Leadvale and Sulphura soils. Leadvale soils are in the slightly lower landscape positions. They have a fragipan. Sulphura soils are on steep hillsides. They are moderately deep over bedrock. Their solum is thinner than that of the Holston soils.

Typical pedon of Holston loam, in an area of Leadvale-Holston complex, 3 to 12 percent slopes, eroded; 0.8 mile north of Etter; 1,000 feet south of the Wolf River, in Fentress County:

Ap—0 to 7 inches; brown (10YR 4/3) loam; weak medium granular structure; very friable; many roots; about 10 percent, by volume, rounded and angular sandstone fragments ¼ to 1 inch in diameter; strongly acid; clear smooth boundary.

BE—7 to 12 inches; yellowish brown (10YR 5/4) loam; weak fine and medium subangular blocky structure; friable; many fine roots; about 5 percent, by volume, rounded and angular sandstone fragments ¼ to 1 inch in diameter; strongly acid; gradual smooth boundary.

Bt1—12 to 30 inches; yellowish brown (10YR 5/6) clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; about 5 percent, by volume, rounded and angular sandstone fragments ½ to 1 inch in diameter; strongly acid; gradual smooth boundary.

Bt2—30 to 43 inches; strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; friable; few thin patchy clay films on faces of peds; about 5 percent, by volume, rounded and angular sandstone fragments ¼ to 1 inch in diameter; strongly acid; gradual smooth boundary.

Bt3—43 to 60 inches; strong brown (7.5YR 5/6) clay loam; common medium distinct yellowish red (5YR 5/6) and pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; about 5 percent, by volume, rounded and angular sandstone fragments ¼ to 1 inch in diameter; strongly acid.

The solum is more than 60 inches thick. The depth to bedrock is more than 5 feet. Reaction is strongly acid or very strongly acid. The content of sandstone, chert, or shale fragments ¼ inch to 3 inches in diameter ranges, by volume, from 2 to about 15 percent in the upper part of the profile and from 2 to about 40 percent in the lower part of the Bt horizon.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The BE horizon has hue of 10YR, value of 5 or 6, and chroma of 4. It is loam, clay loam, fine sandy loam, or sandy loam. The Bt horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. It is clay loam, sandy clay loam, or silty clay loam.

Jefferson Series

The Jefferson series consists of very deep, well drained soils that formed in colluvium derived from the higher slopes of hills and mountains underlain by sandstone and siltstone. These soils are on benches, fans, and foot slopes on the Cumberland Plateau. Slopes range from 15 to 60 percent.

Jefferson soils are geographically associated with Grimsley and Ramsey soils. Grimsley soils are on side slopes. They are loamy-skeletal. Ramsey soils are on the higher sides of hills. They are less than 20 inches deep over bedrock.

Typical pedon of Jefferson loam, in an area of Grimsley-Jefferson-Rock outcrop complex, 20 to 60 percent slopes; 100 feet east of the city lake dam on White Oak Creek, in Fentress County:

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

E—2 to 6 inches; brown (10YR 5/3) loam; moderate fine and medium granular structure; very friable; many fine roots; about 10 percent, by volume, fragments of sandstone 1 to 3 inches across; strongly acid; gradual smooth boundary.

Bt1—6 to 12 inches; strong brown (7.5YR 5/6) clay loam; weak medium subangular blocky structure; friable; common fine roots; few faint clay films on faces of peds; about 10 percent, by volume, fragments of sandstone 1 to 3 inches across; strongly acid; gradual smooth boundary.

Bt2—12 to 24 inches; strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; about 10 percent, by volume, fragments of sandstone 1 to 3 inches across; strongly acid; gradual smooth boundary.

Bt3—24 to 40 inches; strong brown (7.5YR 5/6) gravelly clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; about 15 percent, by volume, fragments of sandstone 1 to 3 inches across; strongly acid; gradual wavy boundary.

BC—40 to 60 inches; yellowish brown (10YR 5/6) gravelly clay loam; common medium distinct brown (10YR 5/3) mottles; weak medium subangular blocky structure; friable; about 20 percent, by volume, fragments of sandstone 1 to 3 inches across; strongly acid.

The thickness of the solum ranges from 45 to 60 inches. The depth to bedrock is more than 60 inches. The content of sandstone fragments ranges, by volume, from 0 to 15 percent in the A and Bt horizons and from 15 to 35 percent in the BC horizon. The fragments range from 1 to 6 inches in diameter. Reaction is strongly acid or very strongly acid in unlimed areas.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The E horizon has hue of 10YR, value of 4 to 6, and chroma of 3 or 4. It is loam or silt loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 6 to 8. It is clay loam, sandy clay loam, or the gravelly analogs of those textures.

The BC horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 8. It is loam, sandy clay loam, or the gravelly analogs of those textures.

Leadvale Series

The Leadvale series consists of very deep, moderately well drained soils that formed in alluvial and fluvial material washed from soils that formed in material weathered from shale and siltstone. The Leadvale soils have a fragipan. They are on slightly concave toe slopes and terraces around Dale Hollow Lake. Slopes range from 3 to 12 percent.

Leadvale soils are geographically associated with Holston and Sullivan soils. Holston soils are on side slopes slightly above the Leadvale soils. They do not have a fragipan. Sullivan soils are on flood plains and are well drained.

Typical pedon of Leadvale silt loam, in an area of Leadvale-Holston complex, 3 to 12 percent slopes, eroded; 150 feet north of Jovett Creek; 500 feet west of a curve in a road, in Pickett County:

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

BA—6 to 15 inches; yellowish brown (10YR 5/4) silt loam; moderate fine and medium subangular blocky structure; friable; few shale fragments ¼ to 1 inch in size; strongly acid; gradual smooth boundary.

Bt—15 to 24 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of some peds; strongly acid; clear wavy boundary.

Bx1—24 to 32 inches; mottled yellowish brown (10YR 5/4), strong brown (7.5YR 5/6), and light brownish gray (10YR 6/3) silty clay loam; moderate medium and thick platy structure parting to moderate medium subangular and angular blocky; firm; brittle; gray streaks one-quarter to one-half inch wide; clay films around voids less than 1 centimeter in size; strongly acid; gradual smooth boundary.

Bx2—32 to 54 inches; mottled pale brown (10YR 6/3), light brownish gray (10YR 6/2), and yellowish brown (10YR 5/6) silty clay loam; massive; firm; brittle; gray streaks of clay 1 to 2 millimeters in size; strongly acid; gradual smooth boundary.

C—54 to 75 inches; brownish yellow (10YR 6/6) silty clay loam; common medium faint yellowish brown (10YR 5/6) and common medium prominent gray (N 6/0) mottles; massive; firm; gray streaks of clay; about 5 percent shale fragments; strongly acid; abrupt boundary.

R—75 inches; soft shale bedrock.

The thickness of the solum ranges from 40 to 60 inches. The depth to bedrock ranges from 4 to more than 8 feet. Depth to the fragipan ranges from 16 to 38 inches. Reaction is strongly acid or very strongly acid in unlimed areas. The content of weathered shale fragments ¼ inch to 1½ inches across ranges, by volume, from 0 to 10 percent in each horizon.

The Ap horizon has hue of 10YR, value of 4 to 6, and chroma of 2 or 3. The BA horizon, if it occurs, and the Bt and Bx horizons are silt loam or silty clay loam. They have hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. In many pedons the Bx horizon is mottled in shades of brown, yellow, or gray. The C horizon, if it occurs, has colors and textures similar to those of the Bx horizon.

Lily Series

The Lily series consists of moderately deep, well drained soils that formed in colluvium weathered mainly from level-bedded, acid sandstone. These soils are on broad, rolling hilltops and side slopes on the Cumberland Plateau. Slopes range from 3 to 8 percent.

Lily soils are geographically associated with Lonewood and Ramsey soils. Lonewood soils are on the slightly higher hilltops. They are more than 40 inches deep over bedrock. Ramsey soils are on the steeper side slopes. They are less than 20 inches deep over bedrock.

Typical pedon of Lily loam, 3 to 8 percent slopes; 2.0 miles south of Jamestown; 1.0 mile east on Ledbetter Road; 50 feet south of the road, in Fentress County:

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

E—2 to 6 inches; brown (10YR 5/3) loam; weak fine granular structure; friable; many roots; strongly acid; abrupt smooth boundary.

BE—6 to 14 inches; yellowish brown (10YR 5/4) loam; weak fine subangular blocky structure; friable;

common fine roots; strongly acid; gradual smooth boundary.

Bt1—14 to 22 inches; yellowish brown (10YR 5/6) loam; moderate fine and medium subangular blocky structure; friable; common fine roots; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—22 to 31 inches; yellowish brown (10YR 5/6) clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; few fine roots; strongly acid; abrupt smooth boundary.

BC—31 to 36 inches; yellowish brown (10YR 5/4) sandy clay loam; very weak fine granular structure; very friable; small pockets of soft, weathered sandstone; strongly acid; abrupt wavy boundary.

R—36 inches; sandstone bedrock.

The thickness of the solum and the depth to hard sandstone bedrock range from 20 to 40 inches. Reaction is strongly acid or very strongly acid throughout the profile, except for surface layer in limed areas.

The Ap and E horizons have hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2 to 4. The A horizon has hue of 7.5YR or 10YR, value 2 to 5, and chroma of 1 to 3.

The Bt horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. It is loam, sandy clay loam, or clay loam.

The BC horizon and the C horizon, if it occurs, have hue of 2.5YR to 10YR, value of 5 or 6, and chroma of 4 to 8. They are loam, clay loam, or sandy clay loam.

Lonewood Series

The Lonewood series consists of very deep, well drained soils that formed in material weathered mainly from shale and siltstone and some sandstone. These soils are in broad, smooth areas on the Cumberland Plateau. Slopes range from 2 to 6 percent.

Lonewood soils are geographically associated with Clarkrange and Lily soils. Clarkrange soils are on the more nearly level ridgetops. They have a fragipan. Lily soils are on the slightly lower side slopes. They are less than 40 inches deep over bedrock.

Typical pedon of Lonewood silt loam, in an area of Lonewood-Clarkrange complex, 2 to 6 percent slopes; 0.25 mile west of U.S. Highway 127 and 4.0 miles north of Jamestown, in Fentress County:

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

AE—2 to 9 inches; brown (10YR 5/3) silt loam; weak medium granular structure; friable; many fine roots; very strongly acid; clear smooth boundary.

BE—9 to 16 inches; yellowish brown (10YR 5/4) silt loam; weak medium granular and fine subangular blocky structure; friable; common fine roots; very strongly acid; gradual smooth boundary.

Bt1—16 to 24 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; common fine roots; few fine dark brown concretions; few faint clay films on faces of some peds; very strongly acid; gradual smooth boundary.

Bt2—24 to 30 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common fine roots; few fine dark brown concretions; common distinct clay films on faces of some peds; very strongly acid; clear smooth boundary.

Bt3—30 to 35 inches; yellowish brown (10YR 5/6) silt loam; common medium faint strong brown (7.5YR 5/6), light yellowish brown (10YR 6/4), and pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; firm; slightly brittle in some parts; few fine roots; few fine dark brown concretions; few faint clay films on faces of some peds; very strongly acid; clear smooth boundary.

Bt4—35 to 42 inches; strong brown (7.5YR 5/6) silty clay loam; few medium distinct pale brown (10YR 6/3) and light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; firm; few faint clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt5—42 to 62 inches; yellowish red (5YR 4/6) clay loam; common medium distinct strong brown (7.5YR 5/6) and brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; firm; few small fragments of shale and sandstone; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

R—62 inches; sandstone and shale bedrock.

The thickness of the solum and the depth to shale, siltstone, or sandstone bedrock range from 40 to 72 inches. Reaction is strongly acid or very strongly acid in unlimed areas. The content of coarse fragments is less than 10 percent in the A and B horizons.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. The E horizon, if it occurs, has hue of 10YR, value of 4 to 6, and chroma of 3 or 4. It is silt loam. The BE horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 4 to 6.

The upper part of the Bt horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 4 to 8. It is silt loam, loam, silty clay loam, or clay loam. The lower part has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 6 to 8. It is clay loam, silty clay loam, or silty clay.

The C horizon, if it occurs, has colors and textures similar to those in the lower part of the Bt horizon. It is mottled in some pedons.

Petros Series

The Petros series consists of shallow, excessively drained soils that formed in material weathered from shale and siltstone. These soils are on the points and crests of mountain ridges on the Cumberland Plateau. Slopes range from 10 to 35 percent.

Petros soils are geographically associated with Sequoia and Shelocta soils. Sequoia soils are on the higher ridgetops. They have an argillic horizon. Shelocta soils are on foot slopes and side slopes. They are more than 4 feet deep over shale bedrock and have an argillic horizon.

Typical pedon of Petros channery silt loam, in an area of Shelocta-Sequoia-Petros complex, 10 to 35 percent slopes; 0.25 mile west of Wilder, near a curve in a gravel road, in Fentress County:

A—0 to 2 inches; very dark grayish brown (10YR 3/2) channery silt loam; weak fine granular structure; very friable; many medium roots; about 20 percent, by volume, fragments of shale; strongly acid; clear smooth boundary.

E—2 to 7 inches; dark brown (10YR 4/3) channery silt loam; weak fine granular structure; about 20 percent, by volume, fragments of shale; very friable; many medium roots; strongly acid; clear smooth boundary.

Bw—7 to 18 inches; yellowish brown (10YR 5/4) very channery silt loam; weak fine subangular blocky and granular structure; about 40 percent, by volume, fragments of shale; friable; common medium roots; strongly acid; clear smooth boundary.

Cr—18 to 26 inches; laminated shale and siltstone bedrock; can be removed by hand tools; yellowish brown silt loam in narrow, discontinuous cracks about one-quarter inch wide.

R—26 inches; moderately hard shale bedrock.

The thickness of the solum and the depth to soft shale bedrock range from 10 to 20 inches. The depth to hard shale bedrock is more than 20 inches. Reaction is strongly acid or very strongly acid in unlimed areas. The content of shale fragments as much as 6 inches long ranges, by volume, from 15 to 35 percent in the A horizon and from 35 to 80 percent in the Bw horizon.

The A and E horizons are channery or very channery silt loam. The A horizon has hue of 10YR, value of 3, and chroma of 2 or 3. The E horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is loam, silt loam, or the very channery or extremely channery analogs of those textures.

Ramsey Series

The Ramsey series consists of shallow, somewhat excessively drained soils that formed in material weathered from sandstone bedrock. These soils are on the sides of hills and mountains on the Cumberland Plateau. Slopes range from about 5 to 35 percent.

Ramsey soils are geographically associated with Alticrest, Jefferson, and Lily soils. Alticrest soils are on benches and side slopes. They are more than 20 inches deep over bedrock. Jefferson soils are on the lower slopes. They have bedrock at a depth of more than 60 inches. Lily soils are on the higher ridgetops. They have bedrock at a depth of 20 to 40 inches.

Typical pedon of Ramsey loam, in an area of Jefferson-Ramsey complex, 15 to 35 percent slopes; 2.0 miles east of U.S. Highway 127 and 50 feet north of Brushy Creek, in Fentress County:

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

E—2 to 6 inches; brown (10YR 4/3) loam; weak medium granular structure; very friable; many fine roots; about 10 percent, by volume, fragments of sandstone; strongly acid; clear smooth boundary.

Bw1—6 to 13 inches; yellowish brown (10YR 5/4) channery loam; weak fine subangular blocky structure; friable; common fine roots; about 15 percent, by volume, flat fragments of sandstone 1 to 3 inches across; strongly acid; clear smooth boundary.

Bw2—13 to 18 inches; yellowish brown (10YR 5/4) channery loam; weak fine and medium subangular blocky structure; very friable; common fine roots; about 30 percent, by volume, flat fragments of sandstone 1 to 6 inches across; strongly acid; clear wavy boundary.

R—18 inches; hard sandstone bedrock.

The thickness of the solum and the depth to bedrock range from 8 to 20 inches. Reaction is very strongly acid or strongly acid. The content of sandstone fragments 1 to 3 inches in diameter ranges, by volume, from 5 to 15 percent in the A horizon. The content of sandstone fragments 1 to 6 inches in diameter ranges, by volume, from 5 to 35 percent in the Bw horizon.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The E horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6. It is loam, sandy loam, or the channery analogs of those textures.

Sequatchie Series

The Sequatchie series consists of very deep, well drained soils that formed in alluvium. These soils are on benches, in mountain coves, and on low terraces along the major rivers on the Cumberland Plateau. Slopes range from 1 to 6 percent.

Sequatchie soils are geographically associated with Egam and Sullivan soils. Egam soils are on flood plains. They contain more clay than the Sequatchie soils. Sullivan soils are on the lower flood plains. They do not have an argillic horizon.

Typical pedon of Sequatchie loam, in an area of Sullivan-Sequatchie-Egam complex, 1 to 6 percent slopes, rarely to occasionally flooded; 100 feet northeast of a road downslope from Sweet Gum School, in Fentress County:

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

Bt1—10 to 22 inches; brown (7.5YR 4/4) clay loam; weak fine and medium subangular blocky structure; friable; many fine roots; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—22 to 45 inches; brown (7.5YR 4/4) clay loam; few fine faint yellowish brown mottles; weak fine and medium subangular blocky structure; friable; common fine roots; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.

BC—45 to 55 inches; brown (7.5YR 4/4) sandy loam; common medium faint yellowish brown (10YR 5/4) mottles; weak fine and medium subangular blocky structure; friable; few fine roots; strongly acid; gradual smooth boundary.

C—55 to 70 inches; yellowish brown (10YR 5/6) sandy loam; single grain; friable; strongly acid.

The thickness of the solum ranges from 35 to 55 inches. The depth to bedrock is more than 5 feet. Reaction is strongly acid or very strongly acid in unlimed areas. The content of sandstone pebbles and cobbles ranges, by volume, from 0 to 15 percent in the solum and from 5 to 30 percent below the solum.

The Ap horizon has hue of 7.5YR or 10YR, value of 3, and chroma of 2 to 4. The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8 or hue of 5YR, value of 4, and chroma of 4 to 6. The BC horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 8. It is loam, clay loam, fine sandy loam, or sandy loam. The C horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 3 to 6. It is fine sandy loam or sandy loam.

Sequoia Series

The Sequoia series consists of moderately deep, well drained soils that formed in material weathered from shale and siltstone. These soils are on low hills and ridges on the Cumberland Plateau. Slopes range from 5 to 20 percent.

Sequoia soils are geographically associated with Clarkrange, Petros, and Shelocta soils. Clarkrange soils are on the slightly lower ridgetops. They have a fragipan. Petros soils are on the crest of ridges. They are less than 20 inches deep over soft bedrock. Shelocta soils are on the lower side slopes. They are less clayey than the Sequoia soils.

Typical pedon of Sequoia silt loam, 5 to 20 percent slopes, eroded; 0.25 mile west of Armathwaite School; 25 feet north of State Highway 52, in Fentress County:

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

Bt1—5 to 11 inches; yellowish brown (10YR 5/4) silty clay loam; fine weak and medium subangular blocky structure; friable; common fine roots; few faint clay films; strongly acid; gradual smooth boundary.

Bt2—11 to 20 inches; strong brown (7.5YR 5/6) silty clay; moderate medium subangular blocky structure; firm; few fine roots; few distinct clay films; very strongly acid; gradual smooth boundary.

Bt3—20 to 36 inches; yellowish red (5YR 5/6) silty clay; many medium distinct yellowish brown (10YR 5/4) and pale brown (10YR 6/3) mottles; strong angular blocky structure; firm; few distinct clay films; very strongly acid; gradual smooth boundary.

Cr—36 to 60 inches; soft, acid shale bedrock that has a few thin seams of silt loam extending into cracks and coating rock fragments.

The thickness of the solum and the depth to soft shale bedrock range from 20 to 40 inches. Reaction is strongly acid or very strongly acid in unlimed areas. The content of shale fragments of ¼ to 1 inch across ranges, by volume, from 0 to about 15 percent in the Bt horizon.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The Bt horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 6 to 8. It is silty clay loam, silty clay, or clay.

Sewanee Series

The Sewanee series consists of deep, moderately well drained soils that formed in alluvial sediments washed mainly from soils that formed in material weathered from sandstone and shale. The Sewanee soils are on flood plains along the major creeks and rivers on the Cumberland Plateau. Slopes range from 0 to 2 percent.

Sewanee soils are geographically associated with Jefferson and Ramsey soils. Jefferson soils are on foot slopes. They have an argillic horizon. Ramsey soils are on steep mountainsides. They are less than 20 inches deep over bedrock.

Typical pedon of Sewanee loam, 0 to 2 percent slopes, occasionally flooded; 500 feet east of Allardt Road; 200 feet north of Crooked Creek, in Fentress County:

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

Bw1—6 to 20 inches; brown (10YR 4/3) loam; common fine and medium faint light brownish gray (10YR 6/2) and pale brown (10YR 6/3) mottles; weak medium subangular blocky and weak fine granular structure; friable; many fine roots; strongly acid; abrupt smooth boundary.

Bw2—20 to 29 inches; brown (10YR 5/3) loam; common fine and medium faint yellowish brown (10YR 5/4) and light brownish gray (10YR 6/2) and distinct brown (7.5YR 4/4) mottles; weak medium subangular blocky structure; friable; common fine roots; strongly acid; clear smooth boundary.

Bw3—29 to 36 inches; mottled brown (7.5YR 4/4), yellowish brown (10YR 5/4), and light brownish gray (10YR 6/2) loam; weak medium subangular blocky structure; friable; few fine roots; strongly acid; clear smooth boundary.

C—36 to 50 inches; light brownish gray (10YR 6/2) loam; common fine faint yellowish brown and pale brown mottles; massive; friable; strongly acid; few sandstone pebbles; abrupt smooth boundary.

R—50 inches; hard sandstone bedrock.

The thickness of the solum ranges from 25 to 40 inches. The depth to sandstone bedrock ranges from 40 to 60 inches. Reaction is strongly acid or very strongly acid in unlimed areas. The content of sandstone fragments as much as 3 inches in diameter ranges, by volume, from 0 to 15 percent in the A and B horizons and from 0 to 30 percent in the C horizon.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. The Bw and C horizons are loam, silt loam, or fine sandy loam. The Bw horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 or 4. In the lower part it is mottled in shades of brown, yellow, or gray. The C horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2.

Shelocta Series

The Shelocta series consists of deep, well drained soils that formed in colluvium washed from soils underlain by shale, siltstone, and sandstone. The Shelocta soils are on hillsides, foot slopes, and benches in the more dissected areas on the Cumberland Plateau. Slopes range from 10 to 35 percent.

Shelocta soils are geographically associated with Petros and Sequoia soils. Petros soils are on the crest of ridges. They are less than 20 inches deep over soft shale. Sequoia soils are on the higher ridges and in the lower areas on ridgetops. They contain more clay than the Shelocta soils.

Typical pedon of Shelocta silt loam, in an area of Shelocta-Sequoia-Petros complex, 10 to 35 percent slopes; 0.25 mile west of Wilder, near a curve in the road to Sandy, in Fentress County:

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

E—2 to 6 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; very friable; many fine roots; strongly acid; clear smooth boundary.

Bt1—6 to 25 inches; strong brown (7.5YR 5/6) silty clay loam; weak fine and medium subangular blocky structure; friable; few faint clay films on faces of peds; common fine roots; strongly acid; gradual smooth boundary.

Bt2—25 to 30 inches; yellowish brown (10YR 5/6) channery silty clay loam; moderate fine and medium subangular blocky structure; friable; few roots; few faint clay films on faces of peds; about 15 percent, by volume, fragments of shale; very strongly acid; gradual wavy boundary.

BC—30 to 52 inches; yellowish brown (10YR 5/4) channery silty clay loam; many medium distinct pale brown (10YR 6/3) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; about 20 percent, by volume, fragments of shale; firm; very strongly acid; clear smooth boundary.

R—52 inches; shale and siltstone bedrock.

The thickness of the solum ranges from 40 to 60 inches. The depth to hard shale, siltstone, or sandstone bedrock ranges from 48 to more than 90 inches.

Reaction is strongly acid or very strongly acid in unlimed areas. The content of shale or sandstone fragments ranges, by volume, from 5 to 15 percent in the A horizon and from 10 to 25 percent in the Bt horizon.

The A horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3. The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 4.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. It is silty clay loam, silt loam, or the channery or gravelly analogs of those textures.

The BC horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 6 or is mottled in shades of brown, olive, or gray. It is silt loam, silty clay loam, clay loam, loam, or the channery or very channery analogs of those textures.

Sullivan Series

The Sullivan series consists of very deep, well drained soils that formed in alluvium washed from soils that formed in material weathered from limestone, shale, and sandstone. The Sullivan soils are on flood plains along small creeks and rivers. Slopes are 1 to 2 percent.

Sullivan soils are geographically associated with Egam, Leadvale, and Sequatchie soils. Egam and Sequatchie soils are more clayey than the Sullivan soils. Egam soils are on flood plains. Sequatchie soils are in the slightly higher areas on low terraces. Leadvale soils have a fragipan.

Typical pedon of Sullivan silt loam, in an area of Sullivan-Sequatchie-Egam complex, 1 to 6 percent slopes, rarely to occasionally flooded; 3.0 miles east of Pall Mall School, on the north side of the Wolf River, in Fentress County:

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

Bw1—8 to 20 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine and medium subangular blocky structure; friable; many roots; slightly acid; gradual smooth boundary.

Bw2—20 to 42 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine subangular blocky structure; friable; few fine roots; slightly acid; gradual smooth boundary.

Bw3—42 to 51 inches; brown (10YR 4/3) loam; weak fine and medium subangular blocky structure; friable; slightly acid; gradual smooth boundary.

C—51 to 65 inches; brown (10YR 4/3) sandy loam; single grain; friable; slightly acid.

The thickness of the solum ranges from 20 to 55 inches. The depth to bedrock is more than 5 feet. Reaction is slightly acid or neutral. The content of rounded sandstone pebbles ranges from 0 to 5 percent in the upper 40 inches and from 5 to 15 percent below a depth of 40 inches.

The Ap horizon has hue of 10YR, value of 4, and chroma of 2 to 4. The Bw horizon is silt loam or loam. It generally has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. In some pedons a buried A horizon or subhorizons of the B horizon have hue of 10YR or 7.5YR, value of 3, and chroma of 2 or 3. Some pedons have a few mottles with chroma of 2 or less below a depth of 24 inches.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. In some pedons it has few or common mottles with chroma of 2 or less. It is loam or sandy loam.

Sulphura Series

The Sulphura series consists of moderately deep, somewhat excessively drained soils that formed in material weathered from shale or shaly limestone. These soils are on steep hillsides on the Highland Rim. Slopes range from 20 to 75 percent.

Sulphura soils are geographically associated with Christian and Holston soils. Christian soils are on the higher ridgetops. They contain more clay than the Sulphura soils. Holston soils are on the lower foot slopes and benches. They contain more clay than the Sulphura soils and do not have a high content of shale fragments.

Typical pedon of Sulphura channery silt loam, 20 to 75 percent slopes; 0.25 mile north of Cove Creek, at the Cove Creek Recreational Area, in Pickett County:

A—0 to 2 inches; very dark grayish brown (10YR 3/2) channery silt loam; moderate medium granular structure; very friable; about 20 percent, by volume, fragments of shale 1/4 inch to 3 inches across; common medium and fine roots; common fine and medium pores; medium acid; clear smooth boundary.

E—2 to 6 inches; yellowish brown (10YR 5/4) channery silt loam; moderate medium granular structure; friable; about 25 percent, by volume, fragments of shale 1/4 inch to 2 inches across; common fine and medium roots; medium acid; gradual smooth boundary.

Bw1—6 to 20 inches; dark yellowish brown (10YR 4/4) channery silty clay loam; moderate medium subangular blocky structure; friable; about 35 percent, by volume, fragments of shale 1/4 inch to 3 inches across; common fine roots; medium acid; gradual smooth boundary.

Bw2—20 to 28 inches; dark yellowish brown (10YR 4/4) very channery silty clay loam; weak medium subangular blocky structure; friable; about 55 percent, by volume, fragments of shale 1 to 6 inches across; common fine roots; medium acid; clear smooth boundary.

R—28 inches; hard, dark shale bedrock.

The thickness of the solum and the depth to hard shale bedrock range from 20 to 40 inches. Reaction is strongly acid or medium acid in the A horizon and in the upper part of the Bw horizon and strongly acid to slightly acid in the lower part of the Bw horizon. The content of weathered shale fragments ranges, by volume, from 10 to 25 percent in the A horizon and from 35 to 55 percent in the Bw horizon.

The A and E horizons are silt loam or gravelly or channery silt loam. The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The E horizon has hue of 10YR, value of 4 to 6, and chroma of 3 or 4.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is silty clay loam, clay loam, or the very gravelly or very channery analogs of those textures.

Talbott Series

The Talbott series consists of moderately deep, well drained soils that formed in material weathered from limestone. These soils are on the side slopes of low hills in the Cumberland Mountains adjacent to the eastern edge of the Highland Rim. Slopes range from 10 to 35 percent.

Talbott soils are geographically associated with Baxter and Christian soils. Baxter and Christian soils are on the upper side slopes. They are more than 40 inches deep over bedrock.

Typical pedon of Talbott silt loam, in an area of Talbott-Rock outcrop complex, 10 to 35 percent slopes; 0.5 mile south of Honey Spring Mountain; 0.5 mile north of Riler Mountain; 50 feet west of a road, in Pickett County:

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

Bt1—5 to 12 inches; yellowish red (5YR 4/6) clay; moderate and strong medium subangular blocky structure parting to fine subangular blocky; firm, plastic; few faint clay films on faces of peds; few fine black concretions; strongly acid; gradual smooth boundary.

Bt2—12 to 20 inches; yellowish red (5YR 5/6) clay; strong medium subangular blocky structure; common distinct clay films; firm, plastic; few fine black concretions; strongly acid; gradual smooth boundary.

Bt3—20 to 28 inches; yellowish red (5YR 5/6) clay; moderate medium subangular blocky structure; firm, plastic; common distinct clay films; strongly acid; gradual smooth boundary.

Bt4—28 to 34 inches; yellowish red (5YR 4/6) clay; common medium distinct dark reddish brown (5YR 3/4) mottles; moderate medium subangular blocky structure; common distinct clay films; firm, plastic; few fine black concretions; strongly acid; clear smooth boundary.

BC—34 to 36 inches; strong brown (7.5YR 5/6) clay; common medium distinct reddish brown (5YR 5/4) mottles; moderate fine subangular blocky structure; firm; neutral; clear smooth boundary.

R—36 inches; limestone bedrock.

The thickness of the solum and the depth to hard limestone bedrock range from 20 to 40 inches. Reaction is strongly acid to slightly acid in the upper part of the solum and ranges to mildly alkaline directly above the bedrock. A few pedons have chert fragments in the upper part.

The Ap horizon generally has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4. In eroded areas, however, it has hue of 5YR and chroma of 6. It is dominantly silt loam but in eroded areas is silty clay loam.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8 or hue of 7.5YR, value of 5, and chroma of 6 to 8. It is silty clay or clay.

The BC and C horizons, if they occur, have hue of 2.5Y to 5YR, value of 4 to 6, and chroma of 4 to 8. They are silty clay or clay.

Waynesboro Series

The Waynesboro series consists of very deep, well drained soils that formed in old alluvium and in the underlying material weathered from limestone. These soils are on high terraces on the Highland Rim. Slopes range from 5 to 20 percent.

Waynesboro soils are geographically associated with Christian and Etowah soils. Christian soils are on the steeper side slopes. Their solum is thinner than that of the Waynesboro soils. Etowah soils are on the more nearly level concave slopes. They contain less clay than the Waynesboro soils.

Typical pedon of Waynesboro loam, in an area of Waynesboro-Etowah complex, 5 to 12 percent slopes, eroded; 0.5 mile south of Red Hill; 50 feet north of a road, in Pickett County:

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

Bt1—6 to 13 inches; yellowish red (5YR 4/6) clay loam; moderate fine and medium subangular blocky structure; friable; few faint clay films on faces of peds; many fine roots; strongly acid; gradual smooth boundary.

Bt2—13 to 24 inches; red (2.5YR 4/6) clay loam; moderate fine and medium subangular blocky structure; friable; few faint clay films on faces of peds; common fine roots; strongly acid; gradual smooth boundary.

Bt3—24 to 38 inches; dark red (2.5YR 3/6) clay; few fine distinct strong brown mottles in the lower part; moderate fine and medium subangular blocky structure; friable; common distinct clay films; few fine roots; few pebbles ¼ to 1 inch in diameter; strongly acid; gradual smooth boundary.

Bt4—38 to 55 inches; dark red (2.5YR 3/6) clay; few medium distinct yellowish red (5YR 5/6) mottles; weak fine and medium subangular blocky structure; friable; common distinct clay films; few pebbles ¼ to 1 inch in diameter; strongly acid; gradual smooth boundary.

Bt5—55 to 70 inches; dark red (2.5YR 3/6) clay; common medium distinct yellowish red (5YR 5/6) mottles; weak fine angular and subangular blocky structure; friable; few faint clay films on faces of peds; few pebbles ¼ inch to 2 inches in diameter; strongly acid.

The solum is more than 60 inches thick. The depth to limestone bedrock is more than 6 feet. Reaction is strongly acid or very strongly acid in unlimed areas. The content of pebbles ranges, by volume, from 0 to 15 percent in each horizon.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4. The Bt horizon has hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 6 to 8. It is clay, clay loam, or sandy clay.

Zenith Series

The Zenith series consists of deep, well drained soils that formed in residuum washed from soils that formed in material weathered from sandstone, siltstone, and shale. The Zenith soils are in concave areas on east- and north-facing mountain slopes and in mountain coves on the Cumberland Plateau. Slopes range from 20 to 60 percent.

Zenith soils are geographically associated with Gilpin, Grimsley, and Ramsey soils. Gilpin soils are on the higher ridgetops. They do not have a dark surface layer. Grimsley soils are on side slopes. They contain more clay than the Zenith soils. Ramsey soils are on ridges and side slopes above the Zenith soils. They are less than 20 inches deep over bedrock.

Typical pedon of Zenith gravelly loam, 20 to 60 percent slopes; 0.5 mile southeast of Sweetgum School; 20 feet west of a road, in Fentress County:

A1—0 to 4 inches; very dark brown (10YR 2/2) gravelly loam; moderate medium granular structure; very friable; many fine roots; about 20 percent, by volume, fragments of sandstone and siltstone 1 to 4 inches across; strongly acid; clear smooth boundary.

A2—4 to 8 inches; dark brown (10YR 3/3) gravelly loam; moderate medium granular structure; very friable; many fine roots; about 20 percent, by volume, fragments of sandstone and siltstone 1 to 4 inches across; strongly acid; clear wavy boundary.

Bw1—8 to 18 inches; brown (7.5YR 4/4) gravelly loam; weak medium and fine subangular blocky structure; friable; many fine roots; about 25 percent, by volume, fragments of sandstone and siltstone 1 to 4 inches across; strongly acid; gradual smooth boundary.

Bw2—18 to 32 inches; brown (7.5YR 4/4) cobbly loam; weak medium and fine subangular blocky structure; friable; common fine roots; about 30 percent, by volume, fragments of sandstone and siltstone 1 to 5 inches across; strongly acid; gradual wavy boundary.

Bw3—32 to 48 inches; brown (7.5YR 4/4) cobbly loam; weak fine and medium subangular blocky structure; friable; few fine roots; about 25 percent, by volume, fragments of sandstone and siltstone 1 to 5 inches across; strongly acid; clear wavy boundary.

2C—48 to 58 inches; strong brown (7.5YR 5/6) silty clay loam; common medium and coarse light yellowish brown (10YR 6/4), yellowish brown (10YR 5/4), and pale brown (10YR 6/3) mottles; weak medium and coarse subangular blocky structure; firm; few fragments of shale; strongly acid; abrupt smooth boundary.

2R—58 inches; shale bedrock.

The thickness of the solum ranges from 40 to 60 inches. The depth to sandstone, siltstone, or shale bedrock ranges from 40 to 60 inches. Reaction is strongly acid or very strongly acid in unlimed areas. The content of sandstone, siltstone, or shale fragments ranges, by volume, from 10 to 30 percent in the A horizon, from 15 to 35 percent in the Bw horizon, and from 5 to 35 percent in the 2C horizon.

The A horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3. It is loam or gravelly loam.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 8. It is loam, clay loam, silty clay loam, or the gravelly or cobbly analogs of those textures.

The 2C horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 6 to 8. It is silty clay loam, silty clay, clay, clay loam, or the gravelly or cobbly analogs of those textures.

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Glossary

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 40-inch profile or to a limiting layer is expressed as:

Very low	less than 2.0
Low	2.0 to 4.0
Moderate	4.0 to 6.0
High	more than 6.0

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.

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

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.

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

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

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

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

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

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

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

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

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 establishing terraces, diversions, and other water-control structures 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.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

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.

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 human or animal activities or of a catastrophe in nature, such as fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fine textured soil. Sandy clay, silty clay, or clay.

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

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

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.

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.

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 layer.—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.

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.

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

Large stones (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.

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

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.

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
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

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). 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.

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.

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.

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

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the substratum. The living roots and plant and animal activities are largely confined to the solum.

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 if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

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 soil blowing 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).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

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."

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.

Toxicity (in tables). An excessive amount of toxic substances in the soil, such as sodium or sulfur, severely hinders the establishment of vegetation or severely restricts plant growth.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

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. 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 1951-73 at Allardt, Tennessee)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	44.9	24.9	34.9	68	-8	8	4.72	2.80	6.43	9	5.1
February----	48.3	26.9	37.7	70	-4	24	4.77	2.85	6.48	9	5.4
March-------	56.1	34.0	45.1	79	12	84	5.62	3.77	7.30	10	3.6
April-------	67.9	44.3	56.1	85	24	211	4.81	3.42	6.09	9	.1
May---------	75.6	51.6	63.6	87	31	422	4.17	2.70	5.50	8	.0
June--------	81.8	58.7	70.3	93	42	609	5.07	3.25	6.71	8	.0
July--------	84.5	62.3	73.4	93	49	725	5.60	3.09	7.65	9	.0
August------	84.3	61.1	72.7	94	48	704	3.62	2.10	4.84	6	.0
September---	79.2	55.6	67.4	92	35	522	3.68	2.09	4.97	6	.0
October-----	68.6	44.4	56.5	85	23	227	2.91	1.20	4.29	5	.0
November----	56.5	34.6	45.6	77	10	21	3.68	2.19	5.01	8	1.2
December----	47.6	28.5	38.1	69	-2	30	5.14	2.95	6.93	8	4.1
Yearly:											
Average---	66.3	43.9	55.1	---	---	---	---	---	---	---	---
Extreme---	---	---	---	96	-11	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,587	53.79	47.16	60.22	95	19.5

* 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 1951-73 at Allardt, Tennessee)

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. 3	Apr. 25	May 13
2 years in 10 later than--	Apr. 4	Apr. 20	May 6
5 years in 10 later than--	Mar. 23	Apr. 10	Apr. 23
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 27	Oct. 21	Oct. 3
2 years in 10 earlier than--	Oct. 31	Oct. 23	Oct. 8
5 years in 10 earlier than--	Nov. 7	Oct. 29	Oct. 17

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-73 at Allardt, Tennessee)

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	209	186	152
8 years in 10	214	191	160
5 years in 10	224	201	176
2 years in 10	233	211	192
1 year in 10	238	217	200

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Fentress County	Pickett County	Total-- Area	Extent
		Acres	Acres	Acres	Pct
ArD	Arents, loamy, 2 to 20 percent slopes	1,580	0	1,580	0.4
BeB	Bewleyville-Dickson complex, 2 to 6 percent slopes	200	2,860	3,060	0.8
BoF	Bouldin stony loam, 25 to 70 percent slopes	11,560	2,560	14,120	3.4
CbD2	Christian-Baxter complex, 5 to 20 percent slopes, eroded	3,800	23,660	27,460	6.5
GeF	Grimsley-Jefferson-Rock outcrop complex, 20 to 60 percent slopes	37,210	6,990	44,200	10.5
GpD2	Gilpin silt loam, 5 to 20 percent slopes, eroded	12,460	1,300	13,760	3.3
Gu	Guthrie silt loam, 0 to 3 percent slopes, depressional	0	400	400	0.1
JeE	Jefferson-Ramsey complex, 15 to 35 percent slopes	29,110	7,500	36,610	8.7
LeC2	Leadvale-Holston complex, 3 to 12 percent slopes, eroded	120	2,070	2,190	0.5
LlC	Lily loam, 3 to 8 percent slopes	73,760	2,740	76,500	18.2
LoC	Lonewood-Clarkrange complex, 2 to 6 percent slopes	25,240	830	26,070	6.2
OeE	Orthents, steep and very steep	1,500	170	1,670	0.4
RaD	Ramsey-Alticrest-Rock outcrop complex, 5 to 20 percent slopes	62,360	1,920	64,280	15.3
SaD2	Sequoia silt loam, 5 to 20 percent slopes, eroded	3,100	0	3,100	0.7
Se	Sewanee loam, 0 to 2 percent slopes, occasionally flooded	1,100	60	1,160	0.3
SlE	Shelocta-Sequoia-Petros complex, 10 to 35 percent slopes	4,500	220	4,720	1.1
SnB	Sullivan-Sequatchie-Egam complex, 1 to 6 percent slopes, rarely to occasionally flooded	4,000	1,560	5,560	1.3
SuF	Sulphura channery silt loam, 20 to 75 percent slopes	2,600	16,730	19,330	4.6
TaE	Talbott-Rock outcrop complex, 10 to 35 percent slopes	22,980	9,280	32,260	7.7
WaC2	Waynesboro-Etowah complex, 5 to 12 percent slopes, eroded	5,268	7,300	12,568	3.0
WaD2	Waynesboro-Etowah complex, 12 to 20 percent slopes, eroded	7,902	10,950	18,852	4.5
ZeF	Zenith gravelly loam, 20 to 60 percent slopes	8,350	2,000	10,350	2.5
	Total	318,700	101,100	419,800	100.0

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland)

Map symbol	Soil name
BeB	Bewleyville-Dickson complex, 2 to 6 percent slopes
LlC	Lily loam, 3 to 8 percent slopes
LoC	Lonewood-Clarkrange complex, 2 to 6 percent slopes
Se	Sewanee loam, 0 to 2 percent slopes, occasionally flooded
SnB	Sullivan-Sequatchie-Egam complex, 1 to 6 percent slopes, rarely to occasionally flooded

TABLE 6.--LAND CAPABILITY AND 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	Land capability	Corn	Soybeans	Tobacco	Snap beans	Wheat	Tall fescue
		Bu	Bu	Lbs	Bu	Bu	AUM*
ArD**. Arents							
BeB**:							
Bewleyville----	IIe	100	40	2,700	210	55	6.5
Dickson--------	IIe	80	35	1,900	200	50	6.0
BoF------------- Bouldin	VIIs	---	---	---	---	---	---
CbD2**:							
Christian------	VIe	---	---	---	---	---	5.5
Baxter---------	IVe	70	22	1,500	100	27	5.5
GeF**:							
Grimsley-------	VIIs	---	---	---	---	---	---
Jefferson------	VIIe	---	---	---	---	---	---
Rock outcrop.							
GpD2------------ Gilpin	IVe	65	23	1,900	125	35	6.0
Gu-------------- Guthrie	Vw	---	---	---	---	---	4.0
JeE**:							
Jefferson------	VIe	---	---	---	---	---	---
Ramsey---------	VIIe	---	---	---	---	---	---
LeC2**:							
Leadvale-------	IIIe	75	28	1,800	175	50	6.0
Holston--------	IIIe	85	30	2,100	175	45	6.0
LlC------------- Lily	IIe	95	35	2,100	175	40	6.0
LoC**:							
Lonewood-------	IIe	100	40	2,300	215	50	6.0
Clarkrange-----	IIe	95	35	1,700	200	40	6.0
OeE**. Orthents							
RaD**:							
Ramsey---------	VIe	---	---	---	---	---	3.0
Alticrest------	IVe	65	30	1,700	100	35	5.2
Rock outcrop.							

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Tobacco	Snap beans	Wheat	Tall fescue
		Bu	Bu	Lbs	Bu	Bu	AUM*
SaD2------------ Sequoia	IVe	55	20	1,700	100	40	4.5
Se-------------- Sewanee	IIw	85	40	---	---	48	7.0
SlE**:							
Shelocta-------	VIe	---	---	---	---	---	6.0
Sequoia--------	VIe	---	---	---	---	---	4.5
Petros---------	VIIs	---	---	---	---	---	---
SnB**:							
Sullivan-------	IIw	120	46	2,200	210	48	7.0
Sequatchie-----	IIe	110	42	2,400	210	55	7.0
Egam-----------	IIw	90	40	---	200	48	7.0
SuF------------- Sulphura	VIIe	---	---	---	---	---	---
TaE**:							
Talbott--------	VIe	---	---	---	---	---	2.0
Rock outcrop.							
WaC2**:							
Waynesboro-----	IIIe	85	30	2,200	175	50	7.0
Etowah---------	IIIe	90	35	2,250	190	55	7.0
WaD2**:							
Waynesboro-----	IVe	80	25	1,900	165	40	6.0
Etowah---------	IVe	85	30	2,000	175	45	6.0
ZeF------------- Zenith	VIIe	---	---	---	---	---	---

* 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 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
BeB**:									
Bewleyville	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar	95	100	Yellow-poplar, loblolly pine.
						White oak	73	57	
						Loblolly pine	80	114	
Dickson	Slight	Slight	Slight	Moderate	Moderate	Yellow-poplar	92	86	Loblolly pine, shortleaf pine.
						White oak	73	57	
						Loblolly pine	80	114	
						Shortleaf pine	70	114	
BoF Bouldin	Severe	Severe	Slight	Slight	Moderate	White oak	70	57	Yellow-poplar.
						Northern red oak	70	57	
						Shortleaf pine	60	86	
						Virginia pine	60	86	
CbD2**:									
Christian	Slight	Slight	Slight	Slight	Moderate	Virginia pine	74	114	Yellow-poplar, eastern white pine, loblolly pine, shortleaf pine, northern red oak, white oak.
						Black oak	77	57	
						Eastern redcedar	41	43	
						Yellow-poplar	87	86	
						White oak	70	57	
Baxter	Slight	Slight	Slight	Slight	Moderate	Black oak	81	57	Yellow-poplar, eastern white pine, shortleaf pine, white ash, white oak, northern red oak, loblolly pine.
						White oak	74	57	
						Southern red oak	70	57	
						Yellow-poplar	92	86	
GeF**:									
Grimsley	Moderate	Severe	Severe	Slight	Moderate	Northern red oak	60	43	
						Shortleaf pine	60	86	
Jefferson	Severe	Severe	Moderate	Slight	Moderate	Scarlet oak	65	43	Shortleaf pine, white oak.
						Shortleaf pine	65	100	
						Virginia pine	70	114	
						Chestnut oak	63	43	
						White oak	65	43	
						Black oak	69	57	
						Yellow-poplar	92	86	
Rock outcrop.									
GpD2 Gilpin	Slight	Slight	Slight	Slight	Moderate	Northern red oak	80	57	Eastern white pine, black cherry, yellow-poplar.
						Yellow-poplar	95	100	
						Shortleaf pine	63	100	
						Virginia pine	80	118	
						White oak	73	57	
						Scarlet oak	77	43	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
Gu-------------- Guthrie	Slight	Severe	Severe	Moderate	Severe	Sweetgum------------	90	100	Sweetgum, willow oak.
						Willow oak----------	85	86	
JeE**:									
Jefferson------	Moderate	Moderate	Slight	Slight	Moderate	Northern red oak----	85	57	Yellow-poplar, eastern white pine, shortleaf pine.
						Yellow-poplar-------	108	114	
Ramsey---------	Moderate	Moderate	Moderate	Severe	Slight	Northern red oak----	60	43	Eastern white pine, shortleaf pine, loblolly pine.
						Shortleaf pine------	59	86	
						White oak-----------	61	43	
						Eastern white pine--	70	114	
						Virginia pine-------	50	29	
LeC2**:									
Leadvale-------	Moderate	Slight	Slight	Moderate	Moderate	Yellow-poplar-------	90	86	Loblolly pine, shortleaf pine.
						White oak-----------	70	57	
						Loblolly pine-------	80	114	
						Shortleaf pine------	70	114	
						Virginia pine-------	70	114	
Holston--------	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar-------	86	86	Yellow-poplar, loblolly pine.
						Northern red oak----	78	57	
						Shortleaf pine------	69	114	
LlC------------- Lily	Slight	Moderate	Slight	Slight	Moderate	Shortleaf pine------	63	100	Shortleaf pine.
						Virginia pine-------	80	114	
						Black oak-----------	78	57	
						White oak-----------	73	57	
						Chestnut oak--------	73	57	
						Yellow-poplar-------	95	86	
						Northern red oak----	78	57	
						Scarlet oak---------	77	43	
LoC**:									
Lonewood-------	Slight	Slight	Slight	Slight	Moderate	Loblolly pine-------	80	114	Loblolly pine, shortleaf pine, eastern white pine.
						Shortleaf pine------	70	114	
						Virginia pine-------	70	114	
						White oak-----------	70	57	
						Eastern white pine--	80	143	
Clarkrange-----	Slight	Slight	Slight	Moderate	Moderate	Yellow-poplar-------	90	86	Eastern white pine, shortleaf pine, loblolly pine.
						Northern red oak----	70	57	
						Eastern white pine--	80	143	
						Virginia pine-------	70	114	
						Loblolly pine-------	76	100	
						Shortleaf pine------	70	114	
RaD**:									
Ramsey---------	Slight	Slight	Moderate	Severe	Slight	Northern red oak----	60	43	Eastern white pine, shortleaf pine, loblolly pine.
						Shortleaf pine------	59	86	
						White oak-----------	61	43	
						Eastern white pine--	70	86	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
RaD**:									
Alticrest------	Slight	Moderate	Slight	Slight	Moderate	Loblolly pine-------	70	86	Shortleaf pine,
						Virginia pine-------	60	86	loblolly pine,
						Shortleaf pine------	60	86	eastern white
						Eastern white pine--	70	114	pine.
Rock outcrop.									
SaD2------------ Sequoia	Slight	Slight	Slight	Slight	Moderate	Northern red oak----	70	57	Loblolly pine,
						Shortleaf pine------	63	100	shortleaf
						Virginia pine-------	71	114	pine.
Se-------------- Sewanee	Slight	Moderate	Moderate	Slight	Severe	Yellow-poplar-------	100	114	Loblolly pine,
						Loblolly pine-------	85	114	yellow-poplar,
						Southern red oak----	80	57	eastern white
						Shortleaf pine------	80	129	pine, eastern
						Sweetgum------------	90	100	cottonwood.
						Eastern white pine--	90	172	
SlE**:									
Shelocta-------	Moderate	Moderate	Moderate	Slight	Severe	White oak-----------	65	43	Shortleaf pine,
						Black oak-----------	73	57	white oak,
						Scarlet oak---------	70	57	eastern white
						Yellow-poplar-------	90	86	pine.
Sequoia--------	Moderate	Moderate	Moderate	Slight	Moderate	Northern red oak----	60	43	Loblolly pine,
						Loblolly pine-------	70	86	shortleaf
						Shortleaf pine------	60	86	pine.
Petros---------	Slight	Moderate	Moderate	Severe	Moderate	Virginia pine-------	50	72	Shortleaf
						Black oak-----------	50	29	pine.
						Chestnut oak--------	50	29	
SnB**:									
Sullivan-------	Slight	Slight	Moderate	Slight	Severe	Yellow-poplar-------	100	114	Yellow-poplar,
						Northern red oak----	70	57	black walnut,
									loblolly pine.
Sequatchie-----	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar-------	100	114	Yellow-poplar,
						White oak-----------	80	57	black walnut,
									loblolly pine.
Egam-----------	Slight	Slight	Moderate	Slight	Severe	Yellow-poplar-------	100	114	Yellow-poplar,
						Southern red oak----	80	57	black walnut,
						Water oak-----------	90	86	loblolly pine.
SuF------------- Sulphura	Severe	Severe	Moderate	Moderate	Moderate	Loblolly pine-------	65	86	Loblolly pine,
						Shortleaf pine------	55	72	shortleaf
						Eastern redcedar----	35	29	pine, eastern
						Chestnut oak--------	50	29	redcedar.
						Scarlet oak---------	50	29	
TaE**:									
Talbott--------	Moderate	Moderate	Slight	Slight	Moderate	White oak-----------	65	43	Loblolly pine,
						Loblolly pine-------	80	114	shortleaf
						Shortleaf pine------	64	100	pine, eastern
						Eastern redcedar----	46	57	redcedar.
						Virginia pine-------	70	72	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns					Potential productivity			
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	Trees to plant
TaE**:									
Rock outcrop.									
WaC2**:									
Waynesboro-----	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar-------	90	86	Yellow-poplar,
						Southern red oak----	70	57	shortleaf
						White oak-----------	70	57	pine, loblolly
						Loblolly pine-------	80	114	pine, black
						Shortleaf pine------	80	129	walnut.
						Virginia pine-------	70	114	
Etowah---------	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar-------	90	86	Yellow-poplar,
						Southern red oak----	80	57	loblolly pine.
						Loblolly pine-------	90	129	
						Shortleaf pine------	80	129	
						Virginia pine-------	70	114	
WaD2**:									
Waynesboro-----	Moderate	Moderate	Slight	Slight	Moderate	Yellow-poplar-------	90	86	Yellow-poplar,
						Southern red oak----	70	57	shortleaf
						White oak-----------	70	57	pine, loblolly
						Loblolly pine-------	80	114	pine, black
						Shortleaf pine------	80	129	walnut.
						Virginia pine-------	70	114	
Etowah---------	Moderate	Moderate	Slight	Slight	Moderate	Yellow-poplar-------	90	86	Yellow-poplar,
						Southern red oak----	80	57	loblolly pine.
						Loblolly pine-------	90	129	
						Shortleaf pine------	80	129	
ZeF------------- Zenith	Moderate	Severe	Slight	Slight	Moderate	Yellow-poplar-------	100	114	Yellow-poplar,
						Northern red oak----	80	57	eastern white
						White oak-----------	80	57	pine, black
						Shortleaf pine------	80	129	walnut.
						Virginia pine-------	70	114	

* 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 8.--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	Golf fairways
ArD*. Arents					
BeB*:					
Bewleyville	Slight	Slight	Moderate: slope.	Slight	Slight.
Dickson	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: erodes easily.	Slight.
BoF Bouldin	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
CbD2*:					
Christian	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Baxter	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
GeF*:					
Grimsley	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope, large stones.
Jefferson	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Rock outcrop.					
GpD2 Gilpin	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, thin layer.
Gu Guthrie	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
JeE*:					
Jefferson	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Ramsey	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
LeC2*:					
Leadvale	Moderate: wetness.	Moderate: wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Slight.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
LeC2*:					
Holston	Slight	Slight	Severe: slope.	Slight	Slight.
LlC Lily	Slight	Slight	Moderate: slope, depth to rock.	Slight	Moderate: depth to rock.
LoC*:					
Lonewood	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
Clarkrange	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Moderate: wetness.	Moderate: wetness.
OeE*. Orthents					
RaD*:					
Ramsey	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight	Severe: depth to rock.
Alticrest	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, depth to rock.
Rock outcrop.					
SaD2 Sequoia	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
Se Sewanee	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
SlE*:					
Shelocta	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Sequoia	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Petros	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope.	Severe: slope, depth to rock.
SnB*:					
Sullivan	Severe: flooding.	Slight	Moderate: small stones, flooding.	Slight	Moderate: flooding.
Sequatchie	Severe: flooding.	Slight	Moderate: slope, small stones.	Slight	Moderate: large stones.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
SnB*:					
Egam	Severe: flooding.	Moderate: percs slowly.	Moderate: slope, flooding.	Slight	Moderate: flooding.
SuF Sulphura	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
TaE*:					
Talbott	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Rock outcrop.					
WaC2*:					
Waynesboro	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Etowah	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
WaD2*:					
Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Etowah	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
ZeF Zenith	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--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
ArD*. Arents										
BeB*:										
Bewleyville	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Dickson	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BoF Bouldin	Very poor.	Very poor.	Fair	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
CbD2*:										
Christian	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Baxter	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
GeF*:										
Grimsley	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Jefferson	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Rock outcrop.										
GpD2 Gilpin	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
Gu Guthrie	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
JeE*:										
Jefferson	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Ramsey	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.
LeC2*:										
Leadvale	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Holston	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LlC Lily	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LoC*:										
Lonewood	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 9.--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
LoC*:										
Clarkrange	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
OeE*. Orthents										
RaD*:										
Ramsey	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Alticrest	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Rock outcrop.										
SaD2 Sequoia	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Se Sewanee	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
SlE*:										
Shelocta	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Sequoia	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Petros	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
SnB*:										
Sullivan	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Sequatchie	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Egam	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
SuF Sulphura	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
TaE*:										
Talbott	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rock outcrop.										
WaC2*:										
Waynesboro	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Etowah	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WaD2*:										
Waynesboro	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 9.--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
WaD2*:										
Etowah	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
ZeF Zenith	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--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	Lawns and landscaping
ArD*. Arents						
BeB*:						
Bewleyville	Moderate: too clayey.	Slight	Moderate: shrink-swell.	Moderate: slope.	Severe: low strength.	Slight.
Dickson	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: low strength.	Slight.
BoF Bouldin	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope.
CbD2*:						
Christian	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, low strength, slope.	Moderate: slope.
Baxter	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: small stones, slope.
GeF*:						
Grimsley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, large stones.
Jefferson	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.						
GpD2 Gilpin	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, thin layer.
Gu Guthrie	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding.	Severe: ponding.
JeE*:						
Jefferson	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ramsey	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
LeC2*:						
Leadvale	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: low strength, wetness.	Slight.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
LeC2*:						
Holston	Slight	Slight	Slight	Moderate: slope.	Slight	Slight.
LlC Lily	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.	Moderate: depth to rock.
LoC*:						
Lonewood	Slight	Slight	Slight	Moderate: slope.	Severe: low strength.	Slight.
Clarkrange	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: low strength, wetness.	Moderate: wetness.
OeE*. Orthents						
RaD*:						
Ramsey	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.
Alticrest	Severe: depth to rock, cutbanks cave.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.	Moderate: slope, depth to rock.
Rock outcrop.						
SaD2 Sequoia	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: droughty, slope.
Se Sewanee	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.
SlE*:						
Shelocta	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Sequoia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Petros	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.
SnB*:						
Sullivan	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Sequatchie	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: large stones.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
SnB*:						
Egam	Moderate: too clayey, wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
SuF Sulphura	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
TaE*:						
Talbott	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Rock outcrop.						
WaC2*:						
Waynesboro	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
Etowah	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
WaD2*:						
Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Etowah	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
ZeF Zenith	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "good," 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
ArD*. Arents					
BeB*:					
Bewleyville	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
Dickson	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
BoF Bouldin	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: large stones, slope.
CbD2*:					
Christian	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Poor: small stones.
Baxter	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
GeF*:					
Grimsley	Severe: slope.	Severe: seepage, slope, large stones.	Severe: depth to rock, slope, seepage.	Severe: slope, seepage.	Poor: small stones, slope.
Jefferson	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
Rock outcrop.					
GpD2 Gilpin	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
Gu Guthrie	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
JeE*:					
Jefferson	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
Ramsey	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, slope.

See footnote at end of table.

TABLE 11.--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
LeC2*:					
Leadvale	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: depth to rock.	Moderate: depth to rock, wetness.	Fair: depth to rock, too clayey.
Holston	Moderate: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight	Fair: too clayey, small stones.
LlC: Lily	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock.
LoC*:					
Lonewood	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Fair: depth to rock, too clayey.
Clarkrange	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Severe: depth to rock, wetness.	Moderate: wetness.	Fair: wetness.
OeE*. Orthents					
RaD*:					
Ramsey	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock.
Alticrest	Severe: depth to rock, poor filter.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock.
Rock outcrop.					
SaD2: Sequoia	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.
Se: Sewanee	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, depth to rock, wetness.	Severe: flooding, wetness.	Poor: wetness.
SlE*:					
Shelocta	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: slope.	Poor: small stones, slope.
Sequoia	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, hard to pack.

See footnote at end of table.

TABLE 11.--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
SlE*:					
Petros	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
SnB*:					
Sullivan	Severe: flooding.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Good.
Sequatchie	Moderate: flooding, percs slowly.	Severe: seepage.	Severe: seepage.	Moderate: flooding.	Fair: too clayey, small stones.
Egam	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack.
SuF: Sulphura	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
TaE*:					
Talbott	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, hard to pack.
Rock outcrop.					
WaC2*:					
Waynesboro	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
Etowah	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey.
WaD2*:					
Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Etowah	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
ZeF: Zenith	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--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
ArD*. Arents				
BeB*:				
Bewleyville	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer, too clayey.
Dickson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
BoF Bouldin	Poor: slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
CbD2*:				
Christian	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
Baxter	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
GeF*:				
Grimsley	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Jefferson	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Rock outcrop.				
GpD2 Gilpin	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Gu Guthrie	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
JeE*:				
Jefferson	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
JeE*:				
Ramsey	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
LeC2*:				
Leadvale	Fair: depth to rock, low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Good.
Holston	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
LlC Lily	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
LoC*:				
Lonewood	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
Clarkrange	Fair: area reclaim, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim.
OeE*. Orthents				
RaD*:				
Ramsey	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
Alticrest	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock.
Rock outcrop.				
SaD2 Sequoia	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Se Sewanee	Fair: depth to rock, thin layer, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
SlE*:				
Shelocta	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Sequoia	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
SlE*:				
Petros	Poor: depth to rock.	Improbable: small stones.	Improbable: thin layer.	Poor: depth to rock, small stones, slope.
SnB*:				
Sullivan	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Sequatchie	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Egam	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.
SuF Sulphura	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
TaE*:				
Talbott	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Rock outcrop.				
WaC2*:				
Waynesboro	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Etowah	Fair: low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey, slope.
WaD2*:				
Waynesboro	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Etowah	Fair: low strength, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
ZeF Zenith	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope, area reclaim.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--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	Terraces and diversions	Grassed waterways
ArD*. Arents					
BeB*:					
Bewleyville	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Erodes easily	Erodes easily.
Dickson	Moderate: seepage, slope.	Severe: piping.	Percs slowly, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
BoF Bouldin	Severe: seepage, slope.	Severe: large stones.	Deep to water	Slope, large stones.	Large stones, slope, droughty.
CbD2*:					
Christian	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Baxter	Moderate: seepage.	Moderate: hard to pack.	Deep to water	Slope	Slope.
GeF*:					
Grimsley	Severe: seepage, slope.	Severe: large stones.	Deep to water	Slope, large stones.	Large stones, slope, droughty.
Jefferson	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope	Slope.
Rock outcrop.					
GpD2 Gilpin	Severe: slope.	Severe: thin layer.	Deep to water	Slope, depth to rock, large stones.	Slope, depth to rock, large stones.
Gu Guthrie	Slight	Severe: piping, ponding.	Ponding, percs slowly.	Erodes easily, ponding, rooting depth.	Wetness, erodes easily, rooting depth.
JeE*:					
Jefferson	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope	Slope.
Ramsey	Severe: depth to rock, slope.	Severe: piping.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
LeC2*:					
Leadvale	Moderate: seepage, depth to rock, slope.	Severe: piping.	Percs slowly, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
Holston	Moderate: seepage, slope.	Severe: piping.	Deep to water	Favorable	Favorable.
LlC Lily	Severe: seepage.	Severe: piping.	Deep to water	Depth to rock	Depth to rock.
LoC*:					
Lonewood	Moderate: seepage, depth to rock, slope.	Moderate: thin layer, piping.	Deep to water	Erodes easily	Erodes easily.
Clarkrange	Moderate: seepage, slope.	Severe: piping.	Percs slowly, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
OeE*. Orthents					
RaD*:					
Ramsey	Severe: depth to rock, slope.	Severe: piping.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
Alticrest	Severe: seepage.	Severe: piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
Rock outcrop.					
SaD2 Sequoia	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, droughty.
Se Sewanee	Moderate: seepage, depth to rock.	Severe: piping, wetness.	Flooding	Wetness	Wetness.
SlE*:					
Shelocta	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope	Slope.
Sequoia	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, droughty.
Petros	Severe: depth to rock, slope.	Severe: thin layer, seepage.	Deep to water	Slope, large stones, depth to rock.	Slope, droughty, depth to rock.
SnB*:					
Sullivan	Moderate: seepage.	Severe: piping.	Deep to water	Favorable	Favorable.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
SnB*:					
Sequatchie	Severe: seepage.	Severe: piping.	Deep to water	Favorable	Favorable.
Egam	Slight	Severe: hard to pack.	Deep to water	Favorable	Favorable.
SuF Sulphura	Severe: slope.	Severe: thin layer.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
TaE*:					
Talbott	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Rock outcrop.					
WaC2*, WaD2*:					
Waynesboro	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope	Slope.
Etowah	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
ZeF Zenith	Severe: slope.	Severe: piping.	Deep to water	Slope, large stones.	Large stones, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--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		Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
ArD*. Arents												
BeB*: Bewleyville--	0-15	Silt loam-----	ML, CL-ML	A-4	0	0	100	95-100	95-100	85-100	20-30	2-7
	15-36	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	95-100	95-100	90-100	85-100	30-45	11-22
	36-72	Clay, clay loam, silty clay loam.	CL, ML, MH, CH	A-6, A-7	---	0-5	75-100	75-100	70-95	60-95	35-65	12-32
Dickson------	0-7	Silt loam-----	CL-ML, ML	A-4	0	0	100	95-100	90-100	75-95	20-28	2-7
	7-24	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	0	100	95-100	95-100	85-95	25-38	5-17
	24-38	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	0	95-100	90-100	85-100	80-95	25-42	7-20
	38-60	Clay, silty clay loam, silty clay.	MH, ML, GC, CL	A-6, A-7	---	0-20	70-100	60-100	55-100	45-95	35-65	12-30
BoF----------- Bouldin	0-9	Stony loam----	SM, ML, SC-SM, GM	A-2, A-4	---	10-30	65-85	55-85	40-65	30-55	15-25	2-7
	9-90	Extremely stony clay loam, very stony loam, extremely stony clay loam.	GC, SC	A-2, A-4, A-6	---	30-55	55-75	45-65	35-60	25-50	25-39	8-16
CbD2*: Christian----	0-5	Silt loam-----	SM, SC-SM, ML, CL-ML	A-4	---	0-5	85-100	85-100	70-95	40-85	<30	NP-7
	5-14	Silty clay loam, gravelly silty clay loam, gravelly silty clay.	ML, CL, SC, GC	A-4, A-6	---	0-10	70-100	50-100	40-100	36-95	20-40	2-20
	14-48	Clay, silty clay loam, gravelly clay.	CL, CH, SC, GC	A-7	---	0-10	70-100	50-100	45-100	40-90	41-70	20-42
	48-65	Clay, silty clay.	CL, MH, CH	A-7	---	0-10	95-100	90-100	85-95	80-95	41-80	20-45

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
CbD2*:												
Baxter--------	0-5	Gravelly silt loam.	ML, GM, CL-ML, GM-GC	A-4	---	0-10	60-90	55-80	45-70	45-70	25-35	4-10
	5-15	Gravelly silty clay loam, gravelly silt loam.	CL, SC-SM, GC, CL-ML	A-4, A-6	---	0-10	60-90	55-80	55-80	45-80	25-40	5-20
	15-70	Gravelly clay, gravelly silty clay.	GC, CH, SC, CL	A-7	---	0-20	50-90	40-75	35-70	35-70	45-70	20-40
GeF*:												
Grimsley------	0-8	Cobbly loam---	ML, CL-ML, SM, SC-SM	A-4, A-2, A-1-b	---	10-35	65-90	60-85	35-80	20-65	<30	NP-10
	8-57	Cobbly loam, cobbly clay loam, cobbly sandy clay loam.	GC, GM-GC, SC, SC-SM	A-2, A-4, A-6, A-1-b	---	25-45	50-75	45-70	25-60	15-50	20-39	5-20
	57-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Jefferson----	0-6	Loam----------	SM, SC, ML, CL	A-2, A-4	---	0-5	85-95	80-90	40-80	25-65	20-35	2-10
	6-24	Gravelly loam, gravelly clay loam, gravelly sandy clay loam.	SM, SC, ML, CL	A-4, A-2, A-6	---	0-5	75-90	50-90	50-80	30-70	15-35	2-15
	24-60	Very gravelly loam, very gravelly clay loam, very gravelly sandy clay loam.	GM, SM, ML, GM-GC	A-2, A-4, A-1	---	0-5	55-75	25-75	20-70	10-60	20-35	2-10
Rock outcrop.												
GpD2---------- Gilpin	0-6	Silt loam-----	CL, CL-ML	A-4, A-6	---	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	6-30	Channery loam, shaly silt loam, silty clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	---	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	30-34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Gu------------ Guthrie	0-7	Silt loam-----	ML, CL-ML	A-4	0	0	100	100	90-100	85-95	18-28	2-7
	7-30	Silt loam, silty clay loam.	ML, CL-ML, CL	A-4, A-6	0	0	100	100	90-100	85-95	23-39	5-15
	30-52	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	0	90-100	85-100	80-100	70-95	20-42	5-20
	52-65	Silty clay loam, silt loam.	CL, CL-ML	A-6, A-7, A-4	0	0-5	85-100	80-100	75-100	66-95	20-50	4-25

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
JeE*:												
Jefferson----	0-6	Loam----------	SM, SC, ML, CL	A-2, A-4	---	0-5	85-95	80-90	40-80	25-65	20-35	2-10
	6-24	Gravelly loam, gravelly clay loam, gravelly sandy clay loam.	SM, SC, ML, CL	A-4, A-2, A-6	---	0-5	75-90	50-90	50-80	30-70	15-35	2-15
	24-60	Very gravelly loam, very gravelly clay loam, very gravelly sandy clay loam.	GM, SM, ML, GM-GC	A-2, A-4, A-1	---	0-5	55-75	25-75	20-70	10-60	20-35	2-10
Ramsey-------	0-6	Loam----------	SM, CL-ML, ML, SC-SM	A-4, A-2	---	0-10	85-100	75-95	60-75	30-70	<25	NP-7
	6-18	Channery loam, channery sandy loam.	SM, CL-ML, ML, SM, SC	A-4, A-2	---	0-10	85-100	75-95	60-77	30-70	<25	NP-7
	18-22	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
LeC2*:												
Leadvale-----	0-6	Silt loam-----	ML, CL-ML, CL	A-4	0	0	100	95-100	85-95	65-85	18-32	2-10
	6-24	Silt loam, silty clay loam, loam.	CL-ML, CL, ML	A-4, A-6	0	0	100	95-100	90-98	75-90	22-36	3-14
	24-54	Silt loam, silty clay loam.	CL-ML, CL, ML	A-4, A-6, A-7	0	0	100	95-100	80-98	70-90	23-42	3-18
	54-75	Silty clay loam, silty clay, clay.	CL, MH, ML, CH	A-6, A-7	---	0-5	90-100	90-100	85-95	70-90	32-58	12-26
Holston------	0-7	Loam----------	ML, CL-ML, SM, SC-SM	A-4, A-2	0	0-5	80-100	75-100	65-100	30-75	<22	NP-6
	7-60	Loam, clay loam, sandy clay loam.	ML, CL-ML, SM, SC-SM	A-4, A-2	0	0-5	80-100	75-100	50-100	30-80	21-33	3-10
LlC----------- Lily	0-14	Loam----------	ML, CL-ML	A-4	---	0-5	90-100	85-100	70-95	55-80	<35	NP-10
	14-31	Clay loam, sandy clay loam, loam.	SM, SC, ML, CL	A-4, A-6	---	0-5	90-100	85-100	75-100	40-80	<35	3-15
	31-36	Sandy clay loam, clay loam, gravelly sandy clay loam.	SM, SC, ML, CL	A-4, A-2, A-6, A-1-b	---	0-10	65-100	50-100	40-95	20-75	<35	3-15
	36-40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct	Pct					Pct	
LoC*:												
Lonewood-----	0-9	Silt loam-----	ML, CL-ML, CL	A-4	0	0	100	90-100	85-100	75-90	18-26	3-9
	9-35	Silt loam, silty clay loam, loam.	CL	A-4, A-6	0	0	100	90-100	85-95	70-90	25-39	9-18
	35-62	Silty clay loam, clay loam, loam.	CL	A-6, A-7	0	0	95-100	85-100	75-90	65-85	29-48	10-23
	62-64	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Clarkrange---	0-11	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	0	85-100	80-100	70-100	60-90	21-32	3-12
	11-24	Silt loam, silty clay loam.	CL, CL-ML, ML	A-4, A-6	0	0	85-100	80-100	75-95	70-90	23-39	3-16
	24-45	Silt loam, loam, silty clay loam.	CL, CL-ML, ML	A-4, A-6	0	0	85-100	80-100	75-95	65-90	23-39	3-16
	45-65	Clay loam, shaly clay loam, silty clay loam.	CL, CL-ML, SC, GC	A-4, A-6, A-2, A-1	---	0-10	45-90	25-85	25-80	20-75	23-40	5-18
	65-69	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
OeE*. Orthents												
RaD*:												
Ramsey-------	0-6	Loam----------	SM, CL-ML, ML, SC-SM	A-4, A-2	---	0-10	85-100	75-95	60-75	30-70	<25	NP-7
	6-18	Channery loam, sandy loam.	SM, CL-ML, ML, SC-SM	A-4, A-2	---	0-10	85-100	75-95	60-77	30-70	<25	NP-7
	18-22	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Alticrest----	0-31	Sandy loam----	ML, CL-ML, SM, SC-SM	A-4, A-2	---	0-2	80-100	75-100	55-80	34-65	<20	NP-6
	31-32	Sand, loamy sand, sandy loam.	SM, SC-SM	A-2, A-4, A-1-b	---	0-5	80-100	75-100	45-75	13-36	<20	NP-5
	32-36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Rock outcrop.												
SaD2---------- Sequoia	0-5	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	95-100	95-100	85-100	80-95	23-35	5-15
	5-36	Silty clay, clay, shaly silty clay.	CL, MH, CH	A-7	0	0	70-100	65-100	60-100	55-95	43-74	20-40
	36-40	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct	Pct					Pct	
Se------------ Sewanee	0-6	Loam----------	ML, CL-ML, SM	A-4	---	0-2	80-100	75-100	55-90	35-65	<30	NP-7
	6-36	Loam, silt loam, fine sandy loam.	ML, CL-ML, CL, SM	A-4	---	0-3	80-100	75-100	65-95	36-65	<35	NP-10
	36-50	Loam, gravelly loam, fine sandy loam.	ML, CL, SM, SC	A-4, A-2	---	0-5	60-100	55-100	45-95	25-70	<30	NP-10
	50-54	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
SlE*:												
Shelocta-----	0-6	Silt loam-----	ML, CL-ML	A-4	0-2	0-5	80-95	75-95	60-95	55-90	<35	NP-10
	6-25	Silty clay loam, silt loam, channery silty clay loam.	CL, CL-ML, GC, SC	A-6, A-4	0-5	0-10	55-95	50-95	45-95	40-90	25-40	4-15
	25-52	Channery silt loam, channery silty clay loam, very channery clay loam.	GM, GC, ML, CL	A-4, A-6, A-2, A-1-b	0-10	0-15	40-85	35-70	25-70	20-65	20-40	3-20
	52-56	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Sequoia------	0-5	Silt loam-----	CL, CL-ML	A-4, A-6	0	0	95-100	95-100	85-100	80-95	23-35	5-15
	5-36	Silty clay, clay, shaly silty clay.	CL, MH, CH	A-7	0	0	70-100	65-100	60-100	55-95	43-74	20-40
	36-40	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Petros-------	0-7		CL, ML, CL-ML, GM	A-4	---	5-15	60-80	55-75	50-70	40-60	<30	NP-8
	7-18	Channery silt loam, channery silty clay loam.	GM, GC, GM-GC, GP-GM	A-2, A-4, A-6, A-1	---	10-25	25-49	20-45	15-40	10-36	20-39	3-17
	18-26	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
	26-30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
SnB*:												
Sullivan-----	0-51	Silt loam, loam	ML, CL, CL-ML, SM	A-4	0	0	80-100	75-100	60-100	36-90	20-31	3-10
	51-65	Loam, sandy loam.	SM, SC-SM, SC, GM	A-4, A-2	---	0-5	65-100	55-100	45-85	25-55	20-30	3-10

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
SnB*:												
Sequatchie---	0-10	Loam----------	ML, CL-ML, CL, SM	A-2, A-4	---	0-10	85-100	75-100	65-95	30-70	15-27	2-10
	10-45	Clay loam, loam, silt loam.	CL-ML, CL	A-4, A-6	---	0-10	85-100	75-100	65-95	55-85	20-32	5-15
	45-70	Sandy loam, loam, fine sandy loam.	ML, CL-ML, CL, SM	A-2, A-4	---	0-15	75-100	65-100	45-85	25-65	15-25	2-10
Egam---------	0-22	Silty clay loam.	CL, ML, CL-ML	A-6, A-7, A-4	0	0	95-100	95-100	85-100	75-95	21-45	4-20
	22-50	Silty clay, silty clay loam, clay.	CL, CH	A-7, A-6	0	0	95-100	95-100	90-100	85-95	38-60	15-30
	50-68	Silty clay loam, clay, clay loam.	CL, ML, CH	A-4, A-6, A-7	0	0	95-100	95-100	90-100	70-95	25-60	8-30
SuF----------- Sulphura	0-6	Channery silt loam.	ML, CL-ML, CL	A-4	---	0-8	70-90	65-85	60-80	55-75	20-32	2-10
	6-28	Channery silt loam, very channery silt loam, channery loam.	GC, GM-GC	A-2, A-4, A-6	---	5-20	45-60	40-55	35-50	30-45	23-32	6-12
	28-32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
TaE*:												
Talbott------	0-5	Silt loam-----	CL	A-4, A-6	0	0-5	95-100	90-100	85-95	75-95	25-40	8-16
	5-36	Clay, silty clay.	CL, MH, CH	A-7	0	0-10	95-100	90-100	85-95	80-95	41-80	20-45
	36-40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Rock outcrop.												
WaC2*:												
Waynesboro---	0-6	Loam----------	ML, CL-ML, CL, SM	A-4	0	0-5	85-100	80-100	70-95	43-70	18-30	2-9
	6-24	Clay loam, loam, sandy clay loam.	CL, SC	A-4, A-6, A-7	0	0-5	90-100	85-100	75-95	45-75	30-41	9-17
	24-70	Clay loam, sandy clay, clay.	MH, CL, ML	A-4, A-6, A-7	0	0-5	90-100	80-100	70-98	55-75	35-68	9-32
Etowah-------	0-14	Silt loam-----	ML, CL, SC-SM, CL-ML	A-4	0	0	80-100	75-100	70-95	45-70	20-30	3-10
	14-50	Silty clay loam, clay loam, silt loam.	CL	A-6	0	0	80-100	75-100	70-95	65-85	25-35	10-15
	50-72	Silty clay loam, clay loam, clay.	CL, ML, MH	A-6, A-7	0	0	80-100	75-100	70-95	65-85	39-60	15-25

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
WaD2*:												
Waynesboro---	0-6	Loam----------	ML, CL-ML, CL, SM	A-4	0	0-5	85-100	80-100	70-95	43-70	18-30	2-9
	6-70	Clay loam, sandy clay, clay.	MH, CL, ML	A-4, A-6, A-7	0	0-5	90-100	80-100	70-98	55-75	35-68	9-32
Etowah-------	0-14	Silt loam-----	ML, CL, SC-SM, CL-ML	A-4	0	0	80-100	75-100	70-95	45-70	20-30	3-10
	14-50	Silty clay loam, clay loam, silt loam.	CL	A-6	0	0	80-100	75-100	70-95	65-85	25-35	10-15
	50-72	Silty clay loam, clay loam, clay.	CL, ML, MH	A-6, A-7	0	0	80-100	75-100	70-95	65-85	39-60	15-25
ZeF-----------	0-8	Gravelly loam	ML, CL-ML	A-4	---	0-15	70-90	65-85	60-80	50-70	16-23	3-7
Zenith	8-48	Gravelly loam, gravelly clay loam, cobbly loam.	CL-ML, CL	A-4, A-6	---	5-20	70-85	65-80	60-75	50-65	20-32	5-12
	48-58	Silty clay loam, silty clay, cobbly clay loam.	CL, GC, SC	A-4, A-6, A-7	---	0-25	70-95	65-90	55-80	45-70	28-45	7-19
	58-62	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--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 K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
ArD*. Arents										
BeB*:										
Bewleyville-----	0-15	15-27	1.30-1.50	0.6-2.0	0.20-0.22	4.5-6.5	Low----------	0.43	5	1-3
	15-36	22-35	1.35-1.55	0.6-2.0	0.18-0.20	4.5-6.0	Low----------	0.37		
	36-72	35-50	1.30-1.50	0.6-2.0	0.12-0.17	4.5-5.5	Moderate-----	0.37		
Dickson---------	0-7	15-26	1.30-1.50	0.6-2.0	0.18-0.22	4.5-5.5	Low----------	0.43	3	.5-2
	7-24	18-30	1.35-1.55	0.6-2.0	0.18-0.20	4.5-5.5	Low----------	0.43		
	24-38	20-32	1.55-1.75	0.06-0.6	0.05-0.11	4.5-5.5	Low----------	0.43		
	38-60	35-50	1.35-1.55	0.2-0.6	0.02-0.04	4.5-5.5	Moderate-----	0.28		
BoF-------------- Bouldin	0-9	10-20	1.35-1.50	2.0-6.0	0.06-0.10	4.5-5.5	Low----------	0.20	5	1-2
	9-90	17-35	1.40-1.55	2.0-6.0	0.06-0.10	4.5-5.5	Low----------	0.20		
CbD2*:										
Christian-------	0-5	12-27	1.20-1.40	2.0-6.0	0.11-0.18	3.6-5.5	Low----------	0.37	3	1-3
	5-14	25-40	1.20-1.50	0.6-2.0	0.14-0.22	3.6-5.5	Moderate-----	0.28		
	14-65	40-60	1.30-1.60	0.6-2.0	0.10-0.16	3.6-5.5	Moderate-----	0.28		
Baxter----------	0-5	12-27	1.20-1.40	0.6-2.0	0.14-0.18	4.5-6.5	Low----------	0.28	5	2-4
	5-15	18-40	1.30-1.55	0.6-2.0	0.14-0.18	4.5-6.5	Moderate-----	0.24		
	15-70	40-60	1.35-1.65	0.6-2.0	0.08-0.13	4.5-5.5	Moderate-----	0.24		
GeF*:										
Grimsley--------	0-8	10-20	1.35-1.45	2.0-6.0	0.07-0.12	4.5-5.5	Low----------	0.20	4	.5-2
	8-57	20-35	1.40-1.50	2.0-6.0	0.05-0.11	4.5-5.5	Low----------	0.20		
	57-60	---	---	0.00-0.06	---	---	-------------	----		
Jefferson-------	0-6	10-20	1.30-1.50	2.0-6.0	0.10-0.18	4.5-5.5	Low----------	0.24	4	.5-5
	6-24	18-34	1.30-1.65	2.0-6.0	0.10-0.16	4.5-5.5	Low----------	0.28		
	24-60	15-30	1.30-1.65	2.0-6.0	0.08-0.14	4.5-5.5	Low----------	0.17		
Rock outcrop.										
GpD2------------- Gilpin	0-6	15-27	1.20-1.40	0.6-2.0	0.12-0.18	3.6-5.5	Low----------	0.32	3	.5-4
	6-30	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low----------	0.24		
	30-34	---	---	0.2-2.0	---	---	-------------	----		
Gu--------------- Guthrie	0-7	10-25	1.35-1.55	0.6-2.0	0.20-0.22	3.6-5.5	Low----------	0.43	3	1-2
	7-30	18-30	1.40-1.60	0.6-2.0	0.18-0.20	3.6-5.5	Low----------	0.43		
	30-52	18-32	1.60-1.75	0.06-0.2	0.03-0.05	3.6-5.5	Low----------	0.43		
	52-65	18-35	1.60-1.75	0.06-0.2	0.03-0.05	3.6-5.5	Low----------	0.43		
JeE*:										
Jefferson-------	0-6	10-20	1.30-1.50	2.0-6.0	0.10-0.18	4.5-5.5	Low----------	0.24	4	.5-5
	6-24	18-34	1.30-1.65	2.0-6.0	0.10-0.16	4.5-5.5	Low----------	0.28		
	24-60	15-30	1.30-1.65	2.0-6.0	0.08-0.14	4.5-5.5	Low----------	0.17		
Ramsey----------	0-18	8-25	1.25-1.50	6.0-20	0.09-0.12	4.5-5.5	Low----------	0.20	1	---
	18-22	---	---	0.0-0.2	---	---	-------------	----		

See footnote at end of table.

TABLE 15.--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 K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
LeC2*:										
Leadvale	0-6	12-22	1.30-1.40	0.6-2.0	0.17-0.22	4.5-5.5	Low	0.43	3	1-4
	6-24	20-32	1.30-1.50	0.6-2.0	0.17-0.20	4.5-5.5	Low	0.43		
	24-54	20-35	1.55-1.70	0.06-0.6	0.06-0.11	4.5-5.5	Low	0.43		
	54-75	30-45	1.40-1.60	0.06-0.6	0.06-0.11	4.5-5.5	Low	0.24		
Holston	0-7	10-25	1.35-1.50	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.28	5	.5-2
	7-60	18-35	1.40-1.55	0.6-2.0	0.13-0.20	4.5-5.5	Low	0.32		
LlC Lily	0-14	7-27	1.20-1.40	0.6-6.0	0.13-0.18	3.6-5.5	Low	0.28	2	.5-4
	14-31	18-35	1.25-1.35	2.0-6.0	0.12-0.18	3.6-5.5	Low	0.28		
	31-36	20-35	1.25-1.35	2.0-6.0	0.08-0.17	3.6-5.5	Low	0.17		
	36-40	---	---	0.0-0.2	---	---	---	---		
LoC*:										
Lonewood	0-9	15-25	1.30-1.40	0.6-2.0	0.18-0.20	4.5-5.5	Low	0.37	4	1-3
	9-35	20-39	1.30-1.45	0.6-2.0	0.16-0.18	4.5-5.5	Low	0.37		
	35-62	25-45	1.40-1.55	0.6-2.0	0.14-0.17	4.5-5.5	Low	0.32		
	62-64	---	---	0.00-0.2	---	---	---	---		
Clarkrange	0-11	15-25	1.30-1.50	0.6-2.0	0.18-0.22	4.5-5.5	Low	0.43	3	.5-2
	11-24	20-32	1.35-1.55	0.6-2.0	0.16-0.20	4.5-5.5	Low	0.43		
	24-45	20-32	1.55-1.70	0.06-0.2	0.08-0.12	4.5-5.5	Low	0.43		
	45-65	25-45	1.35-1.55	0.6-2.0	0.08-0.12	4.5-5.5	Low	0.37		
	65-69	---	---	0.00-0.2	---	---	---	---		
OeE*. Orthents										
RaD*:										
Ramsey	0-6	8-25	1.25-1.50	6.0-20	0.09-0.12	4.5-5.5	Low	0.20	1	.5-2
	6-18	8-25	1.20-1.40	6.0-20	0.09-0.12	4.5-5.5	Low	0.17		
	18-22	---	---	0.0-0.2	---	---	---	---		
Alticrest	0-31	8-18	1.40-1.55	2.0-6.0	0.12-0.18	4.5-5.5	Low	0.24	2	1-3
	31-32	3-10	1.40-1.60	6.0-20	0.04-0.10	4.5-5.5	Low	0.20		
	32-36	---	---	0.00-0.2	---	---	---	---		
Rock outcrop.										
SaD2 Sequoia	0-5	15-27	1.30-1.50	0.6-2.0	0.17-0.20	4.5-5.5	Low	0.37	3	.5-2
	5-36	35-60	1.35-1.55	0.2-0.6	0.08-0.16	4.5-5.5	Moderate	0.24		
	36-40	---	---	0.00-0.2	---	---	---	---		
Se Sewanee	0-6	10-18	1.35-1.55	0.6-2.0	0.12-0.18	4.5-6.0	Low	0.28	3	1-3
	6-36	10-18	1.35-1.55	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.28		
	36-50	10-18	1.35-1.55	0.6-2.0	0.10-0.18	4.5-5.5	Low	0.24		
	50-54	---	---	---	---	---	---	---		
SlE*:										
Shelocta	0-6	10-25	1.15-1.30	0.6-2.0	0.16-0.22	4.5-5.5	Low	0.32	4	.5-5
	6-25	18-34	1.30-1.55	0.6-2.0	0.10-0.20	4.5-5.5	Low	0.28		
	25-52	15-34	1.30-1.55	0.6-6.0	0.08-0.16	4.5-5.5	Low	0.17		
	52-56	---	---	0.00-0.2	---	---	---	---		
Sequoia	0-5	15-27	1.30-1.50	0.6-2.0	0.17-0.20	4.5-5.5	Low	0.37	3	.5-2
	5-36	35-60	1.35-1.55	0.2-0.6	0.08-0.16	4.5-5.5	Moderate	0.24		
	36-40	---	---	0.00-0.2	---	---	---	---		

See footnote at end of table.

TABLE 15.--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 K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
SlE*:										
Petros----------	0-7	15-25	1.30-1.50	0.6-6.0	0.10-0.14	4.5-5.5	Low----------	0.20	1	5-2
	7-18	18-32	1.30-1.55	0.6-6.0	0.04-0.09	4.5-5.5	Low----------	0.15		
	18-26	---	---	0.00-0.2	---	---	-------------	----		
	26-30	---	---	0.00-0.06	---	---	-------------	----		
SnB*:										
Sullivan--------	0-51	18-25	1.30-1.45	0.6-2.0	0.12-0.20	5.1-7.3	Low----------	0.32	5	1-3
	51-65	15-25	1.30-1.45	0.6-2.0	0.09-0.14	5.1-7.3	Low----------	0.32		
Sequatchie------	0-10	10-25	1.50-1.65	0.6-2.0	0.12-0.18	4.5-5.5	Low----------	0.32	5	1-3
	10-45	18-30	1.55-1.70	0.6-2.0	0.15-0.20	4.5-5.5	Low----------	0.24		
	45-70	12-25	1.55-1.70	0.6-6.0	0.09-0.14	4.5-5.5	Low----------	0.24		
Egam------------	0-22	20-35	1.30-1.45	0.2-0.6	0.18-0.22	5.6-7.3	Moderate-----	0.32	5	2-4
	22-50	35-50	1.30-1.45	0.2-0.6	0.14-0.20	5.6-7.3	Moderate-----	0.32		
	50-68	30-45	1.30-1.45	0.2-0.6	0.12-0.18	5.6-8.4	Moderate-----	0.37		
SuF-------------- Sulphura	0-6	15-25	1.30-1.50	0.6-2.0	0.12-0.17	5.1-6.0	Low----------	0.24	2	1-2
	6-28	18-32	1.35-1.55	0.6-2.0	0.07-0.14	5.1-6.5	Low----------	0.24		
	28-32	---	---	0.00-0.06	---	---	-------------	----		
TaE*:										
Talbott---------	0-5	15-27	1.35-1.50	0.6-2.0	0.10-0.18	5.1-6.0	Moderate-----	0.37	2	.5-2
	5-36	40-60	1.40-1.60	0.2-0.6	0.10-0.14	5.1-6.0	Moderate-----	0.24		
	36-40	---	---	0.00-0.06	---	---	-------------	----		
Rock outcrop.										
WaC2*:										
Waynesboro------	0-6	10-30	1.40-1.55	0.6-2.0	0.15-0.21	4.5-5.5	Low----------	0.28	5	.5-2
	6-24	23-35	1.40-1.55	0.6-2.0	0.14-0.20	4.5-5.5	Low----------	0.28		
	24-70	35-50	1.40-1.55	0.6-2.0	0.13-0.18	4.5-5.5	Low----------	0.28		
Etowah----------	0-14	15-27	1.30-1.45	0.6-2.0	0.15-0.20	4.5-5.5	Low----------	0.37	5	1-3
	14-50	23-35	1.35-1.50	0.6-2.0	0.16-0.20	4.5-5.5	Low----------	0.32		
	50-72	32-45	1.40-1.55	0.6-2.0	0.16-0.20	4.5-5.5	Low----------	0.32		
WaD2*:										
Waynesboro------	0-6	10-30	1.40-1.55	0.6-2.0	0.15-0.21	4.5-5.5	Low----------	0.28	5	.5-2
	6-70	35-50	1.40-1.55	0.6-2.0	0.13-0.18	4.5-5.5	Low----------	0.28		
Etowah----------	0-14	15-27	1.30-1.45	0.6-2.0	0.15-0.20	4.5-5.5	Low----------	0.37	5	1-3
	14-50	23-35	1.35-1.50	0.6-2.0	0.16-0.20	4.5-5.5	Low----------	0.32		
	50-72	32-45	1.40-1.55	0.6-2.0	0.16-0.20	4.5-5.5	Low----------	0.32		
ZeF-------------- Zenith	0-8	10-25	1.30-1.45	0.6-2.0	0.13-0.20	4.5-5.5	Low----------	0.20	4	2-5
	8-48	20-35	1.40-1.55	0.6-2.0	0.13-0.18	4.5-5.5	Low----------	0.15		
	48-58	30-45	1.40-1.55	0.00-0.2	0.09-0.16	4.5-5.5	Low----------	0.24		
	58-62	---	---	---	---	---	-------------	----		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hard-ness	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In			
ArD*. Arents											
BeB*:											
Bewleyville	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Dickson	C	None	---	---	2.0-3.0	Perched	Jan-Apr	>60	---	Moderate	Moderate.
BoF Bouldin	B	None	---	---	>6.0	---	---	>60	---	Low	Moderate.
CbD2*:											
Christian	C	None	---	---	>6.0	---	---	>60	---	High	High.
Baxter	B	None	---	---	>6.0	---	---	>60	---	High	High.
GeF*:											
Grimsley	B	None	---	---	>6.0	---	---	40-60	Soft	Low	High.
Jefferson	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
Rock outcrop.											
GpD2 Gilpin	C	None	---	---	>6.0	---	---	20-40	Soft	Low	High.
Gu Guthrie	D	None	---	---	+2-1.0	Perched	Dec-May	>60	---	High	High.
JeE*:											
Jefferson	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
Ramsey	D	None	---	---	>6.0	---	---	10-20	Hard	Low	Moderate.
LeC2*:											
Leadvale	C	None	---	---	2.0-3.0	Perched	Jan-Apr	>48	Soft	Moderate	Moderate.
Holston	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
LlC Lily	B	None	---	---	>6.0	---	---	20-40	Hard	Moderate	High.
LoC*:											
Lonewood	B	None	---	---	>6.0	---	---	40-72	Hard	Low	Moderate.
Clarkrange	C	None	---	---	1.5-2.5	Perched	Jan-Apr	>60	---	Moderate	High.
OeE*. Orthents											
RaD*:											
Ramsey	D	None	---	---	>6.0	---	---	10-20	Hard	Low	Moderate.
Alticrest	B	None	---	---	>6.0	---	---	20-40	Hard	Low	High.
Rock outcrop.											

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In			
SaD2: Sequoia	C	None	---	---	>6.0	---	---	20-40	Soft	High	Moderate.
Se: Sewanee	B	Occasional	Very brief	Dec-Mar	1.0-2.0	Apparent	Dec-Mar	40-60	Hard	Moderate	Moderate.
SlE*:											
Shelocta	B	None	---	---	>6.0	---	---	>40	Hard	Low	High.
Sequoia	C	None	---	---	>6.0	---	---	20-40	Soft	High	Moderate.
Petros	D	None	---	---	>6.0	---	---	10-20	Soft	Low	Moderate.
SnB*:											
Sullivan	B	Occasional	Very brief to brief.	Dec-Mar	4.0-6.0	Apparent	Dec-Mar	>60	---	Low	Low.
Sequatchie	B	Rare	---	---	>6.0	---	---	>60	---	Low	Moderate.
Egam	C	Occasional	Very brief	Dec-Apr	3.0-4.0	Apparent	Dec-Mar	>60	---	High	Low.
SuF: Sulphura	D	None	---	---	>6.0	---	---	20-40	Hard	Low	Moderate.
TaE*:											
Talbott	C	None	---	---	>6.0	---	---	20-40	Hard	High	Moderate.
Rock outcrop.											
WaC2*, WaD2*:											
Waynesboro	B	None	---	---	>6.0	---	---	>60	---	High	High.
Etowah	B	None	---	---	>6.0	---	---	>60	---	Low	Moderate.
ZeF: Zenith	B	None	---	---	>6.0	---	---	40-60	Hard	Low	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Alticrest	Coarse-loamy, siliceous, mesic Typic Dystrochrepts
Baxter	Fine, mixed, mesic Typic Paleudalfs
Bewleyville	Fine-silty, siliceous, thermic Typic Paleudults
Bouldin	Loamy-skeletal, siliceous, mesic Typic Paleudults
Christian	Clayey, mixed, mesic Typic Hapludults
Clarkrange	Fine-silty, siliceous, mesic Typic Fragiudults
Dickson	Fine-silty, siliceous, thermic Glossic Fragiudults
Egam	Fine, mixed, thermic Cumulic Hapludolls
Etowah	Fine-loamy, siliceous, thermic Typic Paleudults
Gilpin	Fine-loamy, mixed, mesic Typic Hapludults
Grimsley	Loamy-skeletal, siliceous, mesic Typic Hapludults
Guthrie	Fine-silty, siliceous, thermic Typic Fragiaquults
Holston	Fine-loamy, siliceous, thermic Typic Paleudults
Jefferson	Fine-loamy, siliceous, mesic Typic Hapludults
Leadvale	Fine-silty, siliceous, thermic Typic Fragiudults
Lily	Fine-loamy, siliceous, mesic Typic Hapludults
Lonewood	Fine-loamy, siliceous, mesic Typic Hapludults
Petros	Loamy-skeletal, mixed, mesic, shallow Typic Dystrochrepts
Ramsey	Loamy, siliceous, mesic Lithic Dystrochrepts
Sequatchie	Fine-loamy, siliceous, thermic Humic Hapludults
Sequoia	Clayey, mixed, mesic Typic Hapludults
Sewanee	Coarse-loamy, siliceous, mesic Fluvaquentic Dystrochrepts
Shelocta	Fine-loamy, mixed, mesic Typic Hapludults
Sullivan	Fine-loamy, siliceous, thermic Dystric Fluventic Eutrochrepts
Sulphura	Loamy-skeletal, siliceous, thermic Ruptic-Alfic Dystrochrepts
Talbott	Fine, mixed, thermic Typic Hapludalfs
Waynesboro	Clayey, kaolinitic, thermic Typic Paleudults
Zenith	Fine-loamy, siliceous, mesic Umbric Dystrochrepts

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