United States Department of Agriculture

Soil Conservation Service

In cooperation with Tennessee Agricultural Experiment Station

Soil Survey of Bledsoe County, Tennessee

How To Use This Soil Survey

General Soil Map

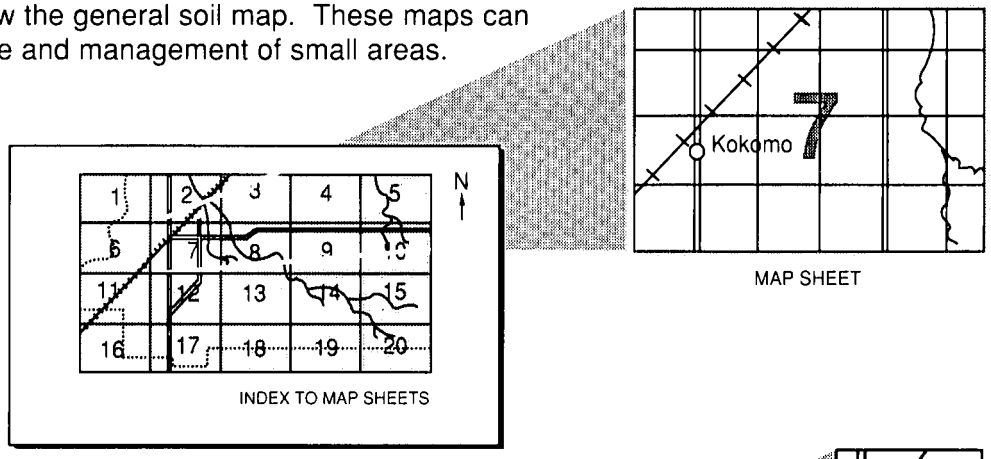
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

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.

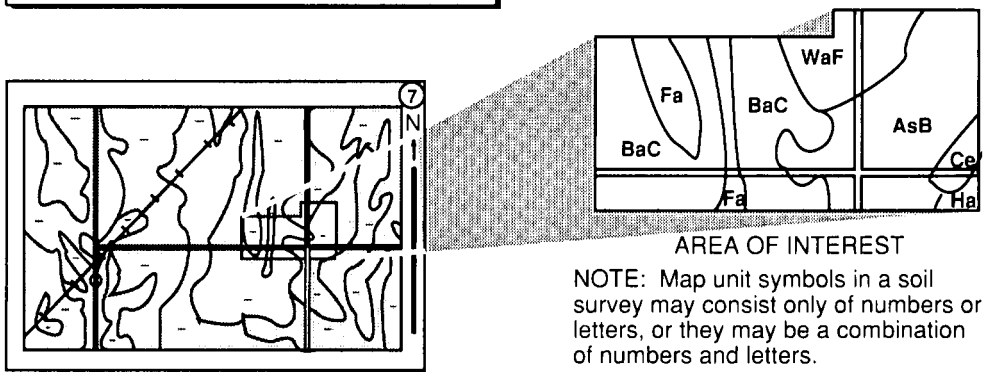
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

MAP SHEET

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



MAP SHEET

AREA OF INTEREST

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

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

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

Major fieldwork for this soil survey was completed in 1984. Soil names and descriptions were approved in 1984. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1984. This soil survey was made cooperatively by the Soil Conservation Service and the Tennessee Agricultural Experiment Station. Assistance was provided by the Bledsoe County Board of Commissioners. This soil survey is part of the technical assistance furnished to the Bledsoe County Soil Conservation District.

All programs and services 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 in the Sequatchie Valley in Bledsoe County. Waynesboro loam, 6 to 12 percent slopes, is the dominant soil in the foreground. A sandstone cliff is near the top of the Cumberland Plateau escarpment in the background.

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Issued November 1993

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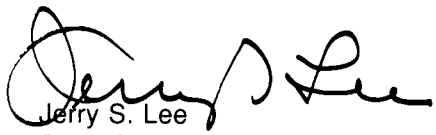
Foreword

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

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

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

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



Jerry S. Lee
State Conservationist
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Soil Survey of Bledsoe County, Tennessee

By Harry C. Davis, Soil Conservation Service

Soils surveyed by Harry C. Davis, Laurence A. Rochat, Bedford Jackson, and Hershel D. Dollar, Soil Conservation Service

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

General Nature of the County

BLEDSOE COUNTY is in the southeastern part of Tennessee (fig. 1). It is about 28 miles from north to south and 15 miles from east to west. It covers 258,600 acres, or 404 square miles. It is bordered on the south by Sequatchie County, on the north by Cumberland County, on the west by Van Buren County, and on the east by Rhea and Hamilton Counties. Pikeville, the county seat and the only incorporated town, is near the center of the county. In 1984, the population of the county was 9,322.

About 66 percent of the county is woodland, 14 percent cropland, and 20 percent pasture. The Sequatchie Valley divides the county from north to south.

The county is divided into two major land resource areas—the Cumberland Plateau and Mountains and the Southern Appalachian Ridges and Valleys. The soils in both major land resource areas formed under forest vegetation and are dominantly light in color. The soils in the Cumberland Plateau and Mountains area are moderately deep over sandstone and shale bedrock. The soils in the Southern Appalachian Ridges and Valleys area are deep over limestone and shale bedrock.

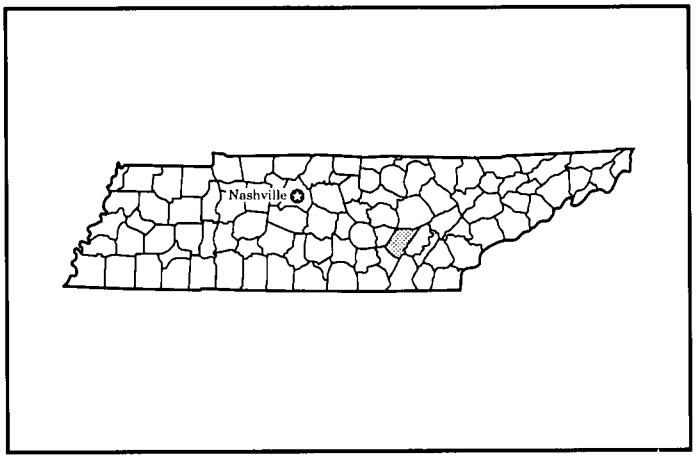

Figure 1.—Location of Bledsoe County in Tennessee.

History

Bledsoe County was the 33rd county formed in Tennessee. It was organized on November 30, 1807, from land obtained by the Cherokee Treaty of 1805. It was named in honor of Abraham Bledsoe, an early explorer and settler of the Cumberland Plateau.

Madison was declared the first county seat in 1808. It was about 15 miles south of Pikeville, which became the county seat in 1818. Pikeville was named in honor of Zebulon Montgomery Pike, a soldier and explorer in the Mississippi Valley.

Natural Resources

Timber, coal, farmland, and water are the most abundant natural resources in the county. The forest products industry is a major enterprise on the

Cumberland Plateau and on the steep ridges of the Sequatchie Valley. Numerous coal mines are on the plateau and the escarpment that separates the plateau from the valley. Many freshwater streams flow throughout the year on the plateau. The Sequatchie River dissects the valley from north to south. Highly productive farmland is both in the valley and on the plateau. Generally, the soils on the plateau require more fertilizer than those in the valley.

Transportation

Highways provide the major means of transportation in the county. State Highway 30, which dissects the county from east to west, and U.S. Highway 127, which dissects the county from north to south, are the two major highways. They intersect in Pikeville. In addition, State Highways 101 and 601 carry a significant amount of traffic. Several paved county roads and many gravel roads also are in the county.

Climate

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

Table 1 gives data on temperature and precipitation for the survey area as recorded at Pikeville, Tennessee, in the period 1962 to 1980. 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 40 degrees F and the average daily minimum temperature is 28 degrees. The lowest temperature on record, which occurred at Pikeville on January 24, 1963, is -10 degrees. In summer, the average temperature is 75 degrees and the average daily maximum temperature is 87 degrees. The highest recorded temperature, which occurred at Pikeville on July 16, 1980, is 107 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 53 inches. Of this, 25 inches, or 47 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 21 inches. The heaviest 1-day rainfall during the period of record was 6.1 inches at Pikeville on April 28, 1970. Thunderstorms occur on about 56 days each year.

Heavy rains may occur during prolonged storms throughout the year. They occasionally occur throughout the entire county and cause severe flooding in the valleys.

The average seasonal snowfall is about 7 inches. The greatest snow depth at any one time during the period of record was 10 inches.

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 45 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 8 miles per hour, in spring.

How This Survey Was Made

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

The soils in the survey area occur in an orderly pattern that is related to the geology, 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. These latter soils are called inclusions or included soils.

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 soil on the landscape.

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

General Soil Map Units

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

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

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

1. Pailo-Fullerton-Barger

Gently sloping to steep, well drained and moderately well drained, loamy soils that have a loamy or clayey subsoil; on hills and ridges in the Sequatchie Valley

This map unit is characterized by prominent ridges that cross the county from northeast to southwest. The ridges are not continuous. This unit consists mostly of narrow ridgetops and steep hillsides.

This map unit makes up about 5 percent of the county. It is about 50 percent Pailo soils, 23 percent Fullerton soils, 13 percent Barger soils, and 14 percent soils of minor extent.

The moderately steep and steep Pailo soils are on side slopes. They are deep and well drained. They are loamy and have a high content of chert in the surface layer and the upper part of the subsoil. They are clayey below a depth of about 3 feet.

The gently sloping to steep Fullerton soils are on ridgetops and side slopes. They are deep and well drained. They have a subsoil of cherty clay.

The gently sloping and sloping Barger soils are on ridgetops. They are deep and moderately well drained. They have a loamy surface layer and subsoil. They have a very cherty, slowly permeable fragipan at a depth of about 2 feet.

Of minor extent in this unit are the well drained Minvale soils on foot slopes and the well drained Waynesboro soils on some of the lowest and broadest ridgetops.

About 25 percent of this unit is cleared of trees, and the rest supports mostly mixed hardwoods. The ridgetops generally are well suited to corn and hay, but many of them are too narrow for cropping. Most of this unit is moderately suited or poorly suited to pasture and woodland. The steepest part is best suited to woodland. The small size of the areas, the slope, and the hazard of erosion are the most serious management concerns affecting farming.

Generally, this unit is poorly suited to urban uses because of the slope of the Pailo and Fullerton soils. Several of the ridgetops are suitable sites for dwellings, but they are poorly suited to septic tank absorption fields because of the slow permeability in the Barger soils.

2. Waynesboro-Etowah-Sullivan

Nearly level to moderately steep, well drained, loamy soils that have a loamy or clayey subsoil; on intermediate and high stream terraces and flood plains in the Sequatchie Valley

This map unit makes up the largest part of the Sequatchie Valley. It consists of nearly level bottom land and low stream terraces along the Sequatchie River and its tributaries. Adjacent to the terraces are intermediate and high stream terraces that are dissected by drainageways.

This map unit makes up about 10 percent of the county. It is about 55 percent Waynesboro soils, 19 percent Etowah soils, 12 percent Sullivan soils, and 14 percent soils of minor extent.

The gently sloping to moderately steep Waynesboro soils are on ridgetops and side slopes of high terraces. They are deep and have a loamy surface layer and a clayey subsoil.

The gently sloping and sloping Etowah soils are on

intermediate terraces and on foot slopes of high terraces. They are deep and have a loamy surface layer and subsoil.

The nearly level Sullivan soils are on bottom land. They are occasionally flooded for brief periods. They are deep and have a loamy surface layer and subsoil.

Of minor extent in this unit are the well drained Sequatchie and moderately well drained Swafford and Whitwell soils on low terraces, the well drained Fullerton soils on the adjacent side slopes, and the moderately well drained Hamblen soils on bottom land.

Most areas of this unit are cleared of trees and are used for soybeans, corn, or hay. Some of the steeper areas are used for pasture. The unit is well suited or moderately suited to crops and pasture. The slope and the hazard of erosion are the most significant management concerns. Flooding is not a serious hazard for crops because it mostly occurs before the crops are planted. The unit is suited to woodland, but not many trees are grown because of the suitability of the soils for crops.

Most of this unit is well suited or moderately suited to urban uses. The flood plains are not suitable as a site for dwellings and other buildings.

3. Talbott-Bouldin-Gilpin

Moderately steep to very steep, well drained, loamy soils that have a loamy or clayey subsoil; on the Cumberland Plateau escarpment

This map unit is characterized by sandstone cliffs and shallow soils on the top of the Cumberland Plateau escarpment. Deep colluvium is at the base of the cliffs. Stones and boulders are on the surface of the colluvium. Limestone residuum and rock outcrop are on the lower part of the escarpment. This unit is on the eastern side of the Sequatchie Valley and faces northwest.

This map unit makes up about 7 percent of the county. It is about 29 percent Talbott soils, 26 percent Bouldin soils, 24 percent Gilpin soils, and 21 percent soils of minor extent.

The moderately steep and steep Talbott soils are on foot slopes and the lower part of the mountain slopes. They are moderately deep over limestone bedrock and have a clayey subsoil.

The steep and very steep Bouldin soils are in slightly concave areas below the sandstone cliffs and in colluvial areas along drainageways. They formed in deep, loamy colluvium that has a high content of rock fragments and has stones and boulders on the surface.

The steep and very steep Gilpin soils are associated with the Bouldin soils. They are on nose slopes and in other convex areas between drainageways. They are loamy and are moderately deep over shale bedrock. They have some stones and boulders on the surface.

Of minor extent in this unit are the shallow Ramsey soils and areas of sandstone outcrop at the top of the escarpment and the deep, clayey Braxton soils and areas of limestone outcrop on the lower part of the escarpment. Braxton soils are associated with the Talbott soils.

All of this unit supports mixed hardwoods and pine. The soils are moderately suited to woodland. The equipment limitation and the hazard of erosion are the most serious management concerns. This unit is generally unsuited to farming and urban uses because of the slope, the rock outcrop, and the stones and boulders on the surface.

4. Lily-Hendon

Gently sloping and sloping, well drained soils that have a loamy surface layer and subsoil; on broad interfluves of the Cumberland Plateau

This map unit consists of the broadest, smoothest areas on the Cumberland Plateau.

This map unit makes up about 3 percent of the county. It is about 54 percent Lily soils, 26 percent Hendon soils, and 20 percent soils of minor extent.

Lily soils are dominantly on the most dissected part of the landscape. The depth to sandstone bedrock is 20 to 40 inches.

Hendon soils are on the smoothest part of the landscape. They are more than 60 inches deep over bedrock. They have a slightly compact and brittle layer at a depth of about 2.0 to 2.5 feet. This layer slows the movement of water through the profile and impedes root growth.

Of minor extent in this unit are the Ramsey and Gilpin soils in the steepest areas and the Morehead and Bonair soils on the low terraces and bottom land along drainageways.

About 5 to 10 percent of this unit is cleared of trees and is used for vegetables, corn, hay, or pasture. The rest supports mixed hardwoods and pine. Some areas have been cleared of hardwoods and planted to pine. Most of these plantings are on land used for commercial timber production.

The soils in this unit are well suited to woodland, but productivity is only moderate because of low fertility. The soils also are well suited to farming. Most of the land is used as woodland because the unit is in a remote location and a significant acreage is owned by timber companies. The soils are moderately suited or poorly suited to most urban uses. Because of the remote location, the unit has not been developed for urban uses.

5. Ramsey-Lily

Moderately steep and steep, well drained and somewhat excessively drained soils that have a loamy surface layer and subsoil; on the Cumberland Plateau adjacent to major drainageways

This map unit makes up the steepest part of the landscape on the Cumberland Plateau. It is deeply dissected by drainageways. Slopes are relatively short and convex.

This map unit makes up about 12 percent of the county. It is about 48 percent Ramsey soils, 32 percent Lily soils, and 20 percent soils of minor extent.

The steep Ramsey soils are adjacent to the drainageways and have numerous associated areas of sandstone rock outcrops. They are less than 20 inches deep over sandstone bedrock and are somewhat excessively drained.

The Lily soils are on the less sloping parts and have only a few associated areas of sandstone rock outcrops. They are well drained and are 20 to 40 inches deep over sandstone bedrock.

Of minor extent in this unit are Gilpin soils on side slopes and Hendon soils on ridgetops.

Most areas of this unit support mixed hardwoods. Some areas support pine. This unit is moderately suited or poorly suited to woodland. The slope, the depth to bedrock, and the rock outcrop are management concerns affecting woodland.

The soils in this unit generally are poorly suited to crops, pasture, and urban uses because of the slope and the depth to bedrock. Some of the less sloping parts are moderately suited to pasture.

6. Bouldin-Gilpin-Enders

Sloping to very steep, well drained, loamy soils that have a loamy or clayey subsoil; on the Cumberland Plateau escarpment

This map unit is characterized by sandstone cliffs and shallow soils on the top of the Cumberland Plateau escarpment. Deep colluvium is at the base of the cliffs. Stones and boulders are on the surface of the colluvium. The lower part of the escarpment and the foot slopes are underlain by shale. This unit is on the western side of the Sequatchie Valley.

This map unit makes up about 6 percent of the county. It is about 31 percent Bouldin soils, 28 percent Gilpin soils, 25 percent Enders soils, and 16 percent soils of minor extent.

The steep and very steep Bouldin soils are in slightly concave areas below the sandstone cliffs and in colluvial areas along drainageways. They formed in deep, loamy colluvium that has a high content of rock fragments and has stones and boulders on the surface.

The steep and very steep Gilpin soils are associated with the Bouldin soils. They are on nose slopes and in other convex areas between drainageways. They are loamy and are 20 to 40 inches deep over shale bedrock. They have some stones and boulders on the surface.

The sloping to steep Enders soils are on the lower part of the escarpment and on foot slopes. They have a clayey subsoil and are 40 to 60 inches deep over shale bedrock.

Of minor extent in this unit are the shallow Ramsey soils at the top of the escarpment; areas of sandstone outcrop; Talbott soils, which are on the lower part of the slope and are less than 40 inches deep over limestone bedrock; and a clayey soil that is less than 40 inches deep over shale bedrock.

Almost all of this unit supports mixed hardwoods or pine. Pines have been planted and are dominant in areas that have been cleared of hardwoods. Some small areas on the foot slopes have been cleared of trees and are in pasture.

The soils in this unit are moderately suited to woodland. The equipment limitation and the hazard of erosion are the most serious management concerns. The soils are generally unsuited to farming and urban uses because of the slope, the rock outcrop, and the stones and boulders on the surface.

7. Lily-Gilpin-Ramsey

Gently sloping to steep, well drained and somewhat excessively drained soils that have a loamy surface layer and subsoil; on the Cumberland Plateau

This map unit is characterized by relatively broad ridges that have been dissected by drainageways. Some areas of sandstone outcrop are in the steepest part of the unit.

This map unit makes up about 57 percent of the county. It is about 37 percent Lily soils, 32 percent Gilpin soils, 19 percent Ramsey soils, and 12 percent soils of minor extent.

The gently sloping and sloping Lily soils are on the broadest ridgetops. They are well drained and are 20 to 40 inches deep over sandstone bedrock.

The sloping to steep Gilpin soils are on side slopes and the nose of ridges. They are well drained and are 20 to 40 inches deep over shale bedrock.

The sloping to steep Ramsey soils are commonly in the most dissected parts of the map unit. They have some areas of sandstone outcrop. They are somewhat excessively drained and are less than 20 inches deep over sandstone bedrock.

Of minor extent in this unit are the Hendon soils on broad ridges and the Morehead and Bonair soils on low terraces and bottom land.

About 35 percent of this unit is cleared and used for corn, vegetables, hay, or pasture. The rest supports mixed hardwoods and pine.

The gently sloping and sloping ridgetops are moderately suited to cultivated crops and are well suited to hay and pasture. The hazard of erosion, low fertility, and the limited available water capacity are the main limitations.

This unit is well suited or moderately suited to woodland. Tree growth is only moderate because of the low fertility and the limited available water capacity.

The soils in this unit are poorly suited to most urban uses because the depth to bedrock is less than 40 inches in the major soils. The slope also is a limitation in some areas.

Detailed Soil Map Units

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

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

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

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

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, 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, 2 to 6 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 or undifferentiated groups.

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. Talbott-Braxton-Rock outcrop complex, 6 to 20 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Bouldin and Gilpin cobbly loams, 20 to 60 percent slopes, stony, is an undifferentiated group in this survey area.

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

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

BaB—Barger silt loam, 2 to 6 percent slopes. This deep, moderately well drained, gently sloping soil is on the broadest ridgetops in the highly dissected uplands. Slopes are smooth and convex. Individual areas range from 5 to 15 acres in size.

Typically, the surface layer is brown silt loam about 8 inches thick. The upper 16 inches of the subsoil is yellowish brown, friable silt loam. The lower part to a depth of more than 60 inches is brownish yellow and yellowish red very cherty loam and very cherty clay loam. It is a compact, slowly permeable fragipan that is mottled in shades of gray, red, and brown.

This soil is low in natural fertility and in content of organic matter. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability is slow in the fragipan. The available water capacity is moderate. The root zone is moderately deep.

Included with this soil in mapping are small areas of Fullerton soils and areas of Barger soils that have slopes of more than 6 percent. Fullerton soils have a

cherty surface layer and a cherty clay subsoil. The included soils make up about 15 percent of the unit. Individual areas of these soils are less than 5 acres in size.

About 50 percent of the acreage of the Barger soil is used as woodland, and the rest is used for crops, hay, or pasture.

This soil is well suited to cultivated crops, hay, and pasture. The main limitations are the moderately deep root zone and the moderate available water capacity. The soil is poorly suited to alfalfa and other crops that require a deep root zone. Erosion is a moderate hazard if cultivated crops are grown.

This soil is well suited to woodland. Productivity is limited by the low natural fertility and the moderate available water capacity. Windthrow is a hazard in places because the fragipan restricts the rooting depth. Suitable species include southern red oak, loblolly pine, shortleaf pine, and Virginia pine.

This soil is moderately suited to most urban uses. It is poorly suited to septic tank absorption fields because of the slow permeability and a perched water table.

The capability subclass is IIe.

BaC—Barger silt loam, 6 to 12 percent slopes. This deep, moderately well drained, sloping soil is on convex ridgetops in the highly dissected uplands. Individual areas range from 5 to 25 acres in size.

Typically, the surface layer is very dark grayish brown and light yellowish brown silt loam about 7 inches thick. The upper 14 inches of the subsoil is yellowish brown silt loam. The lower part is brownish yellow and yellowish red very cherty loam and very cherty clay loam. It is a compact, slowly permeable fragipan that is mottled in shades of gray, red, and brown.

This soil is low in natural fertility and in content of organic matter. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability is slow in the fragipan. The available water capacity is moderate. The root zone is moderately deep.

Included with this soil in mapping are areas of a similar soil on foot slopes and small areas of Pailo and Fullerton soils. Pailo soils are in the steepest part of the map unit and have a very cherty surface layer. Fullerton soils have a cherty surface layer and a cherty clay subsoil. The included soils make up about 25 percent of the unit. Individual areas of these soils are less than 5 acres in size.

Most areas of the Barger soil are used as woodland. A few areas have been cleared of trees and are used as pasture.

This soil is well suited to pasture and hay and moderately suited to cultivated crops. The main limitations are the moderately deep root zone and the moderate available water capacity. Erosion is a severe hazard if cultivated crops are grown. Contour farming, conservation tillage, and no-till farming help to control erosion and conserve moisture. The soil is poorly suited to alfalfa and other crops that require a deep root zone.

This soil is well suited to woodland. Productivity is limited by the moderate available water capacity and the low natural fertility. Windthrow is a hazard in places because the fragipan restricts the rooting depth. Suitable species include southern red oak, loblolly pine, shortleaf pine, and Virginia pine.

This soil is moderately suited to most urban uses. It is poorly suited to septic tank absorption fields because of the slow permeability and a perched water table.

The capability subclass is IIIe.

BeD—Bethesda loam, 8 to 25 percent slopes. This deep, well drained, sloping to steep soil is in areas of reclaimed mine spoil from surface coal mining operations. The slopes were smoothed and reshaped during reclamation. In some areas vertical cuts of bedrock were exposed during mining. These cuts are from 25 to 75 feet high and are commonly referred to as "highwalls." Individual areas range from 5 to 20 acres in size.

Typically, the surface layer is yellowish brown loam about 10 inches thick. The underlying material to a depth of more than 60 inches is strong brown and brownish yellow extremely shaly clay loam and extremely shaly silty clay loam.

This soil is low in natural fertility and in content of organic matter. It ranges from strongly acid to extremely acid. Permeability is moderately slow. The available water capacity is low. The soil is deep, but root growth is limited by the low available water capacity, the low fertility, and the acidity.

Included with this soil in mapping are small areas of Lily and Gilpin soils. These soils are on the adjacent slopes surrounding the reclaimed site. Lily soils are loamy and are less than 40 inches deep over sandstone bedrock. Gilpin soils are silty and are less than 40 inches deep over shale bedrock. The included soils make up about 20 percent of the unit. Individual areas of these soils are less than 5 acres in size.

The Bethesda soil was seeded to tall fescue and sericea lespedeza when it was reclaimed. It is used as pasture or is idle land.

This soil is poorly suited to cultivated crops and moderately suited to hay and pasture. Applying lime and fertilizer helps to maintain grass stands and improves productivity. Erosion is a severe hazard unless a good plant cover is maintained.

This soil is moderately suited to woodland. The erosion hazard, the equipment limitation, the seedling mortality rate, and the windthrow hazard are moderate. Suitable species include loblolly pine, Virginia pine, shortleaf pine, and black locust.

This soil is poorly suited to urban uses. Onsite investigation is necessary to determine if the limitations that affect specific uses can be overcome.

The capability subclass is IVs.

BhE—Bethesda-Pits complex, 20 to 60 percent slopes. This map unit consists of areas of Bethesda soil that have not been reclaimed and areas of Pits that are filled with water part of the time and that have a rock wall, which is commonly referred to as a "highwall." The Bethesda soil consists of irregularly shaped spoil piles that have not been reclaimed. The Pits are 25 to 200 feet wide and several hundred feet long. The "highwall" is 25 to 75 feet high and generally forms one side of the pit. The Bethesda soil makes up about 65 percent of the unit and the Pits about 25 percent. Individual areas range from 5 to 20 acres in size.

Typically, the Bethesda soil has a surface layer of dark grayish brown very shaly silt loam about 3 inches thick. The underlying material to a depth of 60 inches or more is strong brown and brownish yellow extremely shaly silty clay loam and extremely shaly clay loam. In places fragments of hard sandstone as much as 3 feet across are on the surface layer and in the soil.

This soil is low in natural fertility and in content of organic matter. It is strongly acid to extremely acid. Permeability is moderately slow. The available water capacity is low. The soil is deep, but root growth is limited by the low available water capacity, the low fertility, and the acidity.

Included in this unit in mapping are small areas of Lily and Gilpin soils. These soils are on the adjacent slopes surrounding the mining site. Lily soils are loamy and are less than 40 inches deep over sandstone bedrock. Gilpin soils are silty and are less than 40 inches deep over shale bedrock. The included soils make up about 10 percent of the unit. Individual areas of these soils are less than 5 acres in size.

Most of this map unit is not suited to any specific use. Establishing and maintaining a plant cover to help control runoff and erosion is the main management concern. Controlling runoff and erosion helps to protect downstream areas from the acid sediments and the acid water. Virginia pine and loblolly pine have been planted in most areas of the Bethesda soil. Other suitable species include shortleaf pine and black locust. The survival rate and growth of the trees varies considerably in the unit because of the variability of the soil.

This map unit is poorly suited to cultivated crops, pasture, woodland, and urban uses. Major reclamation is needed to make this unit suitable for these uses.

The capability subclass is VIIs.

BoE—Bouldin and Gilpin cobbly loams, 20 to 60 percent slopes, stony. These soils are on the steep and very steep side slopes of the Cumberland Plateau escarpment. They are in each area of the map unit, but the areas are large and the relative proportion of each soil varies considerably from one part of an area to another. A discontinuous sandstone cliff about 20 to 75 feet high is at the top of the side slopes, where they join the plateau. Stones and boulders from the cliff cover 1 to 2 percent of the surface. Individual areas are as much as several hundred acres in size. The Bouldin soil makes up about 50 percent of the unit, and the Gilpin soil makes up about 40 percent.

Typically, the Bouldin soil has a surface layer and subsurface layer of dark grayish brown and yellowish brown cobbly loam about 6 inches thick. The upper part of the subsoil is strong brown and yellowish red cobbly loam and very cobbly loam. The lower part is yellowish red extremely stony clay loam. Sandstone fragments are in the subsoil. They are generally less than 10 inches across in the upper part of the subsoil but may be as much as 24 inches across in the lower part. The depth to bedrock is more than 60 inches.

Typically, the Gilpin soil has a surface layer and subsurface layer of dark grayish brown and yellowish brown cobbly loam about 6 inches thick. The subsoil is yellowish brown shaly and very shaly silty clay loam. Weathered shale bedrock is at a depth of about 30 inches.

The Bouldin and Gilpin soils are low in natural fertility and in content of organic matter. They are strongly acid or very strongly acid. Permeability is moderately rapid in the Bouldin soil and moderate in the Gilpin soil. The available water capacity is low in both soils.

Included with these soils in mapping are areas of Talbott, Braxton, and Enders soils. Talbott and Braxton soils are on the lower, northwest-facing part of the escarpment. They formed in material weathered from limestone and have a clayey subsoil. Enders soils are on the southeast-facing part of the escarpment. They formed in material weathered from shale and have a clayey subsoil. The included soils make up about 10 percent of the unit. Individual areas of these soils are less than 5 acres in size.

All areas of this map unit are wooded. The Bouldin and Gilpin soils are moderately suited to woodland. The slope and the stoniness are the major management concerns. The equipment limitation and the erosion hazard are the most difficult problems to overcome. The

low available water capacity also is a limitation affecting trees. Suitable species include northern red oak, yellow poplar, shortleaf pine, and eastern white pine.

These soils are not suited to cultivated crops, hay, pasture, or most urban uses because of the slope and the stoniness. Slippage is a severe hazard if cuts are made for roads, dwellings, and other structures.

The capability subclass is VIIs.

Co—Cobstone cobbly fine sandy loam, rarely flooded. This deep, well drained, nearly level and gently sloping soil formed in loamy, cobbly alluvial material. It is on alluvial fans and low stream terraces near the base of the Cumberland Plateau. A large number of cobblestones are on the surface and throughout the soil. Individual areas range from 5 to 75 acres in size. Slopes range from 0 to 3 percent.

Typically, the surface layer is dark grayish brown cobbly fine sandy loam about 5 inches thick. The subsoil to a depth of 12 inches is strong brown very cobbly fine sandy loam. Below this to a depth of 63 inches is strong brown and yellowish brown extremely cobbly sandy clay loam, extremely cobbly fine sandy loam, and extremely cobbly sandy loam.

This soil is low in natural fertility and in content of organic matter. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability is moderately rapid. The available water capacity is low. Tilth is poor. The cobblestones interfere with tillage. The root zone is deep. In most areas the soil is subject to rare flooding.

Included with this soil in mapping are small areas of Sequatchie, Whitwell, and Swafford soils, all of which have less than 15 percent coarse fragments. Sequatchie soils are on the adjacent low terraces. Whitwell soils are on the adjacent low terraces and are moderately well drained. Swafford soils have a slightly compact and brittle layer in the subsoil. The included soils make up about 25 percent of the unit. Individual areas of these soils are less than 5 acres in size.

The Cobstone soil is used as pasture or woodland. Many areas were previously cleared of trees but have been replanted to trees or have reverted to woodland. In these areas most of the large stones and several of the smaller stones have been removed from the surface.

The soil is moderately suited to woodland. The large number of cobblestones and the low available water capacity are the main limitations. The seedling mortality rate is a management concern. Suitable species include southern red oak, shortleaf pine, Virginia pine, and loblolly pine.

This soil is poorly suited to cropland and hayland because of the large number of cobblestones on the surface and the low productivity. It is moderately suited or poorly suited to pasture, depending on the number of cobblestones on the surface. Tall fescue is the best suited grass. Productivity is low. Weed and brush control is difficult in places because of the stones.

This soil is not suited to most urban uses because of the large number of cobblestones and the flooding.

The capability subclass is VIs.

Cs—Cobstone cobbly fine sandy loam, rarely flooded, extremely stony. This deep, well drained, nearly level and gently sloping soil formed in loamy, cobbly alluvial material. It is on alluvial fans and low stream terraces in mountain coves and along streams that flow out of the Cumberland Plateau. Stones as much as 30 inches across cover 15 to 50 percent of the surface. Individual areas range from 5 to 60 acres in size. Slopes range from 0 to 3 percent.

Typically, the surface layer is dark grayish brown cobbly fine sandy loam about 5 inches thick. The subsoil to a depth of 12 inches is strong brown very cobbly fine sandy loam. Below this to a depth of 63 inches is strong brown and yellowish brown extremely cobbly sandy clay loam and extremely cobbly sandy loam.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid. Permeability is moderately rapid. The available water capacity is low. Because of the stoniness, tilth is poor. The root zone is deep. In most areas the soil is subject to rare flooding.

Included with this soil in mapping are small areas of Sequatchie and Whitwell soils, both of which are on the adjacent low terraces and have less than 15 percent coarse fragments throughout. Whitwell soils are moderately well drained. Also included are areas of Cobstone soil that have only a few stones on the surface. The included soils make up about 20 percent of the unit. Individual areas of these soils are less than 5 acres in size.

In all areas the Cobstone soil is used as woodland. It is poorly suited to woodland. The large number of stones on the surface makes the use of equipment difficult. The seedling mortality rate also is a management concern. Suitable species include southern red oak, shortleaf pine, and Virginia pine.

This soil is not suited to cultivated crops, hay, or pasture because of the stoniness. It is not suited to urban uses because of the stoniness and the flooding.

The capability subclass is VIIs.

EnC—Enders silt loam, 6 to 12 percent slopes. This deep, well drained, sloping soil is on the narrow tops of shale ridges in the Sequatchie Valley, adjacent

to the Cumberland Plateau. Slopes are smooth and convex. Individual areas range from 5 to 20 acres in size.

Typically, the surface layer and subsurface layer are dark grayish brown and brown silt loam about 4 inches thick. The upper few inches of the subsoil is yellowish red silty clay loam. Below this is yellowish red clay that is mottled in shades of red, yellow, and brown. Soft, weathered shale bedrock is at a depth of about 48 inches.

This soil is low in natural fertility and in content of organic matter. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability is very slow. The available water capacity is moderate or high. The soil is deep, but root growth is restricted by the clayey subsoil.

Included with this soil in mapping are small areas of Bouldin and Gilpin soils on the higher parts of the mountainsides. Bouldin soils are more than 60 inches deep over bedrock and have more than 35 percent rock fragments throughout. Gilpin soils are less than 40 inches deep over shale bedrock and have a loamy subsoil. The included soils make up about 20 percent of the unit. Individual areas of these soils are less than 5 acres in size.

The Enders soil is used mostly as woodland. A few small areas have been cleared of trees and are used for hay, pasture, or row crops.

This soil is poorly suited to cultivated crops and moderately suited to hay and pasture. Erosion is a severe hazard if cultivated crops are grown. The very slowly permeable, clayey subsoil retards the growth of roots and slows the movement of water and air through the soil. The soil is best suited to cool-season grasses because their greatest growth is in spring and fall when the highest amount of moisture is available.

This soil is moderately suited to woodland. Productivity is limited by the low natural fertility. Plant competition is the only significant management concern. Suitable species include southern red oak, white oak, loblolly pine, and shortleaf pine.

This soil is poorly suited to most urban uses. The very slow permeability, a high shrink-swell potential, and low strength are severe limitations for most uses.

The capability subclass is IVe.

EnD—Enders silt loam, 12 to 20 percent slopes. This deep, well drained, moderately steep soil is on the side slopes of shale ridges in the Sequatchie Valley, adjacent to the Cumberland Plateau. Slopes are smooth and convex. Individual areas range from 30 to 150 acres in size.

Typically, the surface layer and subsurface layer are dark grayish brown and brown silt loam about 4 inches thick. The upper few inches of the subsoil is yellowish red silty clay loam. Below this is yellowish red clay that is mottled in shades of red, yellow, and brown. Soft, weathered shale bedrock is at a depth of about 48 inches.

This soil is low in natural fertility and in content of organic matter. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability is very slow. The available water capacity is moderate or high. The soil is deep, but root growth is restricted by the clayey subsoil.

Included with this soil in mapping are small areas of Talbott and Braxton soils. Talbott soils are less than 40 inches deep over limestone bedrock. Braxton soils are more than 60 inches deep over limestone bedrock. The included soils make up about 25 percent of the unit. Individual areas of these soils are less than 5 acres in size.

The Enders soil is used mostly as woodland. A few small areas have been cleared of trees and are used as pasture.

This soil is poorly suited to cultivated crops and moderately suited to hay and pasture. Erosion is a very severe hazard if cultivated crops are grown. The very slowly permeable, clayey subsoil retards the growth of roots and slows the movement of water and air through the soil. The soil is best suited to cool-season grasses because their greatest growth is in spring and fall when the highest amount of moisture is available.

This soil is moderately suited to woodland. Productivity is limited by the low natural fertility. Plant competition is the only significant management concern. Suitable species include southern red oak, white oak, loblolly pine, and shortleaf pine.

This soil is poorly suited to most urban uses. The very slow permeability, a high shrink-swell potential, and low strength are severe limitations for most uses.

The capability subclass is VIe.

EnE—Enders silt loam, 20 to 50 percent slopes. This deep, well drained, steep soil is on the lower, southeast-facing part of the Cumberland Plateau escarpment and on ridges that extend into the valley. Slopes are smooth and convex. Individual areas range from 30 to 150 acres in size.

Typically, the surface layer and subsurface layer are dark grayish brown and brown silt loam about 4 inches thick. The upper few inches of the subsoil is yellowish red silty clay loam. Below this is yellowish red clay that is mottled in shades of red, yellow, and brown. Soft, weathered shale bedrock is at a depth of about 48 inches.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid.

Permeability is very slow. The available water capacity is moderate or high. The soil is deep, but root growth is restricted by the clayey subsoil.

Included with this soil in mapping are small areas of Talbott and Braxton soils on the lower part of the ridges in the Sequatchie Valley and some areas of Bouldin and Gilpin soils on the lower part of the escarpment. The included soils make up about 25 percent of the unit. Individual areas of these soils are less than 5 acres in size.

The Enders soil is used mostly as woodland. A few small areas have been cleared of trees and are used as pasture.

This soil is not suited to cultivated crops and hay and is poorly suited to pasture. The slope and the severe hazard of erosion are the main limitations.

This soil is moderately suited to woodland. Production is limited by the low natural fertility. Because of the slope, the equipment limitation and the erosion hazard are severe management concerns. Plant competition is a moderate management concern.

This soil is poorly suited to urban uses. The slope, the very slow permeability, and a high shrink-swell potential are severe limitations for most urban uses.

The capability subclass is VIIe.

EtB—Etowah silt loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on intermediate and high stream terraces in the Sequatchie Valley. Slopes are smooth and convex. Individual areas range from 5 to 30 acres in size.

Typically, the surface layer is dark brown silt loam about 9 inches thick. The upper 20 inches of the subsoil is strong brown silty clay loam, and the lower part to a depth of 63 inches is yellowish red clay loam.

This soil is medium in natural fertility and moderate or low in content of organic matter. It responds well to the application of fertilizer. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability is moderate. The available water capacity is high. Tilth is good. The soil can be worked throughout a wide range of moisture content. The root zone is deep.

Included with this soil in mapping are small areas of Waynesboro soils, which have a lighter colored surface layer than the Etowah soil and a higher content of clay in the subsoil. Waynesboro soils are in the slightly higher areas in this unit. They make up about 20 percent of the unit. Individual areas of these soils are less than 5 acres in size.

The Etowah soil is used mostly for cultivated crops, but it also is used for pasture or hay. It is well suited to all of these uses.

This soil is well suited to all of the cultivated crops and hay and pasture plants that are commonly grown in the county. Erosion is a moderate hazard if cultivated crops are grown.

This soil is well suited to woodland. Plant competition is the only significant management concern. Suitable species include black walnut, yellow poplar, and loblolly pine.

This soil is well suited to most urban uses. It has no significant limitations that cannot be overcome by proper design and construction.

The capability subclass is IIe.

EtC—Etowah silt loam, 6 to 12 percent slopes. This deep, well drained, sloping soil is on high stream terraces in the Sequatchie Valley. Slopes are smooth and convex. Individual areas range from 5 to 30 acres in size.

Typically, the surface layer is dark brown silt loam about 7 inches thick. The upper part of the subsoil is strong brown silty clay loam, and the lower part to a depth of 60 inches or more is yellowish red clay loam.

This soil is medium in natural fertility and moderate or low in content of organic matter. It responds well to the application of fertilizer. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability is moderate. The available water capacity is high. Tilth is good. The soil can be worked throughout a wide range of moisture content. The root zone is deep.

Included with this soil in mapping are areas of Waynesboro soils, which have a lighter colored surface layer than the Etowah soil and a higher content of clay in the subsoil. Waynesboro soils are on the higher ridgetops and on the steeper part of the side slopes. They make up about 20 percent of the unit. Individual areas of these soils are less than 5 acres in size.

The Etowah soil is used mostly for cultivated crops, hay, or pasture. It is well suited to hay and pasture and moderately suited to cultivated crops. Erosion is a severe hazard if cultivated crops are grown unless minimum tillage or other erosion-control measures are applied.

This soil is well suited to woodland. Plant competition is the only significant management concern. Suitable species include black walnut, yellow poplar, and loblolly pine.

This soil is moderately suited to most urban uses. The slope is a moderate limitation. It generally can be overcome by proper design and construction.

The capability subclass is IIIe.

FuB—Fullerton cherty silt loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on the tops of cherty limestone ridges in the Sequatchie

Valley. Slopes are smooth and convex. Individual areas range from 5 to 30 acres in size.

Typically, the surface layer is brown cherty silt loam about 7 inches thick. The upper 7 inches of the subsoil is strong brown cherty silt loam and cherty silty clay loam. The lower part to a depth of 65 inches is red cherty clay.

This soil is low in natural fertility and in content of organic matter, but it responds well to the application of fertilizer. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability and the available water capacity are moderate. The root zone is deep.

Included with this soil in mapping are small areas of a similar soil that has less than 15 percent chert and small areas of Pailo soils. Pailo soils are loamy and have more than 35 percent chert fragments in the upper part of the subsoil. The included soils make up about 10 percent of the unit. Individual areas of these soils are less than 5 acres in size.

Most areas of the Fullerton soil are used for cultivated crops, hay, or pasture. This soil is well suited to cultivated crops, hay, and pasture. Erosion is a moderate hazard if cultivated crops are grown. The small chert fragments in the surface layer are a minor concern affecting tillage. The moderate available water capacity and the hazard of erosion are the main limitations affecting crop production.

This soil is well suited to woodland. Plant competition is the only significant management concern. Productivity is limited by the low natural fertility and the moderate available water capacity. Suitable species include yellow poplar and loblolly pine.

This soil is moderately suited to most urban uses. The main limitations are a moderate shrink-swell potential in the clayey subsoil and the moderate permeability. These limitations can generally be overcome by proper design and construction.

The capability subclass is IIe.

FuC2—Fullerton cherty silt loam, 6 to 12 percent slopes, eroded. This deep, well drained, sloping soil is on the upper side slopes of cherty limestone ridges in the Sequatchie Valley. Erosion has removed 25 to 50 percent of the original surface layer. Individual areas range from 10 to 45 acres in size.

Typically, the surface layer is brown cherty silt loam about 5 inches thick. The upper 7 inches of the subsoil is strong brown cherty silt loam. The lower part to a depth of 65 inches is red cherty clay.

This soil is low in natural fertility and in content of organic matter but responds well to the application of fertilizer. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability and the available water capacity are moderate. The root zone is deep.

Included with this soil in mapping are small areas of a similar soil that has less than 15 percent chert and small areas of Pailo soils. Pailo soils are loamy and have more than 35 percent chert fragments in the upper part of the subsoil. The included soils make up about 15 percent of the unit. Individual areas of these soils are less than 5 acres in size.

Most areas of the Fullerton soil are used for cultivated crops, hay, or pasture. This soil is moderately suited to cultivated crops and well suited to hay and pasture. Because of the slope, erosion is a severe hazard if cultivated crops are grown. The moderate available water capacity is a limitation affecting crop production.

This soil is well suited to woodland. Plant competition is the only significant management concern. Productivity is limited by the low natural fertility and the moderate available water capacity. Suitable species include yellow poplar and loblolly pine.

This soil is moderately suited to most urban uses. The main limitations are the slope, a moderate shrink-swell potential in the clayey subsoil, and the moderate permeability. These limitations can generally be overcome by proper design and construction.

The capability subclass is IIIe.

FuD2—Fullerton cherty silt loam, 12 to 20 percent slopes, eroded. This deep, well drained, moderately steep soil is on the side slopes of cherty limestone ridges in the Sequatchie Valley. Erosion has removed 25 to 50 percent of the original surface layer. Individual areas range from 5 to 50 acres in size.

Typically, the surface layer is brown cherty silt loam about 5 inches thick. The upper 6 inches of the subsoil is strong brown cherty silt loam and cherty silty clay loam. The lower part to a depth of 65 inches is red cherty clay.

This soil is low in natural fertility and in content of organic matter. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability and the available water capacity are moderate. The root zone is deep.

Included with this soil in mapping are small areas of Pailo and Minvale soils. Pailo soils are loamy and have more than 35 percent chert fragments in the upper part of the subsoil. Minvale soils have a loamy subsoil and are on colluvial foot slopes and benches. The included soils make up about 25 percent of the unit. Individual areas of these soils are less than 5 acres in size.

Most areas of the Fullerton soil are used as woodland. Some areas have been cleared of trees and are used mainly for hay or pasture.

This soil is poorly suited to cultivated crops. Erosion is a very severe hazard if cultivated crops are grown. The slope is a limitation affecting the use of equipment.

This soil is moderately suited to hay and pasture. A lack of available moisture during dry periods is the main limitation. Rapid runoff and the moderate available water capacity cause the moisture deficit. Erosion also is a hazard if a good plant cover is not maintained.

This soil is moderately suited to woodland. The slope causes a hazard of erosion and limits the use of equipment. Productivity is limited by the low natural fertility and the moderate available water capacity. Suitable species include southern red oak, yellow poplar, and shortleaf pine.

This soil is poorly suited to most urban uses because of the slope. The shrink-swell potential and the moderate permeability in the clayey subsoil also affect several urban uses.

The capability subclass is IVe.

FuE—Fullerton cherty silt loam, 20 to 35 percent slopes. This deep, well drained, steep soil is on the side slopes of cherty limestone ridges in the Sequatchie Valley. Individual areas range from 5 to 75 acres in size.

Typically, the surface layer and subsurface layer are dark grayish brown and brown cherty silt loam about 6 inches thick. The upper 5 inches of the subsoil is strong brown cherty silt loam and cherty silty clay loam. The lower part to a depth of 65 inches is red cherty clay.

This soil is low in natural fertility and in content of organic matter. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability and the available water capacity are moderate. The root zone is deep.

Included with this soil in mapping are small areas of Pailo and Minvale soils. Pailo soils are loamy and have more than 35 percent chert fragments in the upper part of the subsoil. Minvale soils have a loamy subsoil. They are on colluvial foot slopes and benches. The included soils make up about 20 percent of the unit. Individual areas of these soils are less than 5 acres in size.

Most areas of the Fullerton soil are used as woodland. A few areas have been cleared of trees and are used as pasture.

This soil is not suited to cultivated crops and hay and is poorly suited to pasture because of the slope. Applying lime and fertilizer and clipping to control weeds and bushes are difficult.

This soil is moderately suited to woodland. The erosion hazard and the equipment limitation are moderate because of the slope. Productivity is limited by the low natural fertility and the moderate available water capacity. Surface runoff is rapid because of the slope. Suitable species are southern red oak, yellow poplar, and shortleaf pine.

This soil is poorly suited to urban uses because of the slope. This limitation is difficult to overcome for most uses.

The capability subclass is VIe.

GpC—Gilpin shaly silt loam, 6 to 12 percent slopes. This moderately deep, well drained, sloping soil is on the Cumberland Plateau. It is on convex ridgetops that are underlain by shale. Individual areas range from 5 to 120 acres in size.

Typically, the surface layer and subsurface layer are very dark grayish brown and brown shaly silt loam about 7 inches thick. The subsoil is yellowish brown shaly silt loam and shaly silty clay loam. Weathered shale bedrock is at a depth of about 32 inches.

This soil is low in natural fertility and in content of organic matter. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability is moderate. The available water capacity is low or moderate. This soil can be worked throughout a wide range of moisture content, but the shale fragments interfere somewhat with tillage. The root zone is moderately deep.

Included with this soil in mapping are small areas of Lily and Ramsey soils. These soils are in adjacent areas on ridgetops and the upper side slopes. They contain more sand than the Gilpin soil. Lily soils are less than 40 inches deep over sandstone bedrock. Ramsey soils are less than 20 inches deep over sandstone bedrock. Also included are small areas of the moderately well drained Morehead and poorly drained Bonair soils along drainageways. The included soils make up about 30 percent of the unit. Individual areas of these soils are less than 5 acres in size.

The Gilpin soil is used mostly as woodland. A few small areas have been cleared of trees and are used for hay or pasture.

This soil is moderately suited to cultivated crops and well suited to hay and pasture. Crop yields are moderate because of the moderately deep root zone and the low or moderate available water capacity. Erosion is a severe hazard if cultivated crops are grown.

This soil is moderately suited to woodland. The low or moderate available water capacity, the depth to bedrock, and the low natural fertility are limitations. Plant competition is the only significant management concern. Suitable species are northern red oak, Virginia pine, and eastern white pine.

This soil is moderately suited or poorly suited to most

urban uses. The depth to bedrock and the slope are the main limitations.

The capability subclass is IIIe.

GpD—Gilpin shaly silt loam, 12 to 20 percent slopes. This moderately deep, well drained, moderately steep soil is on the Cumberland Plateau. It is on the upper part of side slopes and at the head of drainageways. Individual areas range from 5 to 80 acres in size.

Typically, the surface layer and subsurface layer are very dark grayish brown and brown shaly silt loam about 6 inches thick. The subsoil is yellowish brown shaly silt loam and shaly silty clay loam. Weathered shale bedrock is at a depth of about 30 inches.

This soil is low in natural fertility and in content of organic matter. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability is moderate. The available water capacity is low or moderate. The root zone is moderately deep.

Included with this soil in mapping are small areas of Lily and Ramsey soils. These soils contain more sand than the Gilpin soil. Lily soils are less than 40 inches deep over sandstone bedrock. Ramsey soils are less than 20 inches deep over sandstone bedrock. Also included are small areas of the moderately well drained Morehead and poorly drained Bonair soils along drainageways. The included soils make up about 30 percent of the unit. Individual areas of these soils are less than 5 acres in size.

Most areas of the Gilpin soil are used as woodland. A few areas have been cleared of trees and are used for hay or pasture.

This soil is poorly suited to cultivated crops and moderately suited to hay and pasture. Erosion is a severe hazard if cultivated crops are grown. The slope is a limitation affecting the use of equipment. The moderately deep root zone and the low or moderate available water capacity limit the production of grasses and legumes.

This soil is moderately suited to woodland. Productivity is limited by the low or moderate available water capacity, the moderately deep root zone, and the low natural fertility. The erosion hazard, the equipment limitation, and plant competition are moderate. Suitable species include northern red oak, Virginia pine, and eastern white pine.

This soil is poorly suited to most urban uses because of the slope and the depth to bedrock.

The capability subclass is IVe.

GpE—Gilpin shaly silt loam, 20 to 45 percent slopes. This moderately deep, well drained, steep soil is on the Cumberland Plateau. It is on the steepest side slopes. Individual areas range from 5 to 50 acres in size.

Typically, the surface layer and subsurface layer are very dark grayish brown and yellowish brown shaly silt loam about 5 inches thick. The subsoil is yellowish brown shaly silt loam and shaly silty clay loam. Weathered shale bedrock is at a depth of about 29 inches.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid. Permeability is moderate. The available water capacity is low or moderate. The root zone is moderately deep.

Included with this soil in mapping are small areas of Ramsey soils. These soils are on the steep slopes and are less than 20 inches deep over sandstone bedrock. Also included along some drainageways are narrow areas of the moderately well drained Morehead and poorly drained Bonair soils. The included soils make up about 25 percent of the unit. Individual areas of these soils are less than 5 acres in size.

Most areas of the Gilpin soil are used as woodland. A few acres have been cleared of trees and are used as pasture.

This soil is not suited to cultivated crops and hay and is poorly suited to pasture. The slope limits the use of equipment and causes a very severe hazard of erosion unless a good plant cover is maintained.

This soil is moderately suited to woodland. The erosion hazard and the equipment limitation are moderate. Suitable species include northern red oak, Virginia pine, and eastern white pine.

This soil is poorly suited to urban uses because of the slope and the depth to bedrock.

The capability subclass is VIe.

Ha—Hamblen loam, occasionally flooded. This deep, moderately well drained, nearly level soil is on flood plains along the Sequatchie Valley. Individual areas range from 5 to 15 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface layer is dark yellowish brown loam about 6 inches thick. The upper part of the subsoil is dark yellowish brown loam. The lower part to a depth of about 45 inches is yellowish brown silt loam. The substratum to a depth of 60 inches is pale brown silt loam. Mottles in shades of gray, brown, and red are in the subsoil and substratum.

This soil is medium in natural fertility and moderate or low in content of organic matter but responds well to the application of fertilizer. It ranges from neutral to strongly acid. Permeability is moderate. The available water capacity is high. The root zone is deep but is limited by a seasonal high water table during winter and

early spring. The soil is occasionally flooded.

Included with this soil in mapping are small areas of Sullivan, Whitwell, and Newark soils. Sullivan soils are well drained and are in the slightly higher areas on the flood plains. Whitwell soils are on the adjacent low stream terraces. Newark soils are somewhat poorly drained and are in the slightly lower areas on the flood plains. The included soils make up about 25 percent of the unit. Individual areas of these soils are less than 5 acres in size.

Most areas of the Hamblen soil are used for cultivated crops, hay, or pasture. A few small, irregularly shaped areas are used as woodland.

This soil is well suited to cultivated crops, hay, and pasture. This soil is occasionally flooded, but the damage to crops is minor. The flooding generally occurs for very brief periods during winter and early spring.

This soil is well suited to woodland. Plant competition and the seedling mortality rate caused by the flooding are the only significant management concerns. Site preparation and cultivation or spraying are needed to control undesirable plants. Suitable species are yellow poplar and loblolly pine.

This soil is not suited to most urban uses because of the flooding. The seasonal high water table also is a severe or moderate limitation for most urban uses.

The capability subclass is IIw.

HeB—Hendon silt loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on broad ridgetops on the Cumberland Plateau. Slopes are smooth and convex. Individual areas range from 5 to 75 acres in size.

Typically, the surface layer and subsurface layer are very dark grayish brown and yellowish brown silt loam about 10 inches thick. The upper 15 inches of the subsoil is yellowish brown silt loam. The lower part to a depth of 65 inches is yellowish red loam. About 50 percent of the soil between depths of 25 and 44 inches is compact and brittle.

This soil is low in natural fertility and in content of organic matter but responds well to the application of fertilizer. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability is moderately slow. The available water capacity is high. Tilth is good. The soil can be worked throughout a wide range of moisture content. The growth of roots and the movement of water are somewhat restricted below a depth of about 25 inches.

Included with this soil in mapping are small areas of Lily soils, which are less than 40 inches deep over sandstone bedrock. Also included are areas of a soil that has colors and textures similar to those of the Hendon soil but does not have a compact and brittle layer in the subsoil. The included soils make up about 20 percent of the unit. Individual areas of these soils are less than 5 acres in size.

Most areas of the Hendon soil are used as woodland because most of the Cumberland Plateau is still woodland.

This soil is generally well suited to cultivated crops, hay, and pasture. It is only moderately suited to alfalfa because of the restrictive layer in the subsoil. Erosion is a moderate hazard if cultivated crops are grown.

This soil is well suited to woodland. Plant competition is the only significant management concern. Site preparation is needed for new plantings. Suitable species are loblolly pine, shortleaf pine, and eastern white pine.

This soil is well suited to many urban uses, but the moderately slow permeability in the lower part of the subsoil is a severe limitation on sites for septic tank absorption fields. Onsite investigation is necessary to determine if a septic tank system can be designed that will function adequately.

The capability subclass is IIe.

HeC—Hendon silt loam, 6 to 10 percent slopes. This deep, well drained, sloping soil is on broad ridges on the Cumberland Plateau. It is on the convex ridgetops and the upper side slopes. Individual areas range from 5 to 50 acres in size.

Typically, the surface layer and subsurface layer are very dark grayish brown and yellowish brown silt loam about 10 inches thick. The upper 15 inches of the subsoil is yellowish brown silt loam. The lower part to a depth of 65 inches is yellowish red loam. About 50 percent of the soil between depths of 25 and 44 inches is compact and brittle.

This soil is low in natural fertility and in content of organic matter but responds well to the application of fertilizer. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability is moderately slow. The available water capacity is high. Tilth is good. The soil can be worked throughout a wide range of moisture content. The growth of roots and the movement of water are somewhat restricted below a depth of about 25 inches.

Included with this soil in mapping are small areas of Lily soils, which are less than 40 inches deep over sandstone bedrock. Also included are areas of a similar soil that does not have a compact and brittle layer in the subsoil. The included soils make up about 25 percent of the unit. Individual areas of these soils are less than 5 acres in size.

Most areas of the Hendon soil are used as woodland because most of the Cumberland Plateau is still woodland.

This soil is moderately suited to cultivated crops and generally is well suited to hay or pasture. It is only moderately suited to alfalfa because of the restrictive layers in the subsoil. Erosion is a severe hazard if cultivated crops are grown.

This soil is well suited to woodland. Plant competition is the only significant management concern. Site preparation is needed for new plantings. Suitable species are loblolly pine, shortleaf pine, and eastern white pine.

This soil is moderately suited to most urban uses. The slope is a moderate limitation that generally can be overcome by proper design. The moderately slow permeability in the subsoil is a severe limitation on sites for septic tank absorption fields. Onsite examination is necessary to determine if a septic tank system can be designed that will function adequately.

The capability subclass is IIIe.

LyB—Lily loam, 2 to 6 percent slopes. This moderately deep, well drained, gently sloping soil is on upland ridgetops on the Cumberland Plateau. Slopes are smooth and convex. Individual areas range from 5 to 75 acres in size.

Typically, the surface layer and subsurface layer are grayish brown and light yellowish brown loam about 8 inches thick. The subsoil is yellowish brown clay loam and loam. Sandstone bedrock is at a depth of 35 inches.

This soil is low in natural fertility and in content of organic matter but responds well to the application of fertilizer. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability is moderately rapid. The available water capacity is moderate. Tilth is good. The soil can be worked throughout a wide range of moisture content. The root zone is moderately deep.

Included with this soil in mapping are small areas of Ramsey and Hendon soils. Ramsey soils are less than 20 inches deep over sandstone bedrock. Hendon soils are more than 60 inches deep over sandstone bedrock but have a restrictive layer in the subsoil. The included soils make up about 20 percent of the unit. Individual areas of these soils are less than 5 acres in size.

Most areas of the Lily soil are used as woodland because most of the Cumberland Plateau has not been cleared of trees.

In some areas the soil is well suited to vegetables, field crops, hay, and pasture. Erosion is a moderate hazard if cultivated crops are grown. The moderately deep root zone and the moderate available water capacity are the main limitations.

This soil is well suited to woodland. Productivity is limited by the low natural fertility and the moderate available water capacity. Plant competition is the only significant management concern. Suitable species include loblolly pine, shortleaf pine, and Virginia pine.

This soil is moderately suited to some urban uses and poorly suited to others. The depth to bedrock is the main limitation. It is a severe limitation on sites for septic tank absorption fields and dwellings with basements.

The capability subclass is IIe.

LyC—Lily loam, 6 to 12 percent slopes. This moderately deep, well drained, sloping soil is on ridgetops and the upper side slopes on the Cumberland Plateau. Slopes are smooth and convex. Individual areas range from 5 to 200 acres in size.

Typically, the surface layer and subsurface layer are grayish brown and light yellowish brown loam about 7 inches thick. The subsoil is yellowish brown clay loam and loam. Sandstone bedrock is at a depth of about 30 inches.

This soil is low in natural fertility and in content of organic matter but responds well to the application of fertilizer. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability is moderately rapid. The available water capacity is moderate. Tilth is good. The soil can be worked throughout a wide range of moisture content. The root zone is moderately deep.

Included with this soil in mapping are small areas of Hendon, Ramsey, and Gilpin soils. Hendon soils are more than 60 inches deep over sandstone bedrock. Ramsey soils are less than 20 inches deep over sandstone bedrock. Gilpin soils have a higher content of silt than the Lily soil and are less than 40 inches deep over shale bedrock. The included soils make up about 25 percent of the unit. Individual areas of these soils are less than 5 acres in size.

Most areas of the Lily soil are used as woodland. Some areas are used for field crops, vegetable crops, hay, or pasture.

This soil is moderately suited to cultivated crops and well suited to hay and pasture. Erosion is a severe hazard if cultivated crops are grown. The moderately deep root zone and the moderate available water capacity are the main limitations.

This soil is well suited to woodland. Productivity is limited by the low natural fertility and the moderate available water capacity. Plant competition is the only significant management concern. Suitable species include loblolly pine, shortleaf pine, and Virginia pine.

This soil is moderately suited to some urban uses and poorly suited to others. It has severe limitations as

a site for septic tank absorption fields and dwellings with basements. The depth to bedrock and the slope are the main limitations.

The capability subclass is IIIe.

LyD—Lily loam, 12 to 20 percent slopes. This moderately deep, well drained, moderately steep soil is on dissected uplands on the Cumberland Plateau. Individual areas range from 5 to 33 acres in size.

Typically, the surface layer and subsurface layer are grayish brown and light yellowish brown loam about 7 inches thick. The subsoil is yellowish brown clay loam and loam. Sandstone bedrock is at a depth of about 30 inches.

This soil is low in natural fertility and in content of organic matter. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability is moderately rapid. The available water capacity is moderate. Tilth is good. The soil can be worked throughout a wide range of moisture content. The root zone is moderately deep.

Included with this soil in mapping are small areas of Bonair, Ramsey, and Gilpin soils. Bonair soils are poorly drained and are along narrow drainageways. Ramsey soils are less than 20 inches deep over sandstone bedrock. Gilpin soils have a higher content of silt throughout than the Lily soil and are less than 40 inches deep over shale bedrock. The included soils make up about 30 percent of the unit. Individual areas of these soils are less than 5 acres in size.

Most areas of the Lily soil are used as woodland. A few areas are used as pasture.

This soil is poorly suited to cultivated crops and moderately suited to hay and pasture. Erosion is a very severe hazard if cultivated crops are grown. The slope, the moderate available water capacity, and the depth to bedrock are the main limitations.

This soil is moderately suited to woodland. Productivity is low because of the low natural fertility and the moderate available water capacity. The erosion hazard and the equipment limitation are moderate because of the slope. Plant competition also is a management concern. Suitable species include loblolly pine, shortleaf pine, and Virginia pine.

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

The capability subclass is IVe.

MnC2—Minvale silt loam, 6 to 12 percent slopes, eroded. This deep, well drained, sloping soil is on foot slopes, benches, and fans in the Sequatchie Valley. Individual areas range from 5 to 20 acres in size.

Typically, the surface layer is dark yellowish brown silt loam about 7 inches thick. The subsoil to a depth of 62 inches is yellowish red and strong brown cherty silty clay loam.

This soil is low in natural fertility and in content of organic matter but responds well to the application of fertilizer. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability is moderate. The available water capacity is high. The root zone is deep.

Included with this soil in mapping are small areas of Pailo and Fullerton soils. These soils are on the side slopes above the Minvale soil. Pailo soils have more than 35 percent chert in the upper part of the subsoil. Fullerton soils have a clayey subsoil. The included soils make up about 15 percent of the unit. Individual areas of these soils are less than 5 acres in size.

Most areas of the Minvale soil are used for cultivated crops, hay, or pasture. This soil is well suited to hay and pasture and is moderately suited to cultivated crops. Erosion is a severe hazard if cultivated crops are grown.

This soil is well suited to woodland. Plant competition is the only significant management concern. Suitable species include yellow poplar, black walnut, and loblolly pine.

This soil is moderately suited to most urban uses. The slope is the main limitation. It can generally be overcome by proper design.

The capability subclass is IIIe.

MnD—Minvale silt loam, 12 to 20 percent slopes. This deep, well drained, moderately steep soil is on foot slopes of the cherty limestone ridges in the Sequatchie Valley. Individual areas range from 5 to 12 acres in size.

Typically, the surface layer is dark yellowish brown silt loam about 7 inches thick. The subsoil to a depth of 62 inches is yellowish red and strong brown cherty silty clay loam.

This soil is low in natural fertility and in content of organic matter. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability is moderate. The available water capacity is high. The root zone is deep.

Included with this soil in mapping are small areas of Pailo and Fullerton soils. These soils are on side slopes above the Minvale soil. Pailo soils have more than 35 percent chert in the upper part of the subsoil. Fullerton soils have a clayey subsoil. The included soils make up about 20 percent of the unit. Individual areas of these soils are less than 5 acres in size.

Most areas of the Minvale soil are used as woodland. Some areas are used as pasture.

This soil is poorly suited to cultivated crops and moderately suited to hay and pasture. The slope is a

limitation affecting the use of equipment. Erosion is a severe hazard unless a plant cover is maintained.

This soil is well suited to woodland. The erosion hazard and the equipment limitation are moderate because of the slope. Plant competition also is a management concern. Suitable species include yellow poplar, black walnut, and loblolly pine.

This soil is poorly suited to most urban uses because of the slope. This limitation can be overcome or greatly reduced for some uses by proper design.

The capability subclass is IVe.

Mo—Morehead rarely flooded-Bonair occasionally flooded complex. These soils are on the narrow flood plains on the Cumberland Plateau. They occur as areas so intermingled that they could not be separated in mapping. The Morehead soil is on low stream terraces and has slopes of 1 to 4 percent. The Bonair soil is on bottom land and has slopes of 0 to 2 percent. Individual areas of this unit range from 8 to 105 acres in size. The Morehead soil makes up about 45 percent of the unit, and the Bonair soil makes up about 40 percent.

Typically, the Morehead soil has a surface layer and subsurface layer of dark grayish brown and pale brown silt loam about 3 inches thick. The upper part of the subsoil is brownish yellow silt loam. The lower part to a depth of 44 inches is light yellowish brown and strong brown silty clay loam that is mottled in shades of gray, brown, and red. The substratum to a depth of 65 inches is mottled gray and yellowish brown silty clay loam.

Typically, the Bonair soil has a surface layer of very dark gray silt loam about 7 inches thick. The subsoil to a depth of about 45 inches is dark gray and gray silt loam. The substratum is light brownish gray silt loam. Mottles in shades of brown and gray may be throughout the soil but are common in the lower part of the subsoil and in the substratum.

The Morehead soil is moderately well drained, and the Bonair soil is poorly drained. Both soils generally are low in natural fertility. The Morehead soil is low in content of organic matter, and the Bonair soil is moderate. Both soils generally are strongly acid or very strongly acid, but the surface layer is less acid in limed areas. Permeability is moderate in both soils. The available water capacity is high in both soils. The Morehead soil is rarely flooded except under unusual conditions. The Bonair soil is occasionally flooded for very brief periods.

Included with these soils in mapping are small areas of a poorly drained soil on bottom land. This soil is silty clay loam and has a lighter colored surface layer than the Morehead and Bonair soils. Also included are a moderately well drained soil on bottom land and a well drained soil on the low stream terraces. The included soils make up about 15 percent of the unit. Individual areas of these soils are less than 5 acres in size.

Most areas of the Morehead and Bonair soils are used as woodland. Some areas are used for hay or pasture.

These soils are poorly suited to cultivated crops, except where the Bonair soils have been drained. In some areas drainage is not possible because of the size of the area and the lack of suitable outlets. The soils are well suited to hay and pasture if the depressions that collect surface water are drained.

These soils are well suited to woodland. Plant competition is the main management concern in areas of the Morehead soil. The seedling mortality rate and the equipment limitation are moderate management concerns in areas of the Bonair soil because of the wetness and the flooding. Suitable species on the Morehead soil are northern red oak, white oak, yellow poplar, red maple, and shortleaf pine. Suitable species on the Bonair soil are willow oak, sweetgum, and loblolly pine.

These soils are generally not suited to urban uses because of the hazard of flooding and the wetness. The Morehead soil may be suitable for some uses if proper design is used. Onsite investigation is necessary to determine if the limitations for specific uses can be overcome.

The capability subclass is IIIw.

Ne—Newark silt loam, frequently flooded. This deep, somewhat poorly drained, nearly level soil is on flood plains along tributary streams in the Sequatchie Valley. Individual areas range from 5 to 30 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface layer is dark brown silt loam about 5 inches thick. The subsoil to a depth of 27 inches is brown and grayish brown silt loam and loam. The substratum to a depth of 55 inches is grayish brown loam. Below this is dark gray clay loam. The soil is mottled in shades of brown and red throughout.

This soil is medium in natural fertility and low in content of organic matter. It ranges from medium acid to mildly alkaline. Permeability is moderate. The available water capacity is high. A water table is within 6 to 18 inches of the surface from January through April in most years. The soil is flooded for several days from January through April in most years.

Included with this soil in mapping are small areas of Hamblen soils. These soils are in the highest areas in this unit and are moderately well drained. Also included is a poorly drained soil in slight depressions. The included soils make up about 20 percent of the unit. Individual areas of these soils are less than 5 acres in size.

The Newark soil is used mostly as pasture or woodland.

This soil is poorly suited to cultivated crops because of the wetness and the hazard of flooding. The soil is best suited to short-season crops, such as soybeans and grain sorghum. It is moderately suited to hay and pasture. It is best suited to plants, such as tall fescue and ladino clover, that can tolerate the wetness and the flooding.

This soil is well suited to woodland. The wetness is a moderate limitation affecting the use of equipment. Because of the flooding, the seedling mortality rate is moderate. New plantings require site preparation because of competition from undesirable plants. Suitable species include pin oak, eastern cottonwood, sweetgum, cherrybark oak, and American sycamore.

This soil is not suited to urban uses because of the flooding and the wetness.

The capability subclass is IVw.

PaD—Pailo very cherty sandy loam, 12 to 20 percent slopes. This deep, well drained, moderately steep soil is on the sides of ridges in the Sequatchie Valley. Individual areas range from 5 to 100 acres in size.

Typically, the surface layer is very dark grayish brown very cherty loamy sand about 2 inches thick. The subsurface layer is yellowish brown very cherty sandy loam about 10 inches thick. The upper 24 inches of the subsoil is yellowish brown extremely cherty loam. The lower part to a depth of 72 inches is yellowish red clay.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid. Permeability is moderately rapid to a depth of about 34 inches and moderately slow below that depth. The available water capacity is low. Tilth is poor because of the large amount of chert fragments in the surface layer. The root zone is deep, but the growth of roots is impeded in the lower part of the subsoil by the high content of clay.

Included with this soil in mapping are small areas of Barger and Fullerton soils. Barger soils are on the narrow ridgetops and have less chert in the surface layer and in the upper part of the subsoil than the Pailo soil. Fullerton soils have less chert in the surface layer than the Pailo soil and have a clayey subsoil. The included soils make up about 20 percent of the unit. Individual areas of these soils are less than 5 acres in size.

The Pailo soil is used mostly as woodland. A few areas have been cleared of trees and are used as pasture.

This soil is moderately suited to pasture and poorly suited to hay and cultivated crops. The chert fragments in the upper part of the soil, the low available water capacity, and the slope are the main limitations. The soil is best suited to cool-season grasses, such as tall fescue.

This soil is moderately suited to woodland. Productivity is limited by the low available water capacity and the low natural fertility. The equipment limitation, the seedling mortality rate, and plant competition are moderate management concerns. Suitable species include shortleaf pine, Virginia pine, and chestnut oak.

This soil is poorly suited to urban uses. The main limitations are the slope, the large amount of chert fragments in the surface layer and in the upper part of the subsoil, and the moderately slow permeability in the lower part of the subsoil.

The capability subclass is VIs.

PaE—Pailo very cherty sandy loam, 20 to 50 percent slopes. This deep, well drained, steep soil is on the sides of ridges in the Sequatchie Valley. Individual areas range from 5 to 200 acres in size.

Typically, the surface layer is very dark grayish brown very cherty loamy sand about 2 inches thick. The subsurface layer is yellowish brown very cherty sandy loam about 10 inches thick. The upper 22 inches of the subsoil is yellowish brown extremely cherty loam. The lower part to a depth of 72 inches is yellowish red clay.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid. Permeability is moderately rapid to a depth of about 34 inches and moderately slow below that depth. The available water capacity is low. The root zone is deep, but the growth of roots is impeded in the lower part of the subsoil by the high content of clay.

Included with this soil in mapping are small areas of Fullerton and Minvale soils. Fullerton soils have less chert in the surface layer than the Pailo soil and have a clayey subsoil. Minvale soils are on foot slopes. They are loamy and have less chert throughout than the Pailo soil. The included soils make up about 20 percent of the unit. Individual areas of these soils are less than 5 acres in size.

Nearly all areas of the Pailo soil are used as woodland. This soil is moderately suited to woodland. The slope severely limits the use of equipment, and the seedling mortality rate is moderate because the soil is droughty. The low available water capacity and the low natural fertility limit productivity. Suitable species include shortleaf pine, Virginia pine, and chestnut oak.

This soil is poorly suited to cultivated crops, hay, and pasture. The slope, the low available water capacity, and the large amount of chert fragments are severe limitations.

This soil is poorly suited to urban uses. The slope and the large amount of chert fragments are limitations that generally are difficult to overcome.

The capability subclass is VIIs.

RaC—Ramsey sandy loam, 5 to 15 percent slopes. This shallow, somewhat excessively drained, rolling and hilly soil is on convex ridgetops in the dissected uplands on the Cumberland Plateau. Individual areas are 5 to 50 acres in size.

Typically, the surface layer and subsurface layer are very dark grayish brown and yellowish brown sandy loam about 5 inches thick. The subsoil is yellowish brown sandy loam. Sandstone bedrock is at a depth of about 17 inches.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid. Permeability is rapid. The available water capacity is very low. The root zone is shallow.

Included with this soil in mapping are small areas of Lily and Gilpin soils, both of which are more than 20 inches deep over bedrock. Also included are a few sandstone outcrops and a few areas that have stones on the surface. The inclusions make up about 20 percent of the unit. Individual areas of these soils are less than 5 acres in size.

The Ramsey soil is used mostly as woodland. A few small areas have been cleared of trees and are used as pasture.

The soil is poorly suited to cultivated crops, hay, and pasture. The very low available water capacity and the shallow root zone are the main limitations. The soil is best suited to tall fescue for pasture.

This soil is poorly suited to woodland. The very low available water capacity, the low natural fertility, and the shallow root zone are the main limitations. Windthrow is a hazard because of the shallow root zone. The seedling mortality rate is moderate in new plantings. Suitable species include northern red oak, Virginia pine, shortleaf pine, and loblolly pine.

This soil is poorly suited to urban uses. The depth to bedrock is a severe limitation for nearly all urban uses.

The capability subclass is VIe.

RaE—Ramsey sandy loam, 15 to 35 percent slopes. This shallow, somewhat excessively drained, moderately steep and steep soil is in dissected areas on the Cumberland Plateau. Individual areas are 15 to 45 acres in size.

Typically, the surface layer and subsurface layer are very dark grayish brown and yellowish brown sandy loam about 5 inches thick. The subsoil is yellowish brown sandy loam. Sandstone bedrock is at a depth of about 17 inches.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid. Permeability is rapid. The available water capacity is very low. The root zone is shallow.

Included with this soil in mapping are small areas of Lily and Gilpin soils. Lily soils are more than 20 inches deep over sandstone bedrock. Gilpin soils have a higher content of silt than the Ramsey soil and are more than 20 inches deep over shale bedrock. Also included are some areas that have sandstone outcrops and a few areas that have stones on the surface. The inclusions make up about 25 percent of the unit. Individual areas of these soils are less than 5 acres in size.

Nearly all areas of the Ramsey soil are used as woodland. It is poorly suited to woodland. The windthrow hazard is the most severe management concern. The hazard of erosion, the equipment limitation, and the seedling mortality rate are moderate. Productivity is limited by the very low available water capacity, the low natural fertility, and the shallow root zone. Suitable species include Virginia pine, shortleaf pine, loblolly pine, and northern red oak.

This soil is poorly suited to cultivated crops, hay, and pasture. The very low available water capacity, the shallow root zone, and the slope are severe limitations.

This soil is poorly suited to urban uses because of the shallowness to bedrock and the slope.

The capability subclass is VIIe.

RrE—Ramsey-Rock outcrop complex, 15 to 35 percent slopes. This map unit is generally on the break between the Cumberland Plateau and the Cumberland Plateau escarpment. The Ramsey soil and the Rock outcrop occur as areas so intermingled that they could not be separated in mapping. Individual areas range from 20 to 150 acres in size. The Ramsey soil makes up about 70 percent of the map unit, and the Rock outcrop makes up about 15 percent.

Typically, the Ramsey soil has a surface layer and subsurface layer of very dark grayish brown and yellowish brown sandy loam about 5 inches thick. The subsoil is yellowish brown sandy loam. Sandstone bedrock is at a depth of about 17 inches.

The Ramsey soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid. Permeability is rapid. The available water capacity is very low. The root zone is shallow.

The Rock outcrop occurs as relatively flat areas of exposed bedrock and as ledges and cliffs as much as 10 feet high.

Included in this unit in mapping are small areas of Gilpin and Lily soils, both of which are more than 20 inches deep over bedrock. Also included are some

areas of Ramsey soils that are not intermingled with Rock outcrop. The included soils make up about 15 percent of the unit. Individual areas of these soils are less than 5 acres in size.

All areas of this map unit are wooded. The unit is poorly suited to woodland. The very low available water capacity, low natural fertility, and shallow root zone in the Ramsey soil and the Rock outcrop are the main limitations. The erosion hazard, the equipment limitation, the seedling mortality rate, and the windthrow hazard are management concerns. Suitable species include Virginia pine and northern red oak.

This unit is poorly suited to cultivated crops, hay, and pasture. The very low available water capacity, shallow root zone, and the slope of the Ramsey soil and the Rock outcrop are severe limitations.

This unit is poorly suited to urban uses because of the shallowness to bedrock and slope of the Ramsey soil and the Rock outcrop.

The capability subclass is VIIs.

Se—Sequatchie loam, rarely flooded. This deep, well drained, nearly level and gently sloping soil is on low stream terraces and alluvial fans in the Sequatchie Valley. Individual areas range from 5 to 50 acres in size. Slopes range from 0 to 3 percent.

Typically, the surface layer is dark brown loam about 7 inches thick. The subsoil to a depth of about 51 inches is brown loam and fine sandy loam. The upper 9 inches of the substratum is brown sandy loam. The lower part to a depth of 68 inches is yellowish brown very gravelly sandy loam.

This soil is medium in natural fertility and moderate in content of organic matter. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability is moderate. The available water capacity is high. Tilth is good. The soil can be worked throughout a wide range of moisture content. The root zone is deep and can be easily penetrated by roots. Flooding is unlikely on this soil, but it is possible under unusual weather conditions. It is not a serious concern except as it affects urban uses, such as sites for dwellings.

Included with this soil in mapping are small areas of Swafford and Whitwell soils. Swafford soils are on low terraces. They have a compact layer in the subsoil and are moderately well drained. Whitwell soils are slightly lower on the landscape than the Sequatchie soil and are moderately well drained. The included soils make up about 15 percent of the unit. Individual areas of these soils are less than 5 acres in size.

The Sequatchie soil is used mostly for cultivated crops but also is used for hay or pasture. It is well suited to cultivated crops, hay, and pasture. Erosion is only a slight hazard if cultivated crops are grown.

This soil is well suited to woodland. Plant competition is the only significant management concern. Suitable species include yellow poplar, black walnut, and loblolly pine.

This soil is moderately suited to some urban uses, but it is not suitable as a site for dwellings and commercial buildings unless the hazard of flooding is controlled.

The capability class is I.

Su—Sullivan silt loam, occasionally flooded. This deep, well drained, nearly level soil is on flood plains along the Sequatchie River and its tributary streams. Individual areas range from 5 to 15 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface layer is brown silt loam about 6 inches thick. The subsoil is about 24 inches of dark yellowish brown loam and silt loam. Below this to a depth of 65 inches or more is a buried soil of dark grayish brown and brown silt loam.

This soil is low in natural fertility and in content of organic matter but responds well to the application of fertilizer. It ranges from neutral to medium acid. Permeability is moderate. The available water capacity is high. Tilth is good. The soil can be worked throughout a wide range of moisture content. The root zone is deep and can be easily penetrated by roots. The soil is occasionally flooded during winter and early spring.

Included with this soil in mapping are small areas of Hamblen and Sequatchie soils. Hamblen soils are moderately well drained and are in slight depressions. Sequatchie soils are in the highest areas in the unit. The included soils make up about 20 percent of the unit. Individual areas of these soils are less than 5 acres in size.

In most areas the Sullivan soil is used for cultivated crops or pasture. This soil is well suited to pasture and to all of the crops commonly grown in the county. Flooding can cause minor damage to winter wheat and alfalfa. Annual summer crops, such as corn and soybeans, are seldom damaged by flooding.

This soil is well suited to woodland. Plant competition is the only significant management concern. Suitable species include yellow poplar, black walnut, and loblolly pine.

This soil is not suited to most urban uses because of the hazard of flooding.

The capability subclass is IIw.

Sw—Swafford silt loam, rarely flooded. This deep, moderately well drained, nearly level and gently sloping soil is on low stream terraces in the Sequatchie Valley. Slopes are smooth and slightly convex. Individual areas

range from 5 to 20 acres in size. Slopes range from 0 to 3 percent.

Typically, the surface layer is brown silt loam about 8 inches thick. The upper 16 inches of the subsoil is strong brown and yellowish brown loam. The lower part to a depth of 65 inches is brownish yellow loam that has mottles in shades of gray and brown. It is compact and brittle, but it is not so compact and brittle as a fragipan.

This soil is low in natural fertility and in content of organic matter but responds well to the application of fertilizer. It is medium acid or strongly acid to a depth of 24 inches and strongly acid or very strongly acid below that depth. Permeability is moderately slow. The available water capacity is high. Tilth is good. The soil can be worked throughout a wide range of moisture content. The root zone is deep. It is slightly restricted by the compact layer in the subsoil. The soil is subject to rare flooding.

Included with this soil in mapping are small areas of Hamblen, Sequatchie, and Whitwell soils. Hamblen soils are on the narrow bottom land. Sequatchie soils are well drained. Whitwell soils do not have a compact layer in the subsoil. The included soils make up about 20 percent of the unit. Individual areas of these soils are less than 5 acres in size.

The Swafford soil is used for cultivated crops, hay, or pasture. It is well suited to most of the crops and pasture plants commonly grown in the county. It is moderately suited to crops that are sensitive to wetness, such as alfalfa and tobacco.

This soil is well suited to woodland. Plant competition is the only significant management concern. Cultivation or chemical treatment may be needed to control undesirable plants. Suitable species include yellow poplar, northern red oak, sweetgum, and loblolly pine.

This soil is poorly suited or moderately suited to most urban uses. A perched water table, the moderately slow permeability, and the flooding are the main limitations. The soil is not suitable as a site for dwellings or commercial buildings unless the site is above the flood level.

The capability subclass is IIw.

TaB—Talbott-Braxton complex, 2 to 6 percent slopes. These soils are on upland ridgetops in the Sequatchie Valley. They occur as areas so intermingled that they could not be separated in mapping. Individual areas range from 5 to 30 acres in size. The Talbott soil makes up about 45 percent of the unit. It ranges from 40 to 50 percent of each mapped area. The Braxton soil makes up about 35 percent of the unit. It ranges from 30 to 40 percent of each mapped area.

Typically, the Talbott soil has a surface layer of brown silt loam about 6 inches thick. The upper few inches of the subsoil is yellowish red silty clay loam. Below this is yellowish red clay. Bedrock is at a depth of about 32 inches.

The Talbott soil is low in natural fertility and in content of organic matter. It ranges from strongly acid to slightly acid. Permeability is moderately slow. The available water capacity is low or moderate. The root zone is moderately deep, but the growth of roots is impeded by the high content of clay in the subsoil.

Typically, the Braxton soil has a surface layer of brown silt loam about 8 inches thick. The subsoil to a depth of 65 inches is clay. The upper part is yellowish red, and the lower part is strong brown.

The Braxton soil is low in natural fertility and in content of organic matter. It ranges from strongly acid to slightly acid. Permeability is moderately slow. The available water capacity is moderate or high. The effective root zone is moderately deep; however, the clayey subsoil retards the growth of roots and slows the movement of water and air through the soil.

Included with these soils in mapping are small areas of a moderately well drained soil at the base of slopes and small areas of a soil that is more than 40 inches deep over bedrock and is less clayey in the upper part of the subsoil than the Talbott and Braxton soils. The included soils make up about 20 percent of the unit. Individual areas of these soils are less than 5 acres in size.

The Talbott and Braxton soils are used mostly for hay or pasture. In some areas they are used as cropland. They are moderately suited to row crops and well suited to hay and pasture. Crop yields are limited by the effective rooting depth and the low or moderate available water capacity. Erosion is a moderate hazard if cultivated crops are grown.

These soils are well suited to woodland. Productivity is limited by the moderate or low available water capacity and the moderately deep root zone. Plant competition is the only significant management concern. Suitable species include loblolly pine, Virginia pine, eastern redcedar, and northern red oak.

These soils are moderately suited to dwellings without basements and to small commercial buildings and are poorly suited to septic tank absorption fields. The moderately slow permeability, a moderate shrink-swell potential, and the moderate depth to bedrock are limitations.

The capability subclass is IIIe.

TaC—Talbott-Braxton complex, 6 to 12 percent slopes. These soils are on uplands that are underlain by limestone in the Sequatchie Valley. They occur as areas so intermingled that they could not be separated

in mapping. Individual areas range from 5 to 50 acres in size. The Talbott soil makes up about 50 percent of the unit. It ranges from 40 to 50 percent of each mapped area. The Braxton soil makes up about 35 percent of the unit. It ranges from 25 to 40 percent of each mapped area.

Typically, the Talbott soil has a surface layer of brown silt loam about 6 inches thick. The upper few inches of the subsoil is yellowish red silty clay loam. Below this is yellowish red clay. Bedrock is at a depth of about 32 inches.

The Talbott soil is low in natural fertility and in content of organic matter. It ranges from strongly acid to slightly acid. Permeability is moderately slow. The available water capacity is low or moderate. The root zone is moderately deep, but the growth of roots is impeded by the high content of clay in the subsoil.

Typically, the Braxton soil has a surface layer of brown silt loam about 8 inches thick. The subsoil to a depth of 65 inches or more is clay. The upper part is yellowish red, and the lower part is strong brown.

The Braxton soil is low in natural fertility and in content of organic matter. It ranges from strongly acid to slightly acid. Permeability is moderately slow. The available water capacity is moderate or high. The effective root zone is moderately deep; however, the clayey subsoil retards the growth of roots and slows the movement of water and air through the soil.

Included with these soils in mapping are small areas of a moderately well drained soil at the base of slopes and small areas of a soil that is more than 40 inches deep over bedrock and is less clayey in the upper part of the subsoil than the Talbott and Braxton soils. The included soils make up about 15 percent of the unit. Individual areas of these soils are less than 5 acres in size.

The Talbott and Braxton soils are used mostly for hay or pasture. They are moderately suited to hay and pasture and are poorly suited to row crops. Crop yields are limited by the effective rooting depth and the low or moderate available water capacity. Erosion is a severe hazard if cultivated crops are grown.

These soils are well suited to woodland. Productivity is limited by the moderate or low available water capacity and the moderately deep root zone. Plant competition is the only significant management concern. Suitable species include loblolly pine, Virginia pine, eastern redcedar, and northern red oak.

These soils are moderately suited to dwellings without basements and are poorly suited to septic tank absorption fields. The moderately slow permeability, a moderate shrink-swell potential, and the moderate depth to bedrock are limitations.

The capability subclass is IVe.

TaD—Talbott-Braxton complex, 12 to 20 percent slopes. These soils are on upland side slopes in the Sequatchie Valley. They occur as areas so intermingled that they could not be separated in mapping. Individual areas range from 5 to 45 acres in size. The Talbott soil makes up about 50 percent of the unit. It ranges from 40 to 50 percent of each mapped area. The Braxton soil makes up about 35 percent of the unit. It ranges from 30 to 40 percent of each mapped area.

Typically, the Talbott soil has a surface layer of brown silt loam about 6 inches thick. The upper few inches of the subsoil is yellowish red silty clay loam. Below this is yellowish red clay. Bedrock is at a depth of about 32 inches.

The Talbott soil is low in natural fertility and in content of organic matter. It ranges from strongly acid to slightly acid. Permeability is moderately slow. The available water capacity is low or moderate. The root zone is moderately deep, but the growth of roots is impeded by the high content of clay in the subsoil.

Typically, the Braxton soil has a surface layer of brown silt loam about 8 inches thick. The subsoil to a depth of 60 inches or more is clay. The upper part is yellowish red, and the lower part is strong brown.

The Braxton soil is low in natural fertility and in content of organic matter. It ranges from strongly acid to slightly acid. Permeability is moderately slow. The available water capacity is moderate or high. The effective root zone is moderately deep; however, the clayey subsoil retards the growth of roots and slows the movement of water and air through the soil.

Included with these soils in mapping are small areas of a soil that is more than 40 inches deep over bedrock and is less clayey in the upper part of the subsoil than the Talbott and Braxton soils. Also included are eroded areas that have a surface layer of silty clay loam. The included soils make up about 15 percent of the unit. Individual areas of these soils are less than 5 acres in size.

The Talbott and Braxton soils are used mostly for hay or pasture. In a few small areas they are used as woodland.

These soils are moderately suited to hay and pasture and poorly suited to row crops. The effective rooting depth, the low or moderate available water capacity, and the slope are the main limitations. Erosion is a very severe hazard if cultivated crops are grown.

These soils are moderately suited to woodland. Productivity is limited by the moderate or low available water capacity and the moderate depth of the root zone. Because of the slope, the erosion hazard and the equipment limitation are management concerns. Plant competition also is a management concern. Suitable

species include loblolly pine, Virginia pine, northern red oak, and eastern redcedar.

This map unit is poorly suited to most urban uses. The moderately slow permeability, a moderate shrink-swell potential, the depth to bedrock, and the slope are limitations that are difficult to overcome.

The capability subclass is VIe.

TrD—Talbott-Braxton-Rock outcrop complex, 6 to 20 percent slopes. This map unit is on uplands in the Sequatchie Valley. The two soils and the Rock outcrop occur as areas so intermingled that they could not be separated in mapping. Individual areas range from 5 to 50 acres in size. The Talbott soil makes up about 40 percent of the unit. It ranges from 30 to 50 percent of each mapped area. The Braxton soil makes up about 30 percent of the unit. It ranges from 20 to 40 percent of each mapped area. The Rock outcrop makes up about 20 percent of the unit. It ranges from 10 to 30 percent of each mapped area.

Typically, the Talbott soil has a surface layer of brown silt loam about 6 inches thick. The upper few inches of the subsoil is yellowish red silty clay loam. Below this is yellowish red clay. Bedrock is at a depth of about 32 inches.

The Talbott soil is low in natural fertility and in content of organic matter. It ranges from slightly acid to strongly acid. Permeability is moderately slow. The available water capacity is low or moderate. The root zone is moderately deep, but the growth of roots is impeded by the high content of clay in the subsoil.

Typically, the Braxton soil has a surface layer of brown silt loam about 8 inches thick. The subsoil to a depth of 65 inches is clay. The upper part is yellowish red, and the lower part is strong brown.

The Braxton soil is low in natural fertility and in content of organic matter. It ranges from slightly acid to strongly acid. Permeability is moderately slow. The available water capacity is moderate or high. The effective root zone is moderately deep, but the clayey subsoil impedes the growth of roots and the movement of water and air through the soil.

The Rock outcrop is limestone. It occurs as individual exposures and as ledges that are generally on the contour with the slope. The Rock outcrop extends from 1 to 4 feet above the surface. Some stones and boulders also are in scattered areas throughout this unit.

Included in this unit in mapping are small areas of a moderately well drained soil at the base of slopes and small areas of a soil that is more than 40 inches deep over bedrock and is less clayey in the upper part of the subsoil than the Talbott and Braxton soils. The included soils are in small areas that are relatively free of Rock outcrop. Adjacent to the Rock outcrop are some small areas of a soil that is less than 20 inches deep over bedrock. The included soils make up about 10 percent of the unit. Individual areas of these soils are less than 5 acres in size.

The Talbott and Braxton soils are used mostly as woodland. A few areas have been cleared of trees and are used as pasture. These soils are poorly suited to pasture and are not suited to cultivated crops because the Rock outcrop interferes with the use of equipment.

These soils are moderately suited to woodland. Productivity is limited by the moderate or low available water capacity and the moderately deep root zone. The equipment limitation is moderate because of the Rock outcrop. Plant competition also is a management concern. Suitable species include loblolly pine, Virginia pine, northern red oak, and eastern redcedar.

These soils are poorly suited to most urban uses because of the Rock outcrop, the depth to bedrock, the moderately slow permeability, and the slope.

The capability subclass is VIs.

TrE—Talbott-Braxton-Rock outcrop complex, 20 to 35 percent slopes. This map unit is on hillsides in the Sequatchie Valley and on the lower, northwest-facing slopes of the Cumberland Plateau escarpment. The two soils and the Rock outcrop occur as areas so intermingled that they could not be separated in mapping. Individual areas range from 5 to 50 acres in size. The Talbott soil makes up about 35 percent of the unit. It ranges from 25 to 45 percent of each mapped area. The Braxton soil makes up about 20 percent of the unit. It ranges from 15 to 30 percent of each mapped area. The Rock outcrop makes up about 25 percent of the unit. It ranges from 15 to 40 percent of each mapped area.

Typically, the Talbott soil has a surface layer of brown silt loam about 5 inches thick. The upper few inches of the subsoil is yellowish red silty clay loam. Below this is yellowish red clay. Limestone bedrock is at a depth of about 30 inches.

The Talbott soil is low in natural fertility and in content of organic matter. It ranges from slightly acid to strongly acid. Permeability is moderately slow. The available water capacity is low or moderate. The root zone is moderately deep, but the growth of roots is impeded by the high content of clay in the subsoil.

Typically, the Braxton soil has a surface layer of brown silt loam about 7 inches thick. The subsoil to a depth of 65 inches is clay. The upper part is yellowish red, and the lower part is strong brown.

The Braxton soil is low in natural fertility and in content of organic matter. It ranges from slightly acid to strongly acid. Permeability is moderately slow. The

available water capacity is moderate or high. The root zone is deep, but the high content of clay in the subsoil impedes the growth of roots and the movement of water and air through the soil.

The Rock outcrop is limestone. It occurs as individual rocks and as ledges as much as 10 feet high. Some stones and boulders also are in scattered areas throughout this unit.

Included in this unit in mapping are small areas of Bouldin soils on the lower part of the Cumberland Plateau escarpment. Bouldin soils are more than 60 inches deep over bedrock and have more than 35 percent sandstone fragments in the subsoil. Also included are small areas of a soil that has a dark surface layer, has a clayey subsoil, and is less than 20 inches deep over bedrock. This soil is in small areas on the steepest part of this unit. The included soils make up about 20 percent of the unit. Individual areas of these soils are less than 5 acres in size.

The Talbott and Braxton soils are used as woodland. They are moderately suited to woodland. The Rock outcrop and the slope are limitations affecting the use of equipment. The erosion hazard and plant competition are other management concerns. Productivity is limited by the low or moderate available water capacity and the low natural fertility. Suitable species are Virginia pine and eastern redcedar.

The map unit is not suited to row crops and hay and is poorly suited to pasture because of the Rock outcrop and the slope.

This unit is poorly suited to urban uses because of the Rock outcrop, the depth to bedrock, and the slope.

The capability subclass is VIIs.

WaB—Waynesboro loam, 2 to 6 percent slopes. This deep, well drained, gently sloping soil is on high stream terraces in the Sequatchie Valley. Slopes are smooth and convex. Individual areas range from 5 to 25 acres in size.

Typically, the surface layer is brown loam about 8 inches thick. The upper part of the subsoil is yellowish red and red clay loam. The lower part to a depth of more than 60 inches is dark red clay loam.

This soil is low in natural fertility and in content of organic matter but responds well to the application of fertilizer. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability is moderate. The available water capacity is high. Tilth is good. The soil can be worked throughout a wide range of moisture content. The root zone is deep.

Included with this soil in mapping are small areas of Etowah soils and small areas of a soil that contains more than 15 percent chert in the subsoil. Etowah soils have a darker surface layer than the Waynesboro soil and have a higher content of clay in the subsoil. They are in the lower positions on the landscape. The included soils make up about 20 percent of the unit. Individual areas of these soils are less than 5 acres in size.

The Waynesboro soil is used mostly for cultivated crops but also is used for pasture or hay. It is well suited to cultivated crops, hay, and pasture. Erosion is a moderate hazard if cultivated crops are grown.

This soil is well suited to woodland. Plant competition is the only significant management concern. Suitable species are yellow poplar, shortleaf pine, and loblolly pine.

This soil is well suited to most urban uses. The moderate limitations can be overcome by good design and construction.

The capability subclass is IIe.

WaC—Waynesboro loam, 6 to 12 percent slopes. This deep, well drained, sloping soil is on high stream terraces in the Sequatchie Valley. Slopes are smooth and convex. Individual areas range from 5 to 30 acres in size.

Typically, the surface layer is brown loam about 8 inches thick. The upper part of the subsoil is yellowish red and red clay loam. The lower part to a depth of more than 60 inches is dark red clay loam and clay.

This soil is low in natural fertility and in content of organic matter but responds well to the application of fertilizer. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability is moderate. The available water capacity is high. Tilth is good. The soil can be worked throughout a wide range of moisture content. The root zone is deep.

Included with this soil in mapping are small areas of Etowah soils in slightly concave areas and areas of a soil that has more than 15 percent chert fragments in the subsoil. The included soils make up about 20 percent of the unit. Individual areas of these soils are less than 5 acres in size.

Most areas of the Waynesboro soil are used for cultivated crops. Some areas are used for hay or pasture.

This soil is moderately suited to cultivated crops and well suited to hay and pasture. Because of the slope, erosion is a severe hazard if cultivated crops are grown.

This soil is well suited to woodland. Plant competition is the only significant management concern. Suitable species are yellow poplar, shortleaf pine, and loblolly pine.

This soil is moderately suited to most urban uses. The moderate limitations can generally be overcome by good design and construction.

The capability subclass is IIIe.

WaC2—Waynesboro loam, 6 to 12 percent slopes, eroded. This deep, well drained, sloping soil is on high stream terraces in the Sequatchie Valley. Slopes are smooth and convex. Individual areas range from 5 to 30 acres in size.

Typically, the surface layer is brown loam about 5 inches thick. The upper part of the subsoil is yellowish red and red clay loam. The lower part to a depth of more than 60 inches is dark red clay loam and clay. Erosion has removed part of the original surface layer.

This soil is low in natural fertility and in content of organic matter but responds well to the application of fertilizer. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability is moderate. The available water capacity is high. Tilth is good. The soil can be worked throughout a wide range of moisture content. The root zone is deep.

Included with this soil in mapping are small areas of Etowah soils in slightly concave areas and areas of a soil that has more than 15 percent chert fragments in the subsoil. The included soils make up about 20 percent of the unit. Individual areas of these soils are less than 5 acres in size.

Most areas of the Waynesboro soil are used for cultivated crops. Some areas are used for pasture or hay.

This soil is well suited to hay and pasture and moderately suited to cultivated crops. Erosion is a severe hazard if cultivated crops are grown.

This soil is well suited to woodland. Plant competition is the only significant management concern. Suitable species include yellow poplar, shortleaf pine, and loblolly pine.

This soil is moderately suited to most urban uses. The moderate limitations can generally be overcome by proper design and construction.

The capability subclass is IIIe.

WaD2—Waynesboro loam, 12 to 20 percent slopes, eroded. This deep, well drained, moderately steep soil is on high stream terraces in the Sequatchie Valley. It is on side slopes that are moderately dissected by drainageways. Individual areas range from 5 to 25 acres in size.

Typically, the surface layer is strong brown loam about 5 inches thick. The upper part of the subsoil is yellowish red and red clay loam. The lower part to a depth of more than 60 inches is dark red clay loam and clay. Erosion has removed part of the original surface layer, and the subsoil is mixed into the plow layer.

This soil is low in natural fertility and in content of organic matter. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability is moderate. The available water capacity is high. Tilth is good. The soil can be worked throughout a wide range of moisture content. The root zone is deep.

Included with this soil in mapping are small areas of Etowah soils in the less sloping, concave areas. Etowah soils have less clay in the subsoil than the Waynesboro soil. Also included are small areas of a soil that contains more than 15 percent chert fragments in the subsoil and, at the base of slopes, small areas of a soil that has a silty surface layer and a clayey subsoil and is less than 60 inches deep over limestone bedrock. The included soils make up about 25 percent of the unit. Individual areas of these soils are less than 5 acres in size.

Most areas of the Waynesboro soil are used for pasture or hay. Some areas are used for cultivated crops.

This soil is well suited to pasture, moderately suited to hay, and poorly suited to cultivated crops. The slope is a limitation affecting the use of equipment. Erosion is a very severe hazard if cultivated crops are grown.

This soil is well suited to woodland. Because of the slope, the erosion hazard and the equipment limitation are management concerns. Suitable species include loblolly pine, shortleaf pine, and yellow poplar.

This soil is poorly suited to most urban uses because of the slope. This limitation can be partly overcome by proper design and construction.

The capability subclass is IVe.

WbD3—Waynesboro clay loam, 12 to 20 percent slopes, severely eroded. This deep, well drained, moderately steep soil is on high terraces in the Sequatchie Valley. It is on side slopes that are dissected by drainageways and a few shallow gullies. Individual areas range from 5 to 15 acres in size.

Typically, the surface layer is yellowish red clay loam about 6 inches thick. The upper part of the subsoil is yellowish red or red clay loam. The lower part to a depth of more than 60 inches is dark red clay loam and clay. Erosion has removed most of the original surface layer. The present surface layer generally consists of material from the subsoil.

This soil is low in natural fertility and in content of organic matter. It generally is strongly acid or very strongly acid, but the surface layer is less acid in

recently limed areas. Permeability is moderate. The available water capacity is high. The root zone is deep. Tilth is fair.

Included with this soil in mapping are small areas of a soil that contains more than 15 percent chert fragments in the subsoil. The included soils make up about 10 percent of the unit. Individual areas of these soils are less than 5 acres in size.

Most areas of the Waynesboro soil are used for pasture or hay. A few areas are used for cultivated crops.

This soil is moderately suited to pasture and hay and poorly suited to cultivated crops. The slope and the effects of past erosion are the main limitations. They hinder the use of equipment and cause rapid runoff and a very severe hazard of erosion if a plant cover is not maintained.

This soil is moderately suited to woodland. The seedling mortality rate is moderate because of the content of clay in the severely eroded surface layer. Because of the slope, the erosion hazard and the equipment limitation are management concerns. Suitable species are loblolly pine and shortleaf pine.

This soil is poorly suited to most urban uses because of the slope. This limitation can be partly overcome by proper design.

The capability subclass is VIe.

Wh—Whitwell silt loam, occasionally flooded. This deep, moderately well drained, nearly level soil is on low stream terraces in the Sequatchie Valley. It generally is on the lowest position on the terraces. Individual areas range from 5 to 20 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface layer is brown silt loam about 9 inches thick. The upper 21 inches of the subsoil is dark yellowish brown and yellowish brown silt loam, silty clay loam, and clay loam. The lower part to a depth of about 48 inches is yellowish brown clay loam. The substratum to a depth of 60 inches is light brownish gray loam. Mottles in shades of gray, brown, and red are in the upper 30 inches. They increase in number with increasing depth.

This soil is low in natural fertility and in content of organic matter but responds well to the application of fertilizer. It generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. Permeability is moderate. The available water capacity is high. Tilth is good. The soil can be worked throughout a wide range of moisture content. The root zone is deep but is limited by a seasonal high water table during winter and early spring. The soil is occasionally flooded during winter and early spring.

Included with this soil in mapping are small areas of Hamblen, Sequatchie, and Swafford soils. Hamblen soils are on bottom land along drainageways. Sequatchie soils are well drained and are on the higher parts of the terrace. Swafford soils are in the slightly higher areas and have a restrictive layer in the subsoil. The included soils make up about 20 percent of the unit. Individual areas of these soils are less than 5 acres in size.

The Whitwell soil is used mostly for cultivated crops, hay, or pasture. A few small, irregularly shaped areas are used as woodland.

This soil is well suited to most cultivated crops, hay, and pasture plants. It is moderately suited to wheat because of the flooding during winter, and it is poorly suited to alfalfa because of the seasonal wetness and the flooding.

This soil is well suited to woodland. The seedling mortality rate caused by the flooding and plant competition are the only significant management concerns. Site preparation and cultivation or spraying are needed to control undesirable plants. Suitable species are loblolly pine, eastern white pine, sweetgum, and yellow poplar.

This soil is not suited to most urban uses because of the hazard of flooding. The seasonal high water table also is a moderate or severe limitation for most urban uses.

The capability subclass is IIw.

Prime Farmland

In this section, prime farmland is defined and the soils in Bledsoe County that are considered prime farmland are listed.

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

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to food, feed, forage, fiber, and oilseed crops. Such soils have properties that favor the economic production of sustained high yields of crops. The soils need only to be treated and managed by acceptable farming methods. The moisture supply must be adequate, and the growing season must be sufficiently long. Prime farmland soils produce the highest yields with minimal expenditure of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They either 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 6 percent.

In Bledsoe County 39,577 acres, or 15.3 percent of the total acreage, meets the requirements for prime farmland. About 57 percent of the prime farmland is on the Cumberland Plateau and 43 percent is in the Sequatchie Valley. Almost all of the prime farmland in the Sequatchie Valley has been cleared of trees and is used as cropland. A significant acreage of the prime farmland on the Cumberland Plateau is used as woodland because several areas are surrounded by steeper soils that are used as woodland and several other areas are owned by land and timber companies.

The following map units are considered prime farmland in Bledsoe County. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 4. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

The soils identified as prime farmland in Bledsoe County are:

BaB	Barger silt loam, 2 to 6 percent slopes
EtB	Etowah silt loam, 2 to 6 percent slopes
FuB	Fullerton cherty silt loam, 2 to 6 percent slopes
Ha	Hamblen loam, occasionally flooded
HeB	Hendon silt loam, 2 to 6 percent slopes
LyB	Lily loam, 2 to 6 percent slopes
Se	Sequatchie loam, rarely flooded
Su	Sullivan silt loam, occasionally flooded
Sw	Swafford silt loam, rarely flooded
WaB	Waynesboro loam, 2 to 6 percent slopes
Wh	Whitwell silt loam, occasionally flooded

Use and Management of the Soils

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

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

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other 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 potential 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

Donny C. Kimes, agronomist, Soil Conservation Service, helped prepare this section.

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

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

About 88,000 acres, or 34 percent of Bledsoe County, is used as cropland or pasture. Of this acreage, about 36,000 acres is used as cropland, which includes hay and pasture in rotation with other crops, and about 52,000 acres is used mostly as permanent pasture.

In Bledsoe County the Cumberland Plateau and the Sequatchie Valley are the two distinct areas used for crops and pasture. Crops grown on the Cumberland Plateau are mostly hay, corn, soybeans, and specialty crops, such as tomatoes and pumpkins. Cool-season grasses and legumes are grown for hay and pasture. Most pastures include a mixture of tall fescue and white clover. On hayland the dominant mixture is orchardgrass and red clover. Commonly, cattle are kept off the pasture until after the hay is cut once. The major crops in the Sequatchie Valley are corn, soybeans, and small grain, which is used as grain, silage, or hay. Some snap beans, tomatoes, and grain sorghum also are grown. The pasture and hay mixtures are the same as those on the Cumberland Plateau, except alfalfa also is grown for hay.

Most of the soils in the county, except those on the Cumberland Plateau escarpment and the steepest ridges, are well suited or moderately suited to pasture. Seeding legumes with grasses when establishing pasture and adding legumes when renovating pure stands of grass add nitrogen to the soil and improve the quality and increase the quantity of forage. Information on pasture seeding and renovation can be obtained from local offices of the Soil Conservation Service and the Cooperative Extension Service.

The largest acreage of crops grown on the

Cumberland Plateau is in areas of the Lily-Gilpin-Ramsey general soil map unit. The Lily soils are the dominant soils used for crops. Protecting these soils from erosion is critical because the depth to bedrock is only 20 to 40 inches. Some effective erosion-control measures are contour farming, contour stripcropping, conservation tillage, grass buffer strips, and a crop rotation that includes grasses and legumes. These measures increase the yields of crops by increasing the rate of water infiltration and conserving moisture. Assistance in planning and designing conservation measures is available from the local office of the Soil Conservation Service.

The largest acreage of crops grown in the Sequatchie Valley is in areas of the Waynesboro-Etowah-Sullivan general soil map unit. The Waynesboro, Etowah, Sullivan, and Sequatchie soils are the dominant soils used for crops. Because these soils are deep, they are not as fragile as those on the Cumberland Plateau. However, the same conservation measures are needed to maintain productivity and protect the environment on all the soils, except those that are nearly level. Sediment from erosion clogs stream channels and carries chemical pollution into streams.

Most of the soils in the county are naturally acid. Applying ground limestone raises the reaction to the level that is desirable for crops. The amount of lime and fertilizer to be applied should be based on soil tests, the needs of the crop, and the desired yield. Information on collecting and testing soil samples can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification 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 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major, and generally expensive, landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

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

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

Class I soils have few limitations that restrict their use.

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

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

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

Class V soils are not likely to erode, but they have other limitations, impractical to remove, that limit their use. No class V soils are recognized in Bledsoe County.

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

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

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production. No class VIII soils are recognized in Bledsoe County.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w,* or *s,* 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); and *s* shows that the soil is limited mainly because it is shallow, droughty, or stony.

There are no subclasses in class I because the soils of this class have few limitations.

The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

Originally, all of Bledsoe County was forested. Forests now cover about 171,000 acres, or 66 percent of the county. Most of the forests are on the Cumberland Plateau. The only significant acreage of woodland in the Sequatchie Valley is on the section of ridges in the Pailo-Fullerton-Barger general soil map unit. The predominant forest types in the county are oak-hickory on 73 percent of the forest land; oak-pine, on 10 percent; and loblolly-shortleaf pine, on 17 percent.

Good stands of commercial trees in the county support a substantial forest products industry. The forests also provide wildlife habitat, recreational opportunities, and natural beauty and help to conserve soil and water.

Soils vary in their ability to produce trees. Available water capacity and depth of the root zone have major effects on tree growth. Fertility and texture also influence tree growth. Elevation, aspect, and climate determine the kinds of trees that can grow on a site. Elevation and aspect are of particular importance in mountainous areas.

This soil survey can be used by woodland managers planning ways to increase 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, and 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 6 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate*, and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation or harvesting activities expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion-control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of moderate or severe indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning harvesting and reforestation activities, or the use of special equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, or susceptibility of the surface layer to compaction. As slope gradient and length increase, it becomes more difficult to use wheeled equipment. On the steeper slopes, tracked equipment 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 soil wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are so steep that wheeled equipment cannot be operated safely across the slope, if wetness restricts equipment use from 2 to 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize 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 compaction. Ratings of moderate or severe indicate a need to choose the most suitable equipment and to carefully plan the timing of harvesting and other management activities.

Ratings of *seedling mortality* refer to the probability of the death of naturally occurring or properly planted seedlings of good stock in periods of normal rainfall, as

influenced by kinds of soil or topographic features. Seedling mortality is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, rooting depth, and the aspect of the slope. The mortality rate generally is highest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of moderate or severe indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, installing a surface drainage system, and providing artificial shade for seedlings. Reinforcement planting is often needed if the risk is moderate or severe.

Ratings of *windthrow hazard* indicate the likelihood that trees will be uprooted by the wind. A restricted rooting depth is the main reason for windthrow. Rooting depth can be restricted by a high water table, a fragipan, or bedrock or by a combination of such factors as soil wetness, texture, structure, and depth. The risk is *slight* if strong winds cause trees to break but do not uproot them; *moderate* if strong winds cause an occasional tree to be blown over and many trees to break; and *severe* if moderate or strong winds commonly blow trees over. Ratings of moderate or severe indicate that care is needed in thinning or that the stand should not be thinned at all. Special equipment may be needed to prevent damage to shallow root systems in partial cutting operations. A plan for the periodic removal of windthrown trees and the maintenance of a road and trail system may be needed.

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 measures 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 *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

Bledsoe County has numerous recreational facilities. The potential for developing additional facilities is significant. The facilities and activities that have a high potential for development include vacation cabins, camp areas, warm-water fishing, small and big game hunting areas, natural and scenic areas, golf courses, riding stables, and water sports.

In table 7, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational 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 7, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 7 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 10 and interpretations for dwellings without basements and for local roads and streets in table 9.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes, stones, or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

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

Mike Zeman, biologist, Soil Conservation Service, helped prepare this section.

The most common game species in the forests include white-tailed deer, gray squirrel, fox squirrel, and ruffed grouse. In 1983, the Tennessee Wildlife Resources Agency determined that Bledsoe County had a high population of grouse, a good population of gray squirrel, and a low density of deer, or less than 23 deer per 1,000 acres. Higher numbers of deer are likely to occur in areas where woodland and open land adjoin. No wild turkeys were recorded in the county in 1983, but established populations were in the surrounding counties. Because the Tennessee Wildlife Resources Agency has an active restocking program, the turkey population should increase. Common nongame species native to the forests include furbearers, such as raccoons, bobcats, and gray fox, and songbirds, such as woodpeckers and warblers. Animal populations in the forests fluctuate with the relative abundance of food. Mast, or acorn, production is very important to several species.

The most common species in areas of cropland and pasture include cottontail rabbits, groundhog, coyote, bobwhite quail, mourning dove, and songbirds, such as eastern bluebird and meadowlark. The relative abundance of many of these species increases as the diversity of native and improved vegetation increases. Brushy fence rows, thickets, and weedy patches in the cropland, pasture, and woodland provide maximum food and cover for wildlife.

The aquatic resources in the county are diverse. The Sequatchie River runs north to south across the length of the county. It is recognized by the Tennessee Wildlife Resources Agency as a critical habitat for fish. The river is a cold-water and cool-water fishery favorable for rainbow trout and brown trout. Bee Creek is recognized as a native musky stream. The lakes and ponds in the county support such warm-water species as largemouth bass, bluegill, sunfish, redear sunfish, crappie, and several species of catfish. Nongame species, such as gar, carp, buffalo, drum, and darters, also are in the surface waters of the county.

As listed by the Federal Government, threatened and endangered species that may inhabit or migrate through the county are gray bat, Indiana bat, eastern cougar, bald eagle, and peregrine falcon. Species listed by the State of Tennessee as threatened or endangered include Bachman's sparrow, osprey, Cooper's hawk,

grasshopper sparrow, Bewick's wren, river otter, northern pine snake, and Carey's saxifrage.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 8, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

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

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, soybeans, and wheat.

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 fescue, orchardgrass, ryegrass, clover, Korean lespedeza, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, common ragweed, beggarweed, pokeberry, and crotons.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are bush-honeysuckle, autumn-olive, bicolor lespedeza, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, cedar, and hemlock.

Wetland plants are annual and perennial, wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, rushes, sedges, and cattail.

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. A pond is an example of a shallow water area.

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 rabbit, and groundhog.

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, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and a variety of nongame birds.

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

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

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

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

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

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

Building Site Development

Table 9 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, 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, shrink-swell potential, and organic layers 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, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost-action potential, and depth to a high water table affect the traffic-supporting capacity.

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, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials 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 10 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 10 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a high water table, depth to bedrock, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 10 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, depth to bedrock, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is

excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope 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 10 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, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area 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.

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 11 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing 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 depth to the water table is less than 1 foot. These soils may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 11, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source

of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are 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 or stones, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are clayey, have less than 20 inches of suitable material, have a large amount of gravel or stones, 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-available nutrients as it decomposes.

Water Management

Table 12 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives the restrictive features that affect each soil for drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock 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.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock. The performance of a system is affected by the depth of the root zone and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock 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. A hazard of water erosion, 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 13 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 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, CL-ML.

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 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution generally 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.

Physical and Chemical Properties

Table 14 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate 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 the 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 downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 14, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 15 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 15 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional,* or *frequent. None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely, thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons characteristic of soils that are not subject to flooding.

Also considered is local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 15 are the depth to the seasonal high water table; the kind of water table, 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 15.

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. "More than 6.0" indicates that the water table is below a depth of 6 feet or it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severely corrosive environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and the amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(4)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 16 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udults (*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 Paleudults (*Pale*, meaning maximum horizonation, plus *udults*, 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 Paleudults.

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 clayey, kaolinitic, thermic Typic Paleudults.

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" *(4)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Barger Series

The Barger series consists of deep, moderately well drained, gently sloping and sloping soils. These soils have a fragipan in the subsoil. They formed in a loamy

mantle and in the underlying loamy paleosol, which has a high content of chert. They are on ridgetops on dissected uplands in the Sequatchie Valley. Slopes range from 2 to 12 percent.

Barger soils are on the same landscape as Minvale, Pailo, and Fullerton soils. Minvale soils are well drained and are on foot slopes. Pailo soils are on moderately steep and steep side slopes and are loamy-skeletal over clayey. Fullerton soils are on ridgetops and side slopes. They are well drained and have a clayey subsoil.

Typical pedon of Barger silt loam, 6 to 12 percent slopes, 0.4 mile south of College Station Crossroad on Ridge Road, 0.1 mile east on a private road, and 100 feet southeast of a power line, in a wooded area:

O—1 inch to 0; partly decomposed and undecomposed leaves from hardwood trees, pine needles, and twigs.

A—0 to 1 inch; very dark grayish brown (10YR 3/2) silt loam; weak medium granular structure; friable; many fine and medium roots; very strongly acid; abrupt smooth boundary.

E—1 to 7 inches; light yellowish brown (10YR 6/4) silt loam; weak medium granular structure; very friable; many medium and common coarse roots; many fine and medium tubular pores; about 5 percent fragments of rounded chert and pebbles ⅛ to ½ inch across; very strongly acid; gradual smooth boundary.

Bt1—7 to 11 inches; yellowish brown (10YR 5/6) silt loam; weak fine subangular blocky and moderate medium granular structure; friable; common medium and coarse roots; many fine and medium tubular pores; about 5 percent fragments of subrounded chert and pebbles ⅛ to ½ inch across; very strongly acid; gradual smooth boundary.

Bt2—11 to 21 inches; yellowish brown (10YR 5/8) silt loam; moderate medium and weak fine subangular blocky structure; firm; few medium and coarse roots; common fine and medium tubular pores; few faint clay films on faces of peds and in pores; about 10 percent subrounded fragments of chert and pebbles ⅛ to 1 inch across; very strongly acid; abrupt wavy boundary.

2Bx/E—21 to 31 inches; brownish yellow (10YR 6/6) very cherty loam (B part); pockets of light gray (10YR 7/2) loam (E part); common medium distinct light brownish gray (10YR 6/2) and yellowish red (5YR 5/8) mottles; weak coarse prismatic structure; very firm and compact; few faint clay films on vertical faces of fragments; about 35 percent angular fragments of chert ⅛ to 1 inch across; 40 to 60 percent brittle material, by volume; very strongly acid; clear wavy boundary.

2Bx1—31 to 43 inches; brownish yellow (10YR 6/6) very cherty clay loam; common medium distinct light brownish gray (10YR 6/2) and many medium distinct yellowish red (5YR 5/8) mottles; weak very coarse prismatic structure; extremely firm; 45 percent angular fragments of chert ⅛ inch to 3 inches across; weakly cemented; more than 60 percent brittle material, by volume; very strongly acid; clear wavy boundary.

2Bx2—43 to 63 inches; mottled yellowish red (5YR 5/8), light brownish gray (10YR 6/2), and light yellowish brown (10YR 6/4) very cherty clay loam; weak very coarse prismatic structure; extremely firm; about 60 percent fragments of chert ⅛ to 4 inches across; weakly cemented; more than 60 percent brittle material, by volume; very strongly acid.

The thickness of the solum and the depth to bedrock are more than 60 inches. Depth to the fragipan ranges from 18 to 30 inches. Reaction is strongly acid or very strongly acid. The content of subrounded chert fragments and pebbles ⅛ to 1 inch across ranges from 5 to 15 percent in the horizons above the fragipan. The content of angular chert fragments ⅛ to 4 inches across ranges from 30 to 45 percent in the upper part of the fragipan and from 40 to 70 percent in the lower part.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The E and Ap horizons, if they occur, have hue of 10YR, value of 4 to 6, and chroma of 3 to 6. The A and E horizons are loam or silt loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 6 to 8. It is loam or silt loam.

The upper part of the 2Bx horizon has hue of 10YR or 7.5YR, and the lower part has hue of 10YR, 7.5YR, or 5YR. This horizon has value of 5 or 6 and chroma of 4 to 8. It has mottles in shades of gray, brown, or red. In some pedons it is mottled without a dominant matrix color in the lower part. It is loam or clay loam in the fine-earth fraction. The E part of the 2Bx/E horizon is between polygons. It has hue of 10YR, value of 6 or 7, and chroma of 1 to 3. It is loam or silt loam in the fine-earth fraction.

Bethesda Series

The Bethesda series consists of deep, well drained, sloping to very steep soils that formed in mine spoil. The mine spoil is a mixture of weathered fine earth and rock fragments. It was produced by the surface mining of coal on the Cumberland Plateau. The least sloping areas are those that have been reclaimed. Slopes range from 8 to 60 percent.

Bethesda soils are on the same landscape as Gilpin

and Lily soils. Gilpin soils are silty and are less than 40 inches deep over shale bedrock. Lily soils are loamy and are less than 40 inches deep over sandstone bedrock.

Typical pedon of Bethesda very shaly silt loam, in an area of Bethesda-Pits complex, 20 to 60 percent slopes, south on U.S. Highway 127 to College Station Mountain Road, left on Brock Hollow Road, 0.5 mile left on Bowater Road, 1,000 feet southeast of the road:

Ap—0 to 3 inches; dark grayish brown (10YR 4/2) very shaly silt loam; weak fine subangular blocky structure; friable; many fine and medium roots; about 50 percent shale and sandstone fragments as much as 3 inches across; very strongly acid; clear wavy boundary.

C1—3 to 14 inches; strong brown (7.5YR 5/8) extremely shaly silty clay loam; massive; friable; common fine and medium and few coarse roots; about 65 percent dominantly shale rock fragments and sandstone pieces as much as 5 inches across; extremely acid; clear irregular boundary.

C2—14 to 72 inches; brownish yellow (10YR 6/6) extremely shaly clay loam; massive; firm; about 75 percent dominantly shale rock fragments and sandstone pieces as much as 24 inches across; extremely acid.

The depth to bedrock is more than 60 inches. Reaction ranges from strongly acid to extremely acid. The content of shale, sandstone, and coal fragments ranges from 25 to 60 percent in the A horizon and from 35 to 80 percent in the C horizon. The rock fragments that range from ⅛ inch to 24 inches across are dominantly shale but include some larger pieces of sandstone.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. It is dominantly silt loam in the fine-earth fraction. Some pedons are silty clay loam or clay loam in the fine-earth fraction.

The C horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 2 to 8. It is silty clay loam, clay loam, or silt loam in the fine-earth fraction.

Bonair Series

The Bonair series consists of deep, poorly drained, nearly level soils that formed in local alluvium derived from sandstone and shale. These soils are on flood plains along small streams and along drainageways on the Cumberland Plateau. Slopes range from 0 to 2 percent.

Bonair soils are on the same landscape as Morehead, Gilpin, and Lily soils. Morehead soils are moderately well drained and are on the adjacent low stream terraces. The well drained Gilpin and Lily soils are on the higher side slopes adjacent to the Bonair soils, have an argillic horizon, and are less than 40 inches deep over bedrock. Gilpin soils formed in material weathered from shale, and Lily soils formed in material weathered from sandstone.

Typical pedon of Bonair silt loam, in an area of Morehead rarely flooded-Bonair occasionally flooded complex, 1.1 miles west of Saratoga Road on Buck Ridge Road and 150 yards south of the road:

A—0 to 7 inches; very dark gray (10YR 3/1) silt loam; weak fine granular structure; friable; many fine and medium roots; strongly acid; clear smooth boundary.

Bg1—7 to 12 inches; dark gray (10YR 4/1) silt loam; weak fine granular and subangular blocky structure; friable; common fine and medium roots; strongly acid; gradual smooth boundary.

Bg2—12 to 26 inches; gray (10YR 5/1) silt loam; weak medium subangular blocky structure; friable; few fine roots; strongly acid; gradual smooth boundary.

Bg3—26 to 45 inches; gray (10YR 5/1) silt loam; common medium distinct yellowish brown (10YR 5/8) and common fine faint light brownish gray (10YR 6/2) mottles; weak fine subangular blocky structure; friable; strongly acid; gradual smooth boundary.

Cg—45 to 60 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/8) mottles; massive; friable; strongly acid.

The depth to bedrock ranges from 45 to 70 inches. Reaction is strongly acid or very strongly acid.

The A horizon has hue of 10YR, value of 3, and chroma of 1 or 2. It is dominantly silt loam, but it is loam in some pedons.

The Bg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2, or it has hue of 2.5Y, value of 5 or 6, and chroma of 2. It is dominantly silt loam, but it is loam in some pedons. The Cg horizon has the same colors and textures as the Bg horizon.

The Bonair soils in Bledsoe County contain slightly less sand than is definitive for the series, but this difference does not affect the use and management of the soils.

Bouldin Series

The Bouldin series consists of deep, well drained, steep and very steep, stony soils that formed in colluvium derived from sandstone. These soils are on the Cumberland Plateau escarpment. Slopes range from 20 to 60 percent.

Bouldin soils are on the same landscape as Gilpin,

Talbott, and Braxton soils. Gilpin soils are less than 40 inches deep over shale bedrock and have a higher content of silt throughout than the Bouldin soils. Talbott and Braxton soils are on the lower part of the slopes. They have a clayey subsoil and are intermingled with limestone rock outcrop.

Typical pedon of Bouldin cobbly loam, in an area of Bouldin and Gilpin cobbly loams, 20 to 60 percent slopes, stony, 2.2 miles east on Pitts Gap Road from East Valley Road, in a cut on the left side of the road:

O—2 inches to 0; partly decomposed and undecomposed leaves and twigs from hardwood trees.

A—0 to 1 inch; dark grayish brown (10YR 4/2) cobbly loam; weak fine granular structure; very friable; many fine and medium and common coarse roots; many fine tubular pores; about 25 percent, by volume, sandstone fragments as much as 6 inches across; very strongly acid; gradual smooth boundary.

E—1 to 6 inches; yellowish brown (10YR 5/4) cobbly loam; moderate medium granular structure; very friable; many fine and medium and common coarse roots; many fine and few medium tubular pores; about 25 percent, by volume, sandstone fragments as much as 6 inches across; very strongly acid; gradual smooth boundary.

BE—6 to 12 inches; strong brown (7.5YR 5/6) cobbly loam; weak fine subangular blocky structure; very friable; many fine and medium and common coarse roots; many fine and few medium tubular pores; about 30 percent, by volume, angular sandstone fragments as much as 10 inches across; very strongly acid; gradual smooth boundary.

Bt1—12 to 30 inches; yellowish red (5YR 5/6) very cobbly loam; moderate medium subangular blocky structure; friable; common medium and few coarse roots; common fine and medium tubular pores; few faint clay films; about 40 percent, by volume, angular sandstone fragments as much as 10 inches across; very strongly acid; gradual smooth boundary.

Bt2—30 to 70 inches; yellowish red (5YR 5/8) extremely stony clay loam; moderate medium subangular blocky structure; friable; common fine and medium tubular pores; few faint clay films; about 60 percent, by volume, angular sandstone fragments as much as 20 inches across; very strongly acid.

The thickness of the solum and the depth to bedrock are more than 60 inches. Reaction is strongly acid or very strongly acid. The content of angular sandstone fragments ranges from 15 to 35 percent in the A and BE horizons and from 35 to 65 percent in the Bt horizon. The fragments in the upper part of the pedon are dominantly less than 10 inches across and those in the lower part are dominantly 6 to 24 inches across.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2. The E horizon has hue of 10YR, value of 4 to 6, and chroma of 3 or 4. The fine-earth fraction of the A and E horizons is loam.

The BE horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is loam in the fine-earth fraction. The Bt horizon has hue of 7.5YR to 2.5YR, value of 5, and chroma of 6 to 8. It is loam or clay loam in the fine-earth fraction.

Braxton Series

The Braxton series consists of deep, well drained, gently sloping to steep soils that formed in material weathered from limestone. These soils are on uplands in the Sequatchie Valley and on the lower, northwest-facing slopes on the Cumberland Plateau escarpment. Slopes range from 2 to 30 percent.

Braxton soils are on the same landscape as Talbott and Bouldin soils. Talbott soils are less than 40 inches deep over limestone bedrock. Bouldin soils have a loamy surface layer and subsoil and have more than 35 percent rock fragments in the subsoil.

Typical pedon of Braxton silt loam, in an area of Talbott-Braxton-Rock outcrop complex, 6 to 20 percent slopes, about 1 mile south of the Cumberland County line on Alvin C. York Highway, 1,000 feet east on Lowes Gap Road, and 300 feet southeast of the road:

Ap—0 to 8 inches; brown (10YR 4/3) silt loam; moderate medium granular structure; friable; many fine roots; many fine and medium tubular pores; about 2 percent chert fragments and small pieces of limestone rock; slightly acid; abrupt smooth boundary.

Bt1—8 to 23 inches; yellowish red (5YR 5/8) clay; brown (10YR 4/3) silt flows along old root channels; moderate medium subangular blocky structure; friable; few fine and medium roots; few fine tubular pores; many faint clay films; slightly acid; gradual smooth boundary.

Bt2—23 to 36 inches; yellowish red (5YR 5/8) clay; few medium distinct brownish yellow (10YR 6/8) mottles; moderate medium angular blocky structure; firm; many faint clay films; many manganese accumulations as much as ⅛ inch across; slightly acid; gradual smooth boundary.

Bt3—36 to 65 inches; strong brown (7.5YR 5/8) clay; common medium distinct brownish yellow (10YR 6/8) and red (2.5YR 5/8) mottles; moderate fine angular blocky structure; firm; many faint clay films;

many manganese concretions as much as ⅛ inch across; strongly acid.

The thickness of the solum and the depth to limestone bedrock are more than 60 inches. Reaction ranges from strongly acid to slightly acid. The content of chert fragments as much as 1 inch across ranges from 0 to 10 percent throughout.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 3. It is dominantly silt loam, but in a few eroded areas it is silty clay loam.

The upper 30 to 40 inches of the Bt horizon has hue of 5YR, value of 5, and chroma of 6 to 8. The lower part has hue of 7.5YR or 10YR, value of 5, and chroma of 6 to 8. Some pedons have mottles in shades of brown and yellow in the upper part of the Bt horizon. The lower part has few to many mottles in shades of brown, yellow, red, or gray. The Bt horizon is silty clay or clay.

Some of the Braxton soils in Bledsoe County are less acid than is definitive for the series, but this difference does not significantly affect the use and management of the soil.

Cobstone Series

The Cobstone series consists of deep, well drained, nearly level and gently sloping soils. These soils formed in loamy alluvium that has a high content of sandstone fragments. They are on alluvial fans and stream terraces near the base of the Cumberland Plateau escarpment. Slopes range from 0 to 3 percent.

Cobstone soils are on the same landscape as Sequatchie, Whitwell, and Swafford soils, all of which have less than 15 percent, by volume, coarse fragments. Sequatchie soils are well drained. Whitwell and Swafford soils are moderately well drained. Swafford soils have a fragic layer in the subsoil.

Typical pedon of Cobstone cobbly fine sandy loam, rarely flooded, 1 mile south of College Station Mountain Road on Alvin C. York Highway, 350 feet west of the highway, and 150 feet south of Cannon Creek:

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) cobbly fine sandy loam; weak medium granular structure; very friable; many fine and common medium roots; many fine tubular pores; about 25 percent sandstone cobbles and pebbles ⅛ inch to 5 inches across; strongly acid; clear wavy boundary.

BE—5 to 12 inches; strong brown (7.5YR 5/8) very cobbly fine sandy loam; weak medium and fine subangular blocky structure; very friable; common fine and medium roots; many fine and common medium tubular pores; about 45 percent sandstone cobbles and pebbles ⅛ inch to 8 inches across; strongly acid; gradual wavy boundary.

Bt1—12 to 28 inches; strong brown (7.5YR 4/6) extremely cobbly sandy clay loam; weak medium subangular blocky structure; very friable; few fine roots; common fine and medium tubular pores; few faint clay films on faces of peds and some weak bridging of sand grains; about 65 percent sandstone cobbles and pebbles ⅛ inch to 12 inches across; strongly acid; gradual wavy boundary.

Bt2—28 to 34 inches; strong brown (7.5YR 5/8) extremely cobbly fine sandy loam; weak fine subangular blocky structure; very friable; common fine and medium tubular pores; few faint clay films on faces of peds; about 75 percent sandstone cobbles and pebbles ⅛ inch to 12 inches across; very strongly acid; gradual wavy boundary.

Bt3—34 to 63 inches; yellowish brown (10YR 5/8) extremely cobbly sandy loam; weak fine subangular blocky structure; very friable; about 80 percent cobbles, pebbles, and stones ⅛ inch to 18 inches across; very strongly acid.

The thickness of the solum and the depth to bedrock are more than 60 inches. Reaction is strongly acid or very strongly acid. The content of rounded cobbles, pebbles, and stones ranges from 25 to 50 percent in the A, E, and BE horizons and from 35 to 80 percent in the Bt and C horizons. The rock fragments are dominantly sandstone. They are generally 3 to 10 inches across, but some are as large as 30 inches across. Stones on the surface are more common in wooded areas where they have not been removed.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. Where it has value of 3, it is less than 6 inches thick. It is loam, fine sandy loam, and sandy loam in the fine-earth fraction.

The BE horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. It is loam, fine sandy loam, or sandy loam in the fine-earth fraction.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. It is sandy loam, fine sandy loam, loam, or sandy clay loam in the fine-earth fraction.

Enders Series

The Enders series consists of deep, well drained, sloping to steep soils that formed in residuum derived from shale. These soils are on the lower, southeast-facing slopes of the Cumberland Plateau escarpment and on shale ridges that extend out into the Sequatchie Valley. Slopes range from 6 to 50 percent.

Enders soils are on the same landscape as Bouldin, Gilpin, Talbott, and Braxton soils. Bouldin soils have

more than 35 percent rock fragments in the Bt horizon. Gilpin soils have a surface layer of stony loam. They have less clay in the subsoil than the Enders soils. Talbott soils are less than 40 inches deep over limestone bedrock. Braxton soils are more than 60 inches deep over limestone bedrock.

Typical pedon of Enders silt loam, 6 to 12 percent slopes, 1.5 miles north on U.S. Highway 127 from its intersection with State Highway 30 West and 0.7 mile northeast of the highway:

O—2 inches to 0; partly decomposed and undecomposed pine needles, leaves from hardwood trees, and twigs.

A—0 to 2 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; very friable; many fine and medium roots; many fine and medium tubular pores; about 5 percent fragments of shale ⅛ inch to 2 inches across; strongly acid; clear smooth boundary.

E—2 to 4 inches; brown (10YR 5/3) silt loam; moderate medium granular structure; very friable; common medium roots; many fine and medium tubular pores; about 5 percent fragments of shale ⅛ inch to 2 inches across; strongly acid; clear smooth boundary.

Bt1—4 to 15 inches; yellowish red (5YR 5/8) silty clay loam; common medium distinct pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; friable; common medium roots; common medium tubular pores; common faint clay films on faces of peds; about 5 percent shale fragments ⅛ to ½ inch across; very strongly acid; gradual smooth boundary.

Bt2—15 to 34 inches; yellowish red (5YR 5/8) clay; few medium distinct brownish yellow (10YR 6/6) and red (2.5YR 5/8) mottles; moderate medium subangular and angular blocky structure; firm; few fine roots; many faint clay films on faces of peds; about 5 percent shale fragments ⅛ to ½ inch across; very strongly acid; gradual smooth boundary.

Bt3—34 to 44 inches; yellowish red (5YR 5/8) clay; common medium distinct brownish yellow (10YR 6/6) and red (2.5YR 5/8) mottles; moderate medium angular blocky structure; firm; many faint clay films on faces of peds; about 5 percent shale fragments as much as ½ inch across; very strongly acid; gradual smooth boundary.

BC—44 to 48 inches; mottled yellowish red (5YR 5/8), light gray (10YR 7/1), and brownish yellow (10YR 6/8) shaly silty clay loam; moderate medium angular blocky structure; about 20 percent shale fragments ⅛ to 1 inch across; very strongly acid; abrupt smooth boundary.

Cr—48 to 60 inches; soft shale in shades of gray, yellow, and brown; fine-earth coatings between cracks.

The thickness of the solum and the depth to soft shale bedrock range from 40 to 60 inches. Reaction is strongly acid or very strongly acid. The content of shale fragments ⅛ inch to 2 inches across ranges from 0 to 15 percent, by volume, in the A and Bt horizons and from 15 to 45 percent in the BC horizon.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2. The Ap and E horizons, if they occur, have hue of 10YR, value of 4 or 5, and chroma of 3 or 4.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8. It is clay, silty clay, or silty clay loam. Some pedons are mottled in shades of red and brown.

The BC horizon is mottled in shades of brown, red, yellow, and gray. It is shaly silty clay loam, shaly silty clay, or shaly clay. The gray color is believed to be inherited from the shale and is not an indication of wetness.

Etowah Series

The Etowah series consists of deep, well drained, gently sloping and sloping soils that formed in thick deposits of old alluvium. These soils are on high stream terraces in the Sequatchie Valley and are underlain by material weathered from limestone. Slopes range from 2 to 12 percent.

Etowah soils are on the same landscape as Sequatchie and Waynesboro soils. Sequatchie soils have a thinner solum than that of the Etowah soils and a browner subsoil. Waynesboro soils have a clayey particle-size control section.

Typical pedon of Etowah silt loam, 2 to 6 percent slopes, 1.5 miles south of Pikeville on U.S. Highway 127 from its intersection with State Highway 30 East and 100 feet east of the highway:

Ap—0 to 9 inches; dark brown (10YR 3/3) silt loam; weak medium granular structure; very friable; many fine and medium roots; many fine and medium tubular pores; neutral; gradual smooth boundary.

Bt1—9 to 29 inches; strong brown (7.5YR 4/6) silty clay loam; weak medium and fine subangular blocky structure; friable, slightly sticky and slightly plastic; common fine and medium roots; common fine and medium tubular pores; few faint clay films; strongly acid; gradual smooth boundary.

Bt2—29 to 46 inches; yellowish red (5YR 5/8) clay loam; moderate medium and fine subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common fine and medium tubular

pores; common faint clay films; strongly acid; gradual smooth boundary.

Bt3—46 to 63 inches; yellowish red (5YR 5/8) clay loam; moderate medium and fine subangular blocky structure; friable, slightly sticky and slightly plastic; common faint clay films; about 2 percent chert fragments ⅛ to ¼ inch across; strongly acid.

The thickness of the solum and the depth to bedrock are more than 60 inches. Reaction generally is strongly acid or very strongly acid, but the surface layer is less acid in recently limed areas. The content of chert fragments or pebbles as much as 1 inch across ranges from 0 to 5 percent, by volume, in the Bt horizon.

The A horizon has hue of 10YR or 7.5YR, value of 3, and chroma of 2 to 4.

The Bt horizon has hue of 7.5YR to 2.5YR, value of 4 or 5, and chroma of 6 to 8. It is clay loam or silty clay loam. Below a depth of about 45 inches it ranges to clay. Some pedons have brown and red mottles in the lower part.

Fullerton Series

The Fullerton series consists of deep, well drained, gently sloping to steep soils that formed in cherty, clayey residuum derived from limestone. These soils are on the side slopes and top of cherty limestone ridges in the Sequatchie Valley. Slopes range from 2 to 35 percent.

Fullerton soils are on the same landscape as Pailo and Minvale soils. Pailo soils are on the adjacent side slopes and have more than 35 percent chert fragments in the upper part of the subsoil. Minvale soils are on foot slopes and benches and have a fine-loamy particle-size control section.

Typical pedon of Fullerton cherty silt loam, 6 to 12 percent slopes, eroded, 0.2 mile northeast of Mill Dam Road on Bedwell Road and 25 feet east of the road:

Ap—0 to 5 inches; brown (10YR 4/3) cherty silt loam; moderate medium granular structure; very friable; many fine and medium and few coarse roots; about 15 percent chert fragments ⅛ to ½ inch across; strongly acid; clear wavy boundary.

BE—5 to 12 inches; strong brown (7.5YR 5/6) cherty silt loam; weak fine subangular blocky structure; very friable; common medium and few coarse roots; about 20 percent chert fragments ⅛ inch to 2 inches across; very strongly acid; clear wavy boundary.

Bt1—12 to 24 inches; red (2.5YR 4/8) cherty clay; moderate medium subangular blocky structure; firm; many faint clay films; few medium and coarse roots; about 25 percent chert fragments ⅛ inch to 5 inches across; very strongly acid; gradual smooth boundary.

Bt2—24 to 40 inches; red (2.5YR 4/8) cherty clay; moderate medium angular blocky and subangular blocky structure; firm; many faint clay films; about 30 percent chert fragments ⅛ inch to 6 inches across; very strongly acid; gradual smooth boundary.

Bt3—40 to 65 inches; red (2.5YR 4/8) cherty clay; few medium distinct strong brown (7.5YR 5/6) mottles; moderate medium angular blocky structure; firm; many faint clay films; about 30 percent chert fragments ⅛ inch to 6 inches across; very strongly acid.

The thickness of the solum and the depth to bedrock are more than 65 inches. Reaction is strongly acid or very strongly acid. The content of chert fragments less than 2 inches across ranges from 15 to 20 percent in the A horizon, and the content of chert fragments less than 6 inches across ranges from 15 to 35 percent in the B horizon.

The A horizon has hue of 10YR or 7.5YR, value of 4, and chroma of 2 or 3. Some pedons have an E horizon, which has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. The fine-earth fraction of the A and E horizons is silt loam.

The BE horizon has hue of 7.5YR, value of 4 or 5, and chroma of 6 to 8. It is silt loam or silty clay loam in the fine-earth fraction. The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8. It is clay in the fine-earth fraction.

Gilpin Series

The Gilpin series consists of moderately deep, well drained, sloping to steep soils that formed in loamy material weathered from shale. These soils are on the shale ridges in the Cumberland Mountains. Slopes range from 5 to 45 percent.

Gilpin soils are on the same landscape as Lily and Ramsey soils, both of which formed in material weathered from sandstone. Lily soils have a higher content of sand than the Gilpin soils and have fewer fragments. Ramsey soils have a subsoil of sandy loam or loam and are less than 20 inches deep over bedrock.

Typical pedon of Gilpin shaly silt loam, 20 to 45 percent slopes, 250 feet north of Saratoga Road on Buck Ridge Road and 300 feet northwest of the road:

A—0 to 1 inch; very dark grayish brown (10YR 3/2) shaly silt loam; moderate medium granular structure; friable; many fine and medium roots; about 15 percent shale fragments as much as ½ inch across; strongly acid; abrupt smooth boundary.

E—1 to 5 inches; yellowish brown (10YR 5/4) shaly silt loam; moderate medium granular structure; friable; common fine and medium roots; about 15 percent thin shale fragments as much as 2 inches across; strongly acid; gradual smooth boundary.

Bt1—5 to 9 inches; yellowish brown (10YR 5/8) shaly silt loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few faint clay films and clay bridges between sand grains; few fine roots; about 20 percent thin shale fragments as much as 2 inches across; strongly acid; gradual smooth boundary.

Bt2—9 to 22 inches; yellowish brown (10YR 5/8) shaly silty clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few faint clay films and clay bridges between sand grains; about 30 percent thin shale fragments as much as 1½ inches across; strongly acid; gradual smooth boundary.

CB—22 to 29 inches; yellowish brown (10YR 5/8) very shaly silty clay loam; massive with weak blocky structure in some parts; friable, slightly sticky and slightly plastic; about 60 percent thin shale fragments as much as 3 inches across; strongly acid; clear wavy boundary.

Cr—29 to 40 inches; weathered shale bedrock that can be dug with a spade.

The thickness of the solum ranges from 18 to 36 inches, and the depth to weathered shale bedrock ranges from 20 to 40 inches. Reaction is strongly acid or very strongly acid. The content of shale fragments ranges from 5 to 20 percent in the A and E horizons, from 10 to 40 percent in the B horizon, and from 30 to 80 percent in the C horizon.

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

The BE horizon, if it occurs, has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam in the fine-earth fraction. The Bt horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 to 8. It is silt loam or silty clay loam in the fine-earth fraction. The CB or C horizon, if it occurs, has the same colors and textures as the Bt horizon.

Hamblen Series

The Hamblen series consists of deep, moderately well drained, nearly level soils that formed in loamy alluvium derived from shale, sandstone, and limestone. These soils are on flood plains in the Sequatchie Valley. Slopes range from 0 to 2 percent.

Hamblen soils are on the same landscape as Whitwell, Sullivan, and Newark soils. Whitwell soils are on the adjacent low terraces and have an argillic horizon. Sullivan soils are well drained and are in the slightly higher areas on the flood plains. Newark soils are somewhat poorly drained and are in the slightly lower areas on the flood plains.

Typical pedon of Hamblen loam, occasionally flooded, 0.7 mile southwest of Ninemile on Alvin C. York Highway and 200 yards east of the highway, on the flood plain of Little Creek:

Ap—0 to 6 inches; dark yellowish brown (10YR 4/4) loam; few fine faint light yellowish brown mottles; moderate medium granular structure; very friable; many fine roots; many fine and few medium tubular pores; neutral; gradual smooth boundary.

Bw1—6 to 20 inches; dark yellowish brown (10YR 4/4) loam; few medium distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/8) mottles; weak fine subangular blocky structure parting to moderate medium granular; very friable; common fine roots; many fine and few medium tubular pores; neutral; gradual smooth boundary.

Bw2—20 to 45 inches; yellowish brown (10YR 5/6) silt loam; common medium distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine roots; common fine and medium tubular pores; medium acid; gradual smooth boundary.

C—45 to 60 inches; pale brown (10YR 6/3) silt loam; common medium distinct light brownish gray (10YR 6/2) and common medium prominent red (2.5YR 4/8) mottles; massive; friable; common fine and medium tubular pores; 2 percent manganese concretions as much as ¼ inch in diameter; common medium distinct very dark grayish brown stains; strongly acid.

The thickness of the solum ranges from 30 to 55 inches. The depth to bedrock is more than 60 inches. Reaction ranges from neutral to strongly acid.

The Ap horizon has hue of 10YR, value of 4, and chroma of 3 or 4. In some pedons it has few fine faint mottles in shades of brown. It is loam or silt loam.

The Bw horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. It has mottles in shades of gray, brown, or red. It is loam or silt loam.

The C horizon has hue of 10YR, value of 5 or 6, and chroma of 2 to 6. It has mottles in shades of gray, brown, or red. It is silt loam, loam, or sandy loam.

Hendon Series

The Hendon series consists of deep, well drained, gently sloping and sloping soils. These soils formed in a

loamy mantle 18 to 30 inches thick that is higher in content of silt than the underlying loamy residuum derived from sandstone, siltstone, and shale. They have a slightly compact and brittle layer in the subsoil. They are on broad interfluves on the Cumberland Plateau. Slopes range from 2 to 10 percent.

Hendon soils are on the same landscape as Lily and Ramsey soils. Lily soils are less than 40 inches deep over bedrock and do not have a brittle layer in the subsoil. Ramsey soils are less than 20 inches deep over bedrock and have a higher content of sand than the Hendon soils.

Typical pedon of Hendon silt loam, 2 to 6 percent slopes, 1.5 miles east of the Hendon-Brayton Road on Bakewell Road and 100 feet north of the road:

O—2 inches to 0; partly decomposed and undecomposed pine needles and twigs.

A—0 to 1 inch; very dark grayish brown (10YR 3/2) silt loam; weak medium granular structure; friable; many fine and medium roots; very strongly acid; abrupt smooth boundary.

E—1 to 10 inches; yellowish brown (10YR 5/4) silt loam; moderate medium granular structure; friable; common fine and medium roots; very fine tubular pores; very strongly acid; gradual smooth boundary.

Bt1—10 to 15 inches; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; friable; few fine and medium roots; common fine and few medium tubular pores; few faint clay films on faces of peds and in pores; very strongly acid; gradual smooth boundary.

Bt2—15 to 25 inches; yellowish brown (10YR 5/8) silt loam; weak medium subangular blocky structure; friable; few fine roots; common fine and few medium tubular pores; few faint clay films on faces of peds and in pores; about 5 percent small pebbles in the lower part; very strongly acid; gradual smooth boundary.

2Btx/E—25 to 32 inches; yellowish brown (10YR 5/6) loam; common medium distinct yellowish red (5YR 5/8) mottles (B part); few very pale brown (10YR 7/3) loam pockets and coatings on the faces of most prisms (E part); weak medium prismatic structure parting to weak thick platy and weak medium subangular blocky; firm; common fine tubular pores; few small pebbles in the upper 2 inches; 40 to 60 percent brittle material, by volume; few faint clay films on faces of peds and in pores; very strongly acid; gradual smooth boundary.

2Btx—32 to 44 inches; yellowish red (5YR 5/8) loam; few medium distinct light olive brown (2.5YR 5/4) mottles; weak coarse prismatic structure parting to weak thick platy and weak medium subangular blocky; firm; few fine tubular pores; 50 to 60 percent brittle material, by volume; very pale brown coatings on faces of prisms; few faint clay films on faces of peds and in pores; strongly acid; gradual smooth boundary.

2Bt—44 to 65 inches; yellowish red (5YR 5/8) loam; common medium distinct brownish yellow (10YR 6/6) and few fine faint strong brown mottles; weak medium subangular blocky structure; friable; many fine tubular pores; few faint clay films on faces of peds; very strongly acid.

The thickness of the solum and the depth to bedrock are more than 60 inches. Reaction generally is strongly acid or very strongly acid, but the surface layer is less acid in limed areas. The content of sandstone and shale fragments as much as ½ inch across ranges from 0 to 5 percent in the A horizon and the upper part of the B horizon and from 0 to 10 percent in the lower part of the B horizon.

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

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

The Bt horizon and the upper few inches of the 2Btx/E horizon have hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 8. They are silt loam, loam, or clay loam. The E part of the 2Btx/E horizon has hue of 10YR, value of 6 or 7, and chroma of 1 to 3. It is loam or silt loam.

The 2Btx and 2Bt horizons have hue of 7.5YR to 2.5YR, value of 4 or 5, and chroma of 6 to 8. They are loam or clay loam. Mottles in shades of brown, yellow, or red are in the 2B horizons of most pedons. Gray mottles are in a few pedons below a depth of 30 inches.

Lily Series

The Lily series consists of moderately deep, well drained, gently sloping to moderately steep soils. These soils formed in loamy residuum derived from sandstone. They are on uplands on the Cumberland Plateau. Slopes range from 2 to 20 percent.

Lily soils are on the same landscape as Gilpin, Hendon, and Ramsey soils. Gilpin soils have a higher content of silt than the Lily soils and have more rock fragments. Hendon soils are more than 60 inches deep over bedrock. They have a slightly compact and brittle layer in the subsoil. Ramsey soils are less than 20 inches deep over bedrock.

Typical pedon of Lily loam, 2 to 6 percent slopes, 1 mile north of Glade Creek on CCC Camp Road and 50 feet east of the road:

A—0 to 1 inch; grayish brown (10YR 5/2) loam; moderate medium granular structure; very friable; common fine and medium roots; strongly acid; clear smooth boundary.
E—1 to 8 inches; light yellowish brown (10YR 6/4) loam; moderate medium granular structure; very friable; common fine, medium, and coarse roots; common fine and few medium tubular pores; strongly acid; gradual smooth boundary.
Bt1—8 to 17 inches; yellowish brown (10YR 5/6) clay loam; weak fine subangular blocky structure; friable; few faint clay films; common fine and medium and few coarse roots; many very fine interstitial and few fine and medium tubular pores; strongly acid; gradual smooth boundary.
Bt2—17 to 25 inches; yellowish brown (10YR 5/6) clay loam; moderate medium subangular blocky structure; friable; few faint clay films; common fine and medium roots; many very fine interstitial and few fine and medium tubular pores; strongly acid; gradual smooth boundary.
Bt3—25 to 35 inches; yellowish brown (10YR 5/4) loam; moderate medium subangular blocky structure; friable; few fine roots; many very fine interstitial and few fine and medium tubular pores; about 5 percent sandstone fragments as much as ½ inch across; strongly acid; abrupt smooth boundary.
R—35 inches; sandstone bedrock.

The thickness of the solum and the depth to bedrock range from 22 to 40 inches. Reaction is strongly acid or very strongly acid. The content of sandstone fragments as much as ½ inch across ranges from 0 to 5 percent in the A and E horizons, and the content of sandstone fragments as much as 1 inch across ranges from 0 to 15 percent in the B horizon.

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

The Bt horizon has hue of 10YR or 7.5YR and value and chroma of 4 to 6. It is loam or clay loam. Some pedons have a BC horizon, which has hue of 10YR to 5YR, value of 5, and chroma of 4 to 6. This horizon is loam, sandy loam, or clay loam.

Minvale Series

The Minvale series consists of deep, well drained, sloping and moderately steep soils that formed in colluvium derived from cherty limestone. These soils are on foot slopes, benches, and fans on the cherty limestone ridges in the Sequatchie Valley. Slopes range from 6 to 20 percent.

Minvale soils are on the same landscape as Barger, Pailo, and Fullerton soils. Barger soils are on ridgetops and have a fragipan. Pailo soils are on side slopes and are loamy-skeletal over clayey. Fullerton soils are on ridgetops and side slopes. They have a clayey subsoil that has 15 to 35 percent chert fragments.

Typical pedon of Minvale silt loam, 6 to 12 percent slopes, eroded, 1.2 miles southeast of College Station Mountain Road on Beavert Ridge Road, 0.2 mile northeast on a private road, and 135 feet southeast of the road, in a pasture:

Ap—0 to 7 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium granular structure; very friable; many fine and medium roots; many fine and medium tubular pores; about 15 percent chert fragments as much as 1 inch across; medium acid; gradual smooth boundary.
Bt1—7 to 20 inches; yellowish red (5YR 5/8) cherty silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; many fine and common medium tubular pores; about 20 percent chert fragments as much as 2 inches across; few faint clay films; strongly acid; gradual smooth boundary.
Bt2—20 to 33 inches; yellowish red (5YR 5/8) cherty silty clay loam; common medium distinct reddish yellow (7.5YR 6/6) mottles; moderate medium subangular blocky structure; friable; many fine and few medium tubular pores; about 25 percent chert fragments as much as 2 inches across; few faint clay films; strongly acid; gradual smooth boundary.
Bt3—33 to 48 inches; yellowish red (5YR 5/8) cherty silty clay loam; moderate medium subangular blocky structure; friable; common fine and medium tubular pores; about 25 percent chert fragments as much as 3 inches across; few faint clay films; very strongly acid; gradual smooth boundary.
Bt4—48 to 62 inches; strong brown (7.5YR 5/8) cherty silty clay loam; common medium distinct yellowish red (5YR 5/8) and pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; friable; common fine and few medium tubular pores; about 35 percent chert fragments as much as 3 inches across; very strongly acid.

The thickness of the solum and the depth to bedrock are more than 60 inches. Reaction generally is strongly acid or very strongly acid, but the surface layer is less acid in limed areas. The content of chert fragments as much as 2 inches across is dominantly 15 percent or less in the A horizon but may be as much as 20 percent. The content of chert fragments as much as 4 inches across ranges from 15 to 35 percent in the B horizon.

The A horizon has hue of 10YR or 7.5YR, value of 4

or 5, and chroma of 2 to 4. It is silt loam or loam in the fine-earth fraction.

The Bt horizon has hue of 7.5YR or 5YR, value of 5, and chroma of 6 to 8. The upper part is silty clay loam, silt loam, or loam in the fine-earth fraction, and the lower part is silty clay loam or silty clay. Some pedons have a BE horizon, which has hue of 10YR, value of 5 or 6, and chroma of 6.

Morehead Series

The Morehead series consists of deep, moderately well drained, gently sloping soils that formed in local alluvium derived from sandstone and shale. These soils are on low stream terraces in the Cumberland Mountains. Slopes range from 1 to 4 percent.

Morehead soils are on the same landscape as Bonair, Gilpin, and Lily soils. The poorly drained Bonair soils are on flood plains along small streams and drainageways. The well drained Gilpin and Lily soils are on the higher side slopes and are less than 40 inches deep over bedrock. Gilpin soils formed in material weathered from shale, and Lily soils formed in material weathered from sandstone.

Typical pedon of Morehead silt loam, in an area of Morehead rarely flooded-Bonair occasionally flooded complex, 1.5 miles west of Saratoga Road on Buck Ridge Road and 75 feet south of the road:

A—0 to 1 inch; dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; friable; many fine and medium roots; strongly acid; clear smooth boundary.

E—1 to 3 inches; pale brown (10YR 6/3) silt loam; moderate medium granular structure; friable; many fine and medium roots; strongly acid; gradual smooth boundary.

BE—3 to 11 inches; brownish yellow (10YR 6/6) silt loam; weak fine subangular blocky structure; friable; many fine and medium and few coarse roots; strongly acid; gradual smooth boundary.

Bt1—11 to 19 inches; brownish yellow (10YR 6/8) silt loam; weak medium subangular blocky structure; friable; few faint clay films; strongly acid; gradual smooth boundary.

Bt2—19 to 29 inches; light yellowish brown (10YR 6/4) silty clay loam; common medium distinct strong brown (7.5YR 5/6) and light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable; few faint clay films; strongly acid; gradual smooth boundary.

Bt3—29 to 44 inches; strong brown (7.5YR 5/6) silty clay loam; common medium distinct light gray (10YR 7/2) and red (2.5YR 5/8) mottles; moderate medium subangular blocky structure; friable; few faint clay films; strongly acid; clear smooth boundary.

Cg—44 to 65 inches; mottled gray (10YR 6/1) and yellowish brown (10YR 5/6) silty clay loam; massive; firm; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. The depth to bedrock is more than 60 inches. Reaction is strongly acid or very strongly acid. The content of shale or sandstone fragments ⅛ to 1 inch across ranges from 0 to 10 percent throughout the profile.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The E horizon, if it occurs, has hue of 10YR, value of 5 or 6, and chroma of 3 or 4.

The BE horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 6. It is silt loam. The Bt horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 8. It has mottles in shades of brown, red, and gray. Gray mottles are within the upper 20 inches of the argillic horizon. The Bt horizon is silt loam or silty clay loam.

The C horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 1 to 6. It has mottles in shades of gray or brown. In some pedons it is mottled and does not have a dominant matrix color. It is silt loam or silty clay loam.

Newark Series

The Newark series consists of deep, somewhat poorly drained, nearly level soils that formed in mixed alluvium. These soils are on flood plains in the Sequatchie Valley. Slopes range from 0 to 2 percent.

Newark soils are on the same landscape as Hamblen and Whitwell soils. Hamblen soils are moderately well drained and are on the slightly higher flood plains. Whitwell soils are on the adjacent low terraces and have an argillic horizon.

Typical pedon of Newark silt loam, frequently flooded, 100 feet west of Little Creek Crossing on Tollett Road and 100 feet north of the road:

Ap—0 to 5 inches; dark brown (10YR 4/3) silt loam; few medium faint grayish brown (10YR 5/2) mottles; weak fine granular structure; very friable; few small dark brown nodules; many fine and medium roots; neutral; clear smooth boundary.

Bw—5 to 11 inches; brown (10YR 5/3) silt loam; common medium faint grayish brown (10YR 5/2) and few medium prominent yellowish red (5YR 5/6) mottles; weak medium granular structure; very friable; many fine and medium roots; neutral; clear smooth boundary.

Bg1—11 to 20 inches; grayish brown (10YR 5/2) silt

loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; few fine and medium roots; few black manganese nodules as much as ¼ inch across; neutral; gradual wavy boundary.

Bg2—20 to 27 inches; grayish brown (10YR 5/2) loam; common medium faint brown (10YR 5/3) and few medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; very friable; few fine roots; common black manganese nodules as much as ¼ inch across; neutral; gradual wavy boundary.

Cg1—27 to 55 inches; grayish brown (2.5Y 5/2) loam; few fine prominent yellowish red (5YR 4/6) and common medium distinct strong brown (7.5YR 5/6) mottles; massive; friable; mildly alkaline; clear smooth boundary.

Cg2—55 to 67 inches; dark gray (N 4/0) clay loam; common fine prominent olive brown (2.5Y 4/4) mottles; massive; firm; mildly alkaline.

The depth to bedrock is more than 60 inches. Reaction ranges from medium acid to mildly alkaline.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. Some pedons have mottles in shades of brown.

The Bw horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. It has mottles in shades of brown, red, or gray. It is silt loam or silty clay loam.

The Bg horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 4 to 7 and chroma of 0 to 2. It has mottles in shades of brown and red. It is silt loam, loam, silty clay loam, or clay loam.

The Cg horizon has the same colors as the Bg horizon. It is silt loam, loam, silty clay loam, clay loam, or fine sandy loam.

The Newark soils in Bledsoe County have slightly more sand in the Bg and Cg horizons and are slightly warmer than is definitive for the series. These differences do not significantly affect the use or management of the soils.

Pailo Series

The Pailo series consists of deep, well drained, moderately steep and steep soils on hillsides in the uplands. These soils formed in a loamy mantle that has a high content of chert and an underlying residuum of clayey limestone. Slopes range from 12 to 50 percent.

Pailo soils are on the same landscape as Barger, Fullerton, and Minvale soils, all of which are on dissected uplands in the Sequatchie Valley. Barger soils are on the gently sloping and sloping ridgetops and have a fragipan. Fullerton soils are on side slopes. They have a clayey subsoil that has less than 35 percent chert fragments. Minvale soils are on foot slopes and benches. They formed in cherty colluvium and are fine-loamy.

Typical pedon of Pailo very cherty sandy loam, 20 to 50 percent slopes, 1.2 miles southeast on Ridge Road from its intersection with College Station Crossroad, 3,000 feet left on a private road, and 100 feet northwest of the road:

O—1 inch to 0; partly decomposed and undecomposed leaves from hardwood trees, pine needles, and twigs.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) very cherty loamy sand; weak fine granular structure; very friable; many fine and medium roots; about 35 percent subrounded and subangular chert fragments ¼ to 1 inch across; very strongly acid; clear smooth boundary.

E—2 to 12 inches; yellowish brown (10YR 5/4) very cherty sandy loam; weak medium subangular blocky structure; very friable; common medium and coarse and few fine roots; many fine and medium tubular pores; about 35 percent subrounded and subangular chert fragments ¼ inch to 3 inches across; very strongly acid; gradual wavy boundary.

Bt1—12 to 34 inches; yellowish brown (10YR 5/6) extremely cherty loam; weak medium subangular blocky structure; very friable; common medium and few fine roots; many fine and medium tubular pores; few faint clay films on fragments and in pores; about 70 percent subrounded and subangular chert fragments ¼ inch to 6 inches across; very strongly acid; clear wavy boundary.

2Bt2—34 to 38 inches; yellowish red (5YR 5/8) sandy clay loam; moderate medium subangular blocky structure; firm; many fine and medium tubular pores; common faint clay films on faces of peds; about 10 percent angular chert fragments ¼ inch to 3 inches across; very strongly acid; gradual wavy boundary.

2Bt3—38 to 52 inches; yellowish red (5YR 5/8) clay; moderate medium angular blocky structure; firm; many faint clay films on faces of peds; about 5 percent angular chert fragments ¼ to 1 inch across; very strongly acid; gradual smooth boundary.

2Bt4—52 to 72 inches; yellowish red (5YR 5/8) clay; common medium prominent yellowish brown (10YR 5/8) and brownish yellow (10YR 6/6) mottles; coarse medium angular blocky structure; firm; many clay films on faces of peds; about 5 percent angular chert fragments ¼ to 1 inch across; very strongly acid.

The thickness of the solum and the depth to bedrock

are more than 72 inches. Reaction is strongly acid or very strongly acid. The content of subrounded and subangular chert fragments ¼ inch to 4 inches across ranges from 25 to 50 percent in the A and E horizons. The content of subrounded and subangular chert fragments ½ inch to 6 inches across ranges from 30 to 75 percent in the Bt horizon. The content of angular fragments ¼ to 1 inch across ranges from 3 to 15 percent in the 2Bt horizon.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The Ap or E horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is loam, sandy loam, or loamy sand in the fine-earth fraction.

The BE horizon, if it occurs, has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is loam or sandy loam in the fine-earth fraction. The Bt horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 6 to 8. It is loam, clay loam, or sandy clay loam in the fine-earth fraction.

The 2Bt horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. Some pedons have mottles in shades of brown, yellow, or red. Small manganese nodules are in some pedons. The horizon is 60 to 80 percent clay. Some pedons have a thin layer as much as 4 inches thick at the top of the horizon that is clay loam, sandy clay loam, or sandy clay.

Ramsey Series

The Ramsey series consists of shallow, somewhat excessively drained, sloping to steep soils that formed in material weathered from sandstone. These soils are on ridgetops and the upper side slopes on the Cumberland Plateau. Slopes range from 5 to 35 percent.

Ramsey soils are on the same landscape as the Gilpin and Lily soils. Gilpin soils formed in material weathered from shale, have an argillic horizon, and are deeper over bedrock than the Ramsey soils. Lily soils have an argillic horizon and are 20 to 40 inches deep over bedrock.

Typical pedon of Ramsey sandy loam, 5 to 15 percent slopes, on Worthington Road 0.9 mile northeast from its intersection with CCC Camp Road and 350 feet northeast of the road:

A—0 to 1 inch; very dark grayish brown (10YR 3/2) sandy loam; moderate medium granular structure; very friable; many fine and medium roots; about 5 percent sandstone fragments as much as ½ inch across; strongly acid; abrupt smooth boundary.

E—1 to 5 inches; yellowish brown (10YR 5/4) sandy loam; moderate medium granular structure; very friable; many fine and medium and few coarse roots; about 5 percent sandstone fragments as much as ½ inch across; strongly acid; gradual smooth boundary.

Bw—5 to 17 inches; yellowish brown (10YR 5/6) sandy loam; weak fine and medium subangular blocky structure; many fine and medium and few coarse roots; about 10 percent sandstone fragments as much as 2½ inches across; strongly acid; abrupt smooth boundary.

R—17 inches; sandstone bedrock.

The thickness of the solum and the depth to bedrock range from 8 to 20 inches. Reaction is strongly acid or very strongly acid. The content of sandstone fragments ranges from 0 to 10 percent in the A and E horizons and from 0 to 15 percent in the B horizon.

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

The B horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 to 6. It is loam, sandy loam, or fine sandy loam.

Sequatchie Series

The Sequatchie series consists of deep, well drained, nearly level and gently sloping soils that formed in loamy alluvium. These soils are on low stream terraces and alluvial fans in the Sequatchie Valley. Slopes range from 0 to 3 percent.

Sequatchie soils are on the same landscape as Sullivan, Swafford, and Whitwell soils. Sullivan soils are on the adjacent flood plains and do not have an argillic horizon. Swafford and Whitwell soils are on the adjacent low terraces and are moderately well drained. Swafford soils have a compact layer in the subsoil.

Typical pedon of Sequatchie loam, rarely flooded, south from Pikeville on U.S. Highway 127, about 0.4 mile right on Alvin C. York Highway, and 0.5 mile northwest on a farm road:

Ap—0 to 7 inches; dark brown (10YR 3/3) loam; weak medium granular structure; very friable; few fine roots; neutral; gradual smooth boundary.

BA—7 to 12 inches; brown (10YR 4/3) loam; weak fine and medium subangular blocky structure; friable; few fine roots; few fine tubular pores; slightly acid; clear wavy boundary.

Bt1—12 to 28 inches; brown (7.5YR 4/4) loam; few medium faint yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable; many fine and medium tubular pores; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—28 to 39 inches; brown (7.5YR 4/4) loam; few fine

faint yellowish brown (10YR 5/8) mottles; weak medium and fine subangular blocky structure; friable; many fine and medium tubular pores and few interstitial pores; few thin clay films on faces of peds; some bridging of sand grains; strongly acid; gradual smooth boundary.

BC—39 to 51 inches; brown (7.5YR 4/4) fine sandy loam; weak fine subangular blocky structure; very friable; many fine and medium tubular pores; very strongly acid; clear smooth boundary.

C1—51 to 60 inches; brown (7.5YR 5/4) sandy loam; massive; very friable; very strongly acid; clear smooth boundary.

C2—60 to 68 inches; yellowish brown (10YR 5/6) very gravelly sandy loam; massive; very friable; about 50 percent pebbles ⅛ inch to 1½ inches across; very strongly acid.

The thickness of the solum ranges from 36 to 55 inches. The depth to bedrock is more than 60 inches. Reaction generally is strongly acid or very strongly acid, but the surface layer is less acid in limed areas. The content of sandstone pebbles ranges from 0 to 5 percent, by volume, in the A and B horizons. The content of sandstone pebbles averages from 0 to 30 percent in the C horizon, but some subhorizons have as much as 50 percent.

The Ap horizon has hue of 7.5YR or 10YR, value of 3, and chroma of 3 or 4. It is loam or silt loam.

The BA horizon has hue of 7.5YR or 10YR, value of 4, and chroma of 3 or 4. It is loam or silt loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is loam or clay loam. Some pedons have few mottles in shades of brown.

The BC horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. Some pedons have few or common mottles in shades of brown and gray. The horizon is fine sandy loam or sandy loam.

The C horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 4 to 6. The number of mottles in shades of brown and gray ranges from none to common. The horizon is sandy loam, fine sandy loam, or loam in the fine-earth fraction.

Sullivan Series

The Sullivan series consists of deep, well drained, nearly level soils that formed in loamy alluvium. These soils are on flood plains along the Sequatchie River and tributary streams in the Sequatchie Valley. Slopes range from 0 to 2 percent.

Sullivan soils are on the same landscape as Hamblen and Sequatchie soils. Hamblen soils are moderately well drained and are in slight depressions on the flood plains. Sequatchie soils are well drained and are on the adjacent low stream terraces.

Typical pedon of Sullivan silt loam, occasionally flooded, 1.7 miles south of Pikeville on U.S. Highway 127 at its intersection with State Highway 30 East and 300 feet east of U.S. Highway 127:

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

Bw1—6 to 15 inches; dark yellowish brown (10YR 4/4) loam; weak fine and medium subangular blocky structure; friable, slightly sticky and nonplastic; few fine roots; many fine and few medium tubular pores; slightly acid; gradual smooth boundary.

Bw2—15 to 30 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; common fine and few medium tubular pores; slightly acid; clear smooth boundary.

Ab—30 to 48 inches; dark grayish brown (10YR 4/2) silt loam; thin dark yellowish brown (10YR 4/6) silt coatings on vertical faces of peds; weak medium subangular blocky structure; friable; many fine and medium tubular pores; slightly acid; clear wavy boundary.

Bwb—48 to 65 inches; brown (10YR 4/3) silt loam; thin dark yellowish brown (10YR 4/6) silt coatings on vertical faces of peds; weak medium subangular blocky structure; friable; many fine and medium tubular pores; slightly acid.

The depth to bedrock is more than 60 inches. Reaction ranges from neutral to medium acid. The content of pebbles as much as 1 inch across ranges from 0 to 5 percent, by volume, throughout the profile.

The Ap horizon has hue of 10YR, value of 4, and chroma of 2 or 3. The Ab horizon, if it occurs, has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The Ap and Ab horizons are silt loam or loam.

The Bw horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is loam or silt loam. The Bwb horizon, if it occurs, has the same range of colors and textures as those in the Bw horizon.

The C horizon, if it occurs, has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is loam or fine sandy loam.

Swafford Series

The Swafford series consists of deep, moderately well drained soils on low stream terraces. These soils formed in loamy alluvium. They have a slightly compact and brittle layer in the subsoil. Slopes range from 0 to 3 percent.

Swafford soils are on the same landscape as Hamblen, Whitwell, and Sequatchie soils. Hamblen soils

are on bottom land and do not have an argillic horizon. Whitwell soils are moderately well drained; are on nearly level, low terraces; and do not have a compact layer in the subsoil. Sequatchie soils are on low terraces and are generally closer to the stream than the Swafford soils. They are well drained.

Typical pedon of Swafford silt loam, rarely flooded, 0.7 mile south of Ninemile Cross Road on Alvin C. York Highway and 550 feet southeast of the highway:

Ap—0 to 8 inches; brown (7.5YR 4/4) silt loam; moderate medium granular structure; very friable; many fine and medium roots; many fine and few medium tubular pores; strongly acid; clear smooth boundary.

Bt1—8 to 12 inches; strong brown (7.5YR 4/6) loam; weak fine subangular blocky structure; very friable; common fine and few medium roots; many fine and few medium tubular pores; few clay films in pores; medium acid; gradual smooth boundary.

Bt2—12 to 24 inches; yellowish brown (10YR 5/8) loam; few fine distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable; common fine roots; many fine and few medium tubular pores; common manganese nodules as much as ¼ inch across; few faint clay films on faces of peds and in pores; very strongly acid; gradual smooth boundary.

Btx1—24 to 44 inches; brownish yellow (10YR 6/8) loam; common medium distinct strong brown (7.5YR 5/8) and light brownish gray (10YR 6/2) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine roots in seams between prisms; common fine and medium tubular pores; few faint clay films in pores and on faces of secondary peds; light gray silt coatings on faces of prisms and thin light brownish gray seams between some prisms; common medium black manganese nodules and few medium red iron nodules and accumulations; 40 to 60 percent brittle material, by volume; very strongly acid; gradual wavy boundary.

Btx2—44 to 65 inches; brownish yellow (10YR 6/8) loam; common medium distinct strong brown (7.5YR 5/8) and light brownish gray (10YR 6/2) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; friable; common fine and medium tubular pores; few clay films in pores and on faces of secondary peds; light gray silt coatings on faces of prisms and thin light brownish gray seams between some prisms; few gray clay flows and plugs; few coarse black manganese nodules and few medium red iron nodules; 20 to 40 percent brittle material, by volume; very strongly acid.

The thickness of the solum and the depth to bedrock are more than 60 inches. Depth to the Btx horizon ranges from 18 to 36 inches. Reaction is medium acid to very strongly acid throughout the profile. The content of small pebbles ranges from 0 to 10 percent throughout the profile. Some pedons have a B't horizon.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is loam or silt loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. It has mottles with chroma of 2 or less within a depth of 30 inches. It is loam or clay loam.

The Btx horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 8. It has few or common mottles. It is loam or clay loam.

Talbott Series

The Talbott series consists of moderately deep, well drained, gently sloping to steep soils that formed in material weathered from limestone. These soils are on uplands in the Sequatchie Valley and on the lower, northwest-facing slopes on the Cumberland Plateau escarpment. Slopes range from 2 to 35 percent.

Talbott soils are on the same landscape as Braxton and Bouldin soils, both of which are more than 60 inches deep over bedrock. Bouldin soils have more than 35 percent sandstone fragments throughout.

Typical pedon of Talbott silt loam, in an area of Talbott-Braxton-Rock outcrop complex, 6 to 20 percent slopes, about 1 mile south of the Cumberland County line on Alvin C. York Highway, 1,000 feet east on Lowes Gap Road, and 200 feet southeast of the road:

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

Bt1—6 to 10 inches; yellowish red (5YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; common medium roots; common fine and medium tubular pores; few faint clay films; slightly acid; gradual smooth boundary.

Bt2—10 to 20 inches; yellowish red (5YR 5/6) clay; moderate medium subangular blocky structure; firm; few medium roots; few fine tubular pores; many faint clay films; slightly acid; gradual smooth boundary.

Bt3—20 to 32 inches; yellowish red (5YR 5/6) clay; moderate medium angular blocky structure; very firm; few fine roots; few fine tubular pores; many

faint clay films; slightly acid; abrupt smooth boundary.
R—32 inches; limestone bedrock.

The thickness of the solum and the depth to limestone bedrock range from 20 to 40 inches. Reaction ranges from strongly acid to slightly acid. The content of chert fragments as much as ½ inch across ranges from 0 to 5 percent.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. Some pedons have a thin A horizon, which has value of 3 and chroma of 2 or 3.

The Bt horizon has hue of 5YR, value of 4 or 5, and chroma of 6 to 8, or it has hue of 2.5YR, value of 4, and chroma of 6 to 8. It is dominantly silty clay or clay, but some pedons have a thin Bt1 horizon of silty clay loam.

Some of the Talbott soils in Bledsoe County are less acid than is definitive for the series, especially in areas where limestone outcrops. This difference does not significantly affect the use and management of the soils.

Waynesboro Series

The Waynesboro series consists of deep, well drained, gently sloping to moderately steep soils that formed in thick deposits of old alluvium. These soils are on high stream terraces in the Sequatchie Valley and are underlain by material weathered from limestone or shale. Slopes range from 2 to 20 percent.

Waynesboro soils are on the same landscape as Etowah and Sequatchie soils, both of which have a darker surface layer than that of the Waynesboro soils and have less clay in the subsoil. Etowah soils generally are lower on the landscape than the Waynesboro soils. Sequatchie soils are on low stream terraces.

Typical pedon of Waynesboro loam, 2 to 6 percent slopes, 1.2 miles south of State Highway 30 East on East Valley Road and 0.5 mile northwest of the road:

Ap—0 to 8 inches; brown (7.5YR 4/4) loam; moderate medium granular structure; very friable; common fine and medium roots; common fine and medium tubular pores; slightly acid; clear smooth boundary.
Bt1—8 to 12 inches; yellowish red (5YR 4/6) clay loam; weak fine and medium subangular blocky structure; friable; common fine and few medium roots; many fine and common medium tubular pores; medium acid; gradual smooth boundary.
Bt2—12 to 24 inches; red (2.5YR 4/6) clay loam; weak medium and fine subangular blocky structure; friable; common fine and few medium roots; common fine and medium tubular pores; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.
Bt3—24 to 42 inches; dark red (2.5YR 3/6) clay loam; moderate medium subangular blocky structure; friable; few fine roots; common fine and few medium tubular pores; many clay films on faces of peds and in pores; strongly acid; gradual smooth boundary.
Bt4—42 to 65 inches; dark red (2.5YR 3/6) clay loam; moderate fine subangular blocky structure; friable; few fine and medium tubular pores; many faint clay films on faces of peds; strongly acid.

The thickness of the solum and the depth to bedrock are more than 60 inches. Reaction generally is strongly acid or very strongly acid, but the surface layer and the upper few inches of the subsoil are less acid in limed areas. The content of chert fragments or sandstone pebbles as much as ½ inch across ranges from 0 to 5 percent, by volume, throughout the profile.

The Ap horizon has hue of 7.5YR or 10YR, value of 4, and chroma of 2 to 4. It is dominantly loam but is silt loam in a few areas.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8, or it has hue of 2.5YR, value of 3, and chroma of 6. In some pedons the lower part has mottles in shades of brown, yellow, and red. The horizon is clay loam or clay.

Whitwell Series

The Whitwell series consists of deep, moderately well drained, nearly level soils that formed in loamy alluvium. These soils are on low stream terraces in the Sequatchie Valley. Slopes range from 0 to 2 percent.

Whitwell soils are on the same landscape as Hamblen, Sequatchie, and Swafford soils. Hamblen soils are on bottom land and do not have an argillic horizon. Sequatchie soils are on the slightly higher stream terraces and are well drained. Swafford soils are on the slightly higher stream terraces and have a fragipan.

Typical pedon of Whitwell silt loam, occasionally flooded, 3 miles south of Ninemile Cross Road on Alvin C. York Highway and 120 feet south of the highway, in a pasture:

Ap—0 to 9 inches; brown (10YR 4/3) silt loam; moderate medium granular structure; very friable; many fine and medium roots; many fine and few medium tubular pores; slightly acid; gradual smooth boundary.
BA—9 to 14 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; very friable; common fine and medium roots; many

fine and common medium tubular pores; slightly acid; clear smooth boundary.

Bt1—14 to 22 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; friable; common fine and medium roots; many fine and few medium tubular pores; few manganese concretions as much as ¼ inch across; few faint clay films; strongly acid; gradual smooth boundary.

Bt2—22 to 30 inches; yellowish brown (10YR 5/6) clay loam; common medium prominent yellowish red (5YR 5/8) and few fine distinct light brownish gray (10YR 6/2) and light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; few fine roots; many fine and few medium tubular pores; common manganese concretions and iron stains as much as ¼ inch across; many faint clay films; very strongly acid; gradual smooth boundary.

Bt3—30 to 48 inches; yellowish brown (10YR 5/4) clay loam; common medium distinct light brownish gray (10YR 6/2) and common medium prominent yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; friable; common fine tubular pores; many iron stains as much as ¼ inch across; many faint clay films; very strongly acid; gradual smooth boundary.

C—48 to 60 inches; light brownish gray (10YR 6/2) loam; many medium distinct pale brown (10YR 6/3) and common medium prominent strong brown (7.5YR 5/8) mottles; massive; friable; common fine tubular pores; common iron stains as much as ¼ inch across; very strongly acid.

The thickness of the solum ranges from 30 to 60 inches. The depth to bedrock is more than 60 inches. Reaction generally is strongly acid or very strongly acid, but the surface layer is less acid in limed areas. The content of rock fragments less than 3 inches across ranges from 0 to 5 percent in the solum and from 0 to 15 percent in the C horizon.

The Ap horizon has hue of 10YR or 7.5YR, value of 4, and chroma of 2 to 4. It is loam or silt loam.

The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. It has mottles with chroma of 2 or less within a depth of 30 inches. The number of mottles in shades of brown and red ranges from none to common in the Bt horizon. The B horizon is loam, silt loam, clay loam, or silty clay loam.

The C horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 2 to 8. Mottles are in shades of brown, gray, or yellow. The horizon is loam, sandy loam, or silt loam.

References

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(2) American Society for Testing and Materials. 1988. Standard test method for classification of soils for engineering purposes. ASTM Stand. D 2487.

(3) United States Department of Agriculture. 1951 (being revised). Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus.

(4) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 436, 754 pp., illus.

Glossary

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	0 to 2
Low	2 to 4
Moderate	4 to 6
High	more than 6

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.

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

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

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 2 millimeters to 38 centimeters (15 inches) long.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

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

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. 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.

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.

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 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.

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.

Frost action (in tables). Freezing and thawing of soil moisture can damage roads, buildings and other structures, and plant roots.

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

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

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

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

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

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 horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

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

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.

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

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

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

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

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

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

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

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

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

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

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 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.

Low strength. The soil is not strong enough to support loads.

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

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.

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.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

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.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

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 underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

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

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). An otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Unstable fill (in tables). There is a risk of caving or sloughing on banks of fill material.

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

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1962-80 at Pikeville, Tennessee)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average daily	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January	48.9	27.2	38.1	72	-1	30	5.15	3.19	6.91	8	3.8
February	52.4	28.0	40.2	74	2	12	3.89	2.08	5.48	6	2.0
March	63.7	37.1	50.4	83	14	131	6.35	3.93	8.52	9	.2
April	73.8	45.0	59.4	89	24	282	4.64	2.31	6.65	7	.0
May	80.0	53.0	66.5	91	33	512	4.90	2.59	6.93	8	.0
June	85.7	60.5	73.1	95	43	693	3.67	2.30	4.90	7	.0
July	88.3	64.7	76.5	98	51	822	4.59	2.44	6.48	8	.0
August	88.0	63.8	75.9	96	50	803	3.22	1.88	4.41	7	.0
September	82.9	58.4	70.7	95	37	621	4.22	1.87	6.23	6	.0
October	73.7	44.7	59.2	88	25	293	3.10	1.42	4.59	4	.0
November	61.9	36.3	49.1	80	15	83	4.25	2.35	5.92	7	.1
December	52.6	29.7	41.2	74	8	30	4.89	2.19	7.20	7	1.2
Yearly:											
Average	71.0	45.7	58.4	---	---	---	---	---	---	---	---
Extreme	---	---	---	98	-1	---	---	---	---	---	---
Total	---	---	---	---	---	4,312	52.87	46.59	60.34	84	7.3

* 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 1962-80 at Pikeville, 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. 14	Apr. 30	May 29
2 years in 10 later than--	Apr. 4	Apr. 19	May 15
5 years in 10 later than--	Mar. 15	Mar. 27	Apr. 17
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 10	Sept. 26	Sept. 7
2 years in 10 earlier than--	Oct. 24	Oct. 11	Sept. 23
5 years in 10 earlier than--	Nov. 19	Nov. 9	Oct. 23

TABLE 3.--GROWING SEASON

(Recorded in the period 1962-80 at Pikeville, 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	214	190	152
8 years in 10	223	198	160
5 years in 10	239	215	175
2 years in 10	256	233	192
1 year in 10	267	244	202

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
BaB	Barger silt loam, 2 to 6 percent slopes	216	0.1
BaC	Barger silt loam, 6 to 12 percent slopes	1,467	0.6
BeD	Bethesda loam, 8 to 25 percent slopes	116	*
BhE	Bethesda-Pits complex, 20 to 60 percent slopes	594	0.2
BoE	Bouldin and Gilpin cobbly loams, 20 to 60 percent slopes, stony	20,694	8.0
Co	Cobstone cobbly fine sandy loam, rarely flooded	1,431	0.6
Cs	Cobstone cobbly fine sandy loam, rarely flooded, extremely stony	1,374	0.5
EnC	Enders silt loam, 6 to 12 percent slopes	998	0.4
EnD	Enders silt loam, 12 to 20 percent slopes	954	0.4
EnE	Enders silt loam, 20 to 50 percent slopes	2,898	1.1
EtB	Etowah silt loam, 2 to 6 percent slopes	2,552	1.0
EtC	Etowah silt loam, 6 to 12 percent slopes	2,591	1.0
FuB	Fullerton cherty silt loam, 2 to 6 percent slopes	305	0.1
FuC2	Fullerton cherty silt loam, 6 to 12 percent slopes, eroded	773	0.3
FuD2	Fullerton cherty silt loam, 12 to 20 percent slopes, eroded	1,251	0.5
FuE	Fullerton cherty silt loam, 20 to 35 percent slopes	1,089	0.4
GpC	Gilpin shaly silt loam, 6 to 12 percent slopes	2,892	1.1
GpD	Gilpin shaly silt loam, 12 to 20 percent slopes	11,576	4.5
GpE	Gilpin shaly silt loam, 20 to 45 percent slopes	33,962	13.1
Ha	Hamblen loam, occasionally flooded	1,508	0.6
HeB	Hendon silt loam, 2 to 6 percent slopes	652	0.3
HeC	Hendon silt loam, 6 to 10 percent slopes	1,400	0.5
LyB	Lily loam, 2 to 6 percent slopes	21,921	8.5
LyC	Lily loam, 6 to 12 percent slopes	36,388	14.1
LyD	Lily loam, 12 to 20 percent slopes	11,966	4.6
MnC2	Minvale silt loam, 6 to 12 percent slopes, eroded	494	0.2
MnD	Minvale silt loam, 12 to 20 percent slopes	77	*
Mo	Morehead rarely flooded-Bonair occasionally flooded complex	3,868	1.5
Ne	Newark silt loam, frequently flooded	585	0.2
PaD	Pailo very cherty sandy loam, 12 to 20 percent slopes	1,565	0.6
PaE	Pailo very cherty sandy loam, 20 to 50 percent slopes	5,948	2.3
RaC	Ramsey sandy loam, 5 to 15 percent slopes	6,599	2.6
RaE	Ramsey sandy loam, 15 to 35 percent slopes	13,803	5.3
RrE	Ramsey-Rock outcrop complex, 15 to 35 percent slopes	23,575	9.1
Se	Sequatchie loam, rarely flooded	2,718	1.1
Su	Sullivan silt loam, occasionally flooded	3,308	1.3
Sw	Swafford silt loam, rarely flooded	1,752	0.7
TaB	Talbott-Braxton complex, 2 to 6 percent slopes	421	0.2
TaC	Talbott-Braxton complex, 6 to 12 percent slopes	822	0.3
TaD	Talbott-Braxton complex, 12 to 20 percent slopes	1,035	0.4
TrD	Talbott-Braxton-Rock outcrop complex, 6 to 20 percent slopes	4,050	1.6
TrE	Talbott-Braxton-Rock outcrop complex, 20 to 35 percent slopes	7,630	3.0
WaB	Waynesboro loam, 2 to 6 percent slopes	3,744	1.4
WaC	Waynesboro loam, 6 to 12 percent slopes	3,936	1.5
WaC2	Waynesboro loam, 6 to 12 percent slopes, eroded	2,418	0.9
WaD2	Waynesboro loam, 12 to 20 percent slopes, eroded	3,647	1.4
WbD3	Waynesboro clay loam, 12 to 20 percent slopes, severely eroded	3,890	1.5
Wh	Whitwell silt loam, occasionally flooded	1,147	0.4
	Total	258,600	100.0

* Less than 0.05 percent.

TABLE 5.--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	Wheat	Alfalfa hay	Tall fescue
		Bu	Bu	Lbs	Bu	Tons	AUM*
BaB---------- Barger	IIe	80	30	---	42	---	6.5
BaC---------- Barger	IIIe	70	25	---	40	---	6.0
BeD---------- Bethesda	IVs	---	---	---	---	---	4.5
BhE**---------- Bethesda-Pits	VIIs	---	---	---	---	---	---
BoE---------- Bouldin and Gilpin	VIIs	---	---	---	---	---	---
Co---------- Cobstone	VIs	---	---	---	---	---	3.5
Cs---------- Cobstone	VIIs	---	---	---	---	---	---
EnC---------- Enders	IVe	---	---	---	---	---	5.0
EnD---------- Enders	VIe	---	---	---	---	---	4.5
EnE---------- Enders	VIIe	---	---	---	---	---	4.0
EtB---------- Etowah	IIe	120	43	2,900	55	4.5	8.5
EtC---------- Etowah	IIIe	110	40	2,700	52	4.2	8.0
FuB---------- Fullerton	IIe	85	32	2,000	44	3.0	6.5
FuC2---------- Fullerton	IIIe	70	26	1,800	40	2.7	6.0
FuD2---------- Fullerton	IVe	---	---	---	35	2.3	5.5
FuE---------- Fullerton	VIe	---	---	---	---	---	5.0
GpC---------- Gilpin	IIIe	80	28	2,200	40	---	6.0
GpD---------- Gilpin	IVe	70	---	---	36	---	5.5
GpE---------- Gilpin	VIe	---	---	---	---	---	4.0

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Tobacco	Wheat	Alfalfa hay	Tall fescue
		Bu	Bu	Lbs	Bu	Tons	AUM*
Ha Hamblen	IIw	120	40	---	50	---	8.5
HeB Hendon	IIe	110	40	2,800	50	3.8	8.0
HeC Hendon	IIIe	100	36	2,600	47	3.6	7.5
LyB Lily	IIe	105	38	2,700	48	---	7.5
LyC Lily	IIIe	95	34	2,500	45	---	7.0
LyD Lily	IVe	75	---	---	38	---	6.0
MnC2 Minvale	IIIe	80	30	2,200	40	3.0	6.5
MnD Minvale	IVe	70	25	2,000	38	2.8	6.0
Mo Morehead-Bonair	IIIw	85	36	---	---	---	7.0
Ne Newark	IVw	---	30	---	---	---	6.5
PaD Pailo	VIs	---	---	---	---	---	4.0
PaE Pailo	VIIs	---	---	---	---	---	3.0
RaC Ramsey	VIe	---	---	---	---	---	3.5
RaE Ramsey	VIIe	---	---	---	---	---	3.0
RrE** Ramsey-Rock outcrop	VIIs	---	---	---	---	---	---
Se Sequatchie	I	130	45	3,000	55	4.5	8.5
Su Sullivan	IIw	125	43	---	52	4.0	8.5
Sw Swafford	IIw	110	40	2,400	50	3.8	8.0
TaB Talbott-Braxton	IIIe	75	28	2,000	46	---	6.0

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Tobacco	Wheat	Alfalfa hay	Tall fescue
		Bu	Bu	Lbs	Bu	Tons	AUM*
TaC---------- Talbott-Braxton	IVe	65	24	1,800	42	---	5.5
TaD---------- Talbott-Braxton	VIe	---	---	---	---	---	5.0
TrD**---------- Talbott-Braxton-Rock outcrop	VIs	---	---	---	---	---	4.5
TrE**---------- Talbott-Braxton-Rock outcrop	VIIs	---	---	---	---	---	3.5
WaB---------- Waynesboro	IIe	110	40	2,800	55	4.0	8.0
WaC---------- Waynesboro	IIIe	100	36	2,600	52	3.8	7.5
WaC2---------- Waynesboro	IIIe	95	34	2,500	50	3.5	7.0
WaD2---------- Waynesboro	IVe	80	30	2,200	45	3.0	6.0
WbD3---------- Waynesboro	VIe	---	---	---	---	---	5.0
Wh---------- Whitwell	IIw	110	40	---	45	---	7.5

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
BaB, BaC-------- Barger	Slight	Slight	Slight	Moderate	Moderate	Southern red oak---- Shortleaf pine------ Virginia pine------- Eastern redcedar----	70 70 70 50	57 114 114 57	Shortleaf pine, loblolly pine, Virginia pine, southern red oak.
BeD------------- Bethesda	Moderate	Moderate	Moderate	Moderate	Slight		---	---	Loblolly pine, Virginia pine, shortleaf pine, black locust.
BhE**: Bethesda------- Pits.	-------- 	-------- 	-------- 	-------- 	-------- 	Virginia pine------- Loblolly pine------- 	--- ---	--- ---	Loblolly pine, shortleaf pine, Virginia pine, black locust.
BoE**: Bouldin-------- Gilpin--------- 	Moderate Severe	Severe Severe	Slight Slight	Slight Slight	Moderate Moderate	Yellow poplar------- Northern red oak---- Shortleaf pine------ Northern red oak---- Virginia pine------- 	90 75 70 80 65	86 57 86 57 100	Yellow poplar, shortleaf pine, eastern white pine. Virginia pine, eastern white pine, shortleaf pine.
Co-------------- Cobstone	Slight	Slight	Moderate	Slight	Moderate	Southern red oak---- Shortleaf pine------ Virginia pine-------	70 70 70	57 114 114	Loblolly pine, shortleaf pine.
Cs-------------- Cobstone	Slight	Moderate	Moderate	Slight	Moderate	Southern red oak---- Shortleaf pine------ Virginia pine-------	70 70 70	57 114 114	Loblolly pine, shortleaf pine.
EnC, EnD-------- Enders	Slight	Slight	Slight	Slight	Moderate	Southern red oak---- White oak-----------	60 55	43 43	Loblolly pine, shortleaf pine.
EnE------------- Enders	Severe	Severe	Slight	Slight	Moderate	Southern red oak---- White oak----------- Eastern redcedar---- Shortleaf pine------	50 50 35 50	29 29 --- 72	Loblolly pine, shortleaf pine, eastern redcedar.
EtB, EtC-------- Etowah	Slight	Slight	Slight	Slight	Severe	Yellow poplar------- Southern red oak---- Loblolly pine------- Shortleaf pine------	90 80 90 80	86 57 129 129	Yellow poplar, loblolly pine, black walnut.

See footnotes at end of table.

TABLE 6.--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
FuB, FuC2---- Fullerton	Slight	Slight	Slight	Slight	Moderate	Yellow poplar Southern red oak Shortleaf pine	90 70 67	86 57 100	Yellow poplar, loblolly pine.
FuD2, FuE---- Fullerton	Moderate	Moderate	Slight	Slight	Moderate	Yellow poplar Southern red oak Shortleaf pine	90 70 67	86 57 100	Yellow poplar, loblolly pine.
GpC---------- Gilpin	Slight	Slight	Slight	Slight	Moderate	Northern red oak Virginia pine	80 65	57 100	Shortleaf pine, Virginia pine, eastern white pine.
GpD, GpE---- Gilpin	Moderate	Moderate	Slight	Slight	Moderate	Northern red oak Virginia pine	80 65	57 100	Shortleaf pine, Virginia pine, eastern white pine.
Ha---------- Hamblen	Slight	Slight	Moderate	Slight	Severe	Yellow poplar Northern red oak Loblolly pine	100 80 90	114 57 129	Loblolly pine, yellow poplar.
HeB, HeC---- Hendon	Slight	Slight	Slight	Slight	Severe	Southern red oak Shortleaf pine Virginia pine Loblolly pine White oak	70 70 70 80 70	57 114 114 114 57	Loblolly pine, shortleaf pine, Virginia pine, eastern white pine.
LyB, LyC---- Lily	Slight	Slight	Slight	Slight	Moderate	Shortleaf pine Virginia pine Black oak White oak Chestnut oak Yellow poplar Northern red oak Scarlet oak	63 80 78 73 73 95 78 77	100 114 --- 57 --- --- --- 43	Shortleaf pine, eastern white pine, loblolly pine, Virginia pine.
LyD---------- Lily	Moderate	Moderate	Slight	Slight	Moderate	Shortleaf pine Virginia pine Black oak White oak Chestnut oak Yellow poplar Northern red oak Scarlet oak	63 80 78 73 73 95 78 77	100 114 --- 57 --- --- --- 43	Shortleaf pine, eastern white pine, loblolly pine, Virginia pine.
MnC2---------- Minvale	Slight	Slight	Slight	Slight	Moderate	Yellow poplar White oak Shortleaf pine Loblolly pine Virginia pine	90 70 70 80 70	86 57 114 114 114	Yellow poplar, black walnut, loblolly pine.
MnD---------- Minvale	Moderate	Moderate	Slight	Slight	Moderate	Yellow poplar White oak Shortleaf pine Loblolly pine Virginia pine	90 70 70 80 70	86 57 114 114 114	Yellow poplar, black walnut, loblolly pine.

See footnotes at end of table.

TABLE 6.--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
Mo**:									
Morehead	Slight	Slight	Slight	Slight	Severe	Shortleaf pine	84	143	Shortleaf pine, yellow poplar, sweetgum, eastern white pine, loblolly pine.
						Yellow poplar	82	72	
						White oak	---	---	
						Northern red oak	---	---	
						Red maple	---	---	
Bonair	Slight	Moderate	Moderate	Slight	Severe	Loblolly pine	90	129	Loblolly pine, willow oak, sweetgum.
						Willow oak	90	86	
						Sweetgum	90	100	
Ne Newark	Slight	Moderate	Moderate	Moderate	Severe	Pin oak	96	72	Eastern cottonwood, sweetgum, American sycamore.
						Eastern cottonwood	89	100	
						Sweetgum	85	86	
						Green ash	---	---	
						Cherrybark oak	---	---	
PaD Pailo	Slight	Moderate	Moderate	Slight	Moderate	Shortleaf pine	60	86	Shortleaf pine, Virginia pine, loblolly pine.
						Scarlet oak	65	43	
						Chestnut oak	65	43	
						Virginia pine	60	86	
PaE Pailo	Moderate	Severe	Moderate	Slight	Moderate	Shortleaf pine	60	86	Shortleaf pine, Virginia pine, loblolly pine.
						Scarlet oak	65	43	
						Chestnut oak	65	43	
						Virginia pine	60	86	
RaC Ramsey	Slight	Slight	Moderate	Severe	Slight	Northern red oak	60	43	Eastern white pine, shortleaf pine, Virginia pine, loblolly pine.
						Shortleaf pine	59	86	
						Virginia pine	60	86	
RaE Ramsey	Moderate	Moderate	Moderate	Severe	Slight	Northern red oak	60	43	Eastern white pine, shortleaf pine, Virginia pine, loblolly pine.
						Shortleaf pine	59	86	
						Virginia pine	60	86	
RrE**:									
Ramsey	Moderate	Moderate	Moderate	Severe	Slight	Northern red oak	60	43	Eastern white pine, shortleaf pine, Virginia pine, loblolly pine.
						Shortleaf pine	59	86	
						Virginia pine	60	86	
Rock outcrop.									
Se Sequatchie	Slight	Slight	Slight	Slight	Moderate	Yellow poplar	100	114	Yellow poplar, black walnut, loblolly pine.
						White oak	80	57	
						Loblolly pine	90	129	
Su Sullivan	Slight	Slight	Moderate	Slight	Severe	Yellow poplar	100	114	Yellow poplar, black walnut, loblolly pine.
						Northern red oak	70	57	
						Shortleaf pine	70	114	
						Virginia pine	70	114	

See footnotes at end of table.

TABLE 6.--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
Sw---------- Swafford	Slight	Slight	Slight	Slight	Moderate	Yellow poplar-------	95	100	Yellow poplar,
						Northern red oak----	75	57	loblolly pine,
						Sweetgum----------	90	100	sweetgum.
TaB**, TaC**:									
Talbott--------	Slight	Slight	Slight	Slight	Moderate	Northern red oak----	65	43	Loblolly pine,
						Loblolly pine-------	80	114	shortleaf
						Shortleaf pine------	64	100	pine, Virginia
						Eastern redcedar----	46	57	pine, eastern
									redcedar.
Braxton--------	Slight	Slight	Slight	Slight	Moderate	Northern red oak----	70	57	Loblolly pine,
						Eastern redcedar----	50	57	eastern
						Loblolly pine-------	80	114	redcedar,
									shortleaf
									pine.
TaD**:									
Talbott--------	Moderate	Moderate	Slight	Slight	Moderate	Northern red oak----	65	43	Loblolly pine,
						Loblolly pine-------	80	114	shortleaf
						Shortleaf pine------	64	100	pine, Virginia
						Eastern redcedar----	46	57	pine, eastern
									redcedar.
Braxton--------	Moderate	Moderate	Slight	Slight	Moderate	Northern red oak----	70	57	Loblolly pine,
						Eastern redcedar----	50	57	eastern
						Loblolly pine-------	80	114	redcedar,
									shortleaf
									pine.
TrD**:									
Talbott--------	Slight	Slight	Slight	Slight	Moderate	Northern red oak----	65	43	Loblolly pine,
						Loblolly pine-------	80	114	shortleaf
						Shortleaf pine------	64	100	pine, Virginia
						Eastern redcedar----	46	57	pine, eastern
									redcedar.
Braxton--------	Slight	Slight	Slight	Slight	Moderate	Northern red oak----	70	57	Loblolly pine,
						Eastern redcedar----	50	57	eastern
						Loblolly pine-------	80	114	redcedar,
									shortleaf
									pine.
Rock outcrop.									
TrE**:									
Talbott--------	Moderate	Moderate	Slight	Slight	Moderate	Northern red oak----	65	43	Loblolly pine,
						Loblolly pine-------	80	114	shortleaf
						Shortleaf pine------	64	100	pine, Virginia
						Eastern redcedar----	46	57	pine, eastern
									redcedar.
Braxton--------	Moderate	Moderate	Slight	Slight	Moderate	Northern red oak----	70	57	Loblolly pine,
						Eastern redcedar----	50	57	eastern
						Loblolly pine-------	80	114	redcedar,
									shortleaf
									pine.
Rock outcrop.									

See footnotes at end of table.

TABLE 6.--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
WaB, WaC, WaC2--Waynesboro	Slight	Slight	Slight	Slight	Moderate	Yellow poplar White oak Southern red oak Loblolly pine	90 70 70 80	86 57 57 114	Yellow poplar, loblolly pine, shortleaf pine, black walnut.
WaD2--Waynesboro	Moderate	Moderate	Slight	Slight	Moderate	Yellow poplar White oak Southern red oak Loblolly pine	90 70 70 80	86 57 57 114	Yellow poplar, loblolly pine, shortleaf pine.
WbD3--Waynesboro	Moderate	Moderate	Moderate	Slight	Moderate	Yellow poplar White oak Southern red oak Loblolly pine	90 70 70 80	86 57 57 114	Yellow poplar, loblolly pine, shortleaf pine.
Wh--Whitwell	Slight	Slight	Moderate	Slight	Severe	Yellow poplar Northern red oak Sweetgum Loblolly pine Eastern white pine	95 75 90 90 90	100 57 100 129 172	Loblolly pine, eastern white pine, sweetgum.

* Productivity class is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
BaB Barger	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Slight	Slight.
BaC Barger	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Slight	Moderate: slope.
BeD Bethesda	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
BhE*: Bethesda	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: droughty, slope.
Pits.					
BoE*: Bouldin	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Gilpin	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: small stones, large stones, slope.
Co, Cs Cobstone	Severe: flooding, large stones.	Severe: large stones.	Severe: large stones, small stones.	Moderate: large stones.	Severe: large stones.
EnC Enders	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: slope.
EnD Enders	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Severe: slope.
EnE Enders	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, erodes easily.	Severe: slope.
EtB Etowah	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
EtC Etowah	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
FuB Fullerton	Severe: small stones.	Severe: small stones.	Severe: small stones.	Slight	Severe: small stones.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
FuC2 Fullerton	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight	Severe: small stones.
FuD2 Fullerton	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.	Severe: small stones, slope.
FuE Fullerton	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, slope.
GpC Gilpin	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: small stones, slope.	Slight	Moderate: slope, small stones.
GpD Gilpin	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Moderate: slope.	Severe: slope.
GpE Gilpin	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.	Severe: slope.
Ha Hamblen	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Slight	Moderate: flooding.
HeB Hendon	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
HeC Hendon	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
LyB Lily	Slight	Slight	Moderate: slope, depth to rock.	Slight	Moderate: depth to rock.
LyC Lily	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, depth to rock.
LyD Lily	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
MnC2 Minvale	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
MnD Minvale	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Mo*: Morehead	Severe: flooding.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Bonair	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ne Newark	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
PaD Pailo	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.	Severe: small stones, slope.
PaE Pailo	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, slope.
RaC Ramsey	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight	Severe: depth to rock.
RaE Ramsey	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
RrE*: Ramsey	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
Rock outcrop.					
Se Sequatchie	Severe: flooding.	Slight	Slight	Slight	Slight.
Su Sullivan	Severe: flooding.	Slight	Moderate: small stones, flooding.	Slight	Moderate: flooding.
Sw Swafford	Severe: flooding.	Moderate: wetness, percs slowly.	Moderate: small stones, wetness.	Slight	Slight.
TaB*: Talbott	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Moderate: depth to rock.
Braxton	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight	Slight.
TaC*: Talbott	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope, depth to rock.
Braxton	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
TaD*: Talbott	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
TaD*:					
Braxton	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
TrD*:					
Talbott	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope, depth to rock.
Braxton	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
Rock outcrop.					
TrE*:					
Talbott	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Braxton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
WaB Waynesboro	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
WaC, WaC2 Waynesboro	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
WaD2, WbD3 Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Wh Whitwell	Severe: flooding.	Moderate: wetness.	Moderate: small stones, wetness.	Slight	Moderate: flooding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
BaB---- Barger	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BaC---- Barger	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BeD---- Bethesda	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
BhE*:										
Bethesda----	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Pits.										
BoE*:										
Bouldin----	Very poor.	Very poor.	Fair	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Gilpin----	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Co---- Cobstone	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Cs---- Cobstone	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
EnC---- Enders	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
EnD---- Enders	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
EnE---- Enders	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
EtB---- Etowah	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EtC---- Etowah	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FuB---- Fullerton	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FuC2---- Fullerton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FuD2---- Fullerton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
FuE---- Fullerton	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
GpC---- Gilpin	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
GpD---- Gilpin	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
GpE---- Gilpin	Very poor.	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Ha---- Hamblen	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
HeB---- Hendon	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HeC---- Hendon	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LyB---- Lily	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LyC---- Lily	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LyD---- Lily	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
MnC2---- Minvale	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MnD---- Minvale	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Mo*:										
Morehead----	Good	Good	Good	Good	---	Fair	Poor	Good	Good	Poor.
Bonair----	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
Ne---- Newark	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
PaD---- Pailo	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
PaE---- Pailo	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
RaC, RaE---- Ramsey	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.
RrE*:										
Ramsey----	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Rock outcrop.										
Se---- Sequatchie	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Su---------- Sullivan	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Sw---------- Swafford	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
TaB*:										
Talbott----------	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Braxton----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
TaC*:										
Talbott----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Braxton----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
TaD*:										
Talbott----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Braxton----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
TrD*:										
Talbott----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Braxton----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Rock outcrop.										
TrE*:										
Talbott----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Braxton----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rock outcrop.										
WaB---------- Waynesboro	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WaC, WaC2---------- Waynesboro	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WaD2, WbD3--------- Waynesboro	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Wh---------- Whitwell	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
BaB---------- Barger	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness.	Slight.
BaC---------- Barger	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope.	Moderate: slope.
BeD---------- Bethesda	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope.
BhE*: Bethesda----------	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: droughty, slope.
Pits.						
BoE*: Bouldin----------	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope.
Gilpin----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, large stones, slope.
Co, Cs---------- Cobstone	Moderate: large stones.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, large stones.	Severe: large stones.
EnC---------- Enders	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.
EnD, EnE---------- Enders	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.	Severe: slope.
EtB---------- Etowah	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Moderate: low strength.	Slight.
EtC---------- Etowah	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
FuB---------- Fullerton	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, low strength.	Severe: small stones.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
FuC2--Fullerton	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, low strength, slope.	Severe: small stones.
FuD2, FuE--Fullerton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
GpC--Gilpin	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, small stones.
GpD, GpE--Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ha--Hamblen	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
HeB--Hendon	Slight	Slight	Slight	Moderate: slope.	Slight	Slight.
HeC--Hendon	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
LyB--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.
LyC--Lily	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.	Moderate: slope, depth to rock.
LyD--Lily	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
MnC2--Minvale	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
MnD--Minvale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Mo*:						
Morehead	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength.	Moderate: wetness.
Bonair	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
Ne--Newark	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
PaD, PaE---------- Pailo	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
RaC---------- 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.
RaE---------- 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.
RrE*: 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.
Rock outcrop.						
Se---------- Sequatchie	Slight---------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
Su---------- Sullivan	Moderate: flooding, wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Sw---------- Swafford	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: low strength, wetness, flooding.	Slight.
TaB*: Talbott----------	Severe: depth to rock.	Moderate: shrink-swell, depth to rock.	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: low strength.	Moderate: depth to rock.
Braxton----------	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
TaC*: Talbott----------	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Severe: low strength.	Moderate: slope, depth to rock.
Braxton----------	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
TaD*: Talbott----------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Braxton----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
TrD*:						
Talbott	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Severe: low strength.	Moderate: slope, depth to rock.
Braxton	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
Rock outcrop.						
TrE*:						
Talbott	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Braxton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Rock outcrop.						
WaB--Waynesboro	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
WaC, WaC2--Waynesboro	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
WaD2, WbD3--Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wh--Whitwell	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: flooding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "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
BaB Barger	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Moderate: wetness.	Moderate: wetness.	Poor: small stones.
BaC Barger	Severe: wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness, slope.	Poor: small stones.
BeD Bethesda	Severe: percs slowly, slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Poor: small stones, slope.
BhE*: Bethesda	Severe: percs slowly, slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Poor: small stones, slope.
Pits.					
BoE*: Bouldin	Severe: slope, slippage.	Severe: seepage, slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: large stones, slope.
Gilpin	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.
Co, Cs Cobstone	Moderate: flooding, large stones.	Severe: seepage, large stones.	Severe: seepage, large stones.	Severe: seepage.	Poor: small stones.
EnC Enders	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
EnD, EnE Enders	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
EtB Etowah	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Poor: thin layer.
EtC Etowah	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Poor: thin layer.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
FuB---------- Fullerton	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Poor: small stones.
FuC2---------- Fullerton	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Poor: small stones.
FuD2, FuE---------- Fullerton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
GpC---------- Gilpin	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
GpD, GpE---------- Gilpin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Poor: slope, area reclaim, thin layer.
Ha---------- Hamblen	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
HeB---------- Hendon	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey.
HeC---------- Hendon	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
LyB---------- Lily	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock.
LyC---------- Lily	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock.
LyD---------- Lily	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.
MnC2---------- Minvale	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, small stones.
MnD---------- Minvale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Mo*: Morehead----------	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Fair: wetness.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Mo*:					
Bonair	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, depth to rock, wetness.	Severe: flooding, wetness.	Poor: wetness.
Ne Newark	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
PaD, PaE Pailo	Severe: percs slowly, slope.	Severe: seepage, slope.	Severe: slope, too clayey.	Severe: seepage, slope.	Poor: small stones, slope.
RaC 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.
RaE 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.
RrE*:					
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.
Rock outcrop.					
Se Sequatchie	Moderate: flooding.	Severe: flooding.	Moderate: flooding, too clayey.	Severe: seepage.	Good.
Su Sullivan	Severe: flooding.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Good.
Sw Swafford	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: flooding, wetness, too clayey.	Moderate: flooding, wetness.	Fair: too clayey, wetness.
TaB*:					
Talbott	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
Braxton	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
TaC*:					
Talbott	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.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
TaC*:					
Braxton	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
TaD*:					
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.
Braxton	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
TrD*:					
Talbott	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.
Braxton	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
Rock outcrop.					
TrE*:					
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.
Braxton	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Rock outcrop.					
WaB Waynesboro	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
WaC, WaC2 Waynesboro	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
WaD2, WbD3 Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Wh Whitwell	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
BaB, BaC---------- Barger	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
BeD---------- Bethesda	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
BhE*: Bethesda----------	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Pits.				
BoE*: Bouldin----------	Poor: slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Gilpin----------	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Co, Cs---------- Cobstone	Fair: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, area reclaim, large stones.
EnC---------- Enders	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
EnD---------- Enders	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
EnE---------- Enders	Poor: low strength, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
EtB---------- Etowah	Fair: low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
EtC---------- Etowah	Fair: low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
FuB, FuC2---------- Fullerton	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
FuD2---------- Fullerton	Fair: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
FuE---------- Fullerton	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
GpC---------- Gilpin	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
GpD---------- Gilpin	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
GpE---------- Gilpin	Poor: thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Ha---------- Hamblen	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
HeB---------- Hendon	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
HeC---------- Hendon	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
LyB, LyC---------- Lily	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
LyD---------- Lily	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
MnC2---------- Minvale	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
MnD---------- Minvale	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Mo*:				
Morehead----------	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Bonair----------	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Ne Newark	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
PaD Pailo	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
PaE Pailo	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
RaC Ramsey	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
RaE Ramsey	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
RrE*: Ramsey	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Rock outcrop.				
Se Sequatchie	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
Su Sullivan	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Sw Swafford	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
TaB*, TaC*: Talbott	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Braxton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
TaD*: Talbott	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Braxton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
TrD*: Talbott	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
TrD*:				
Braxton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Rock outcrop.				
TrE*:				
Talbott	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Braxton	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Rock outcrop.				
WaB, WaC, WaC2 Waynesboro	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
WaD2, WbD3 Waynesboro	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Wh Whitwell	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "moderate" and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
BaB---------- Barger	Moderate: seepage, slope.	Moderate: seepage, piping, wetness.	Percs slowly, slope.	Slope, wetness, droughty.	Erodes easily, wetness.	Erodes easily, droughty.
BaC---------- Barger	Severe: slope.	Moderate: seepage, piping, wetness.	Percs slowly, slope.	Slope, wetness, droughty.	Slope, erodes easily, wetness.	Slope, erodes easily, droughty.
BeD---------- Bethesda	Severe: slope.	Severe: seepage, piping.	Deep to water	Droughty, rooting depth, slope.	Slope, large stones, erodes easily.	Large stones, slope, erodes easily.
BhE*: Bethesda----------	Severe: slope.	Severe: seepage, piping.	Deep to water	Slope, large stones, droughty.	Slope, large stones, slippage.	Large stones, slope, droughty.
Pits.						
BoE*: Bouldin----------	Severe: seepage, slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
Gilpin----------	Severe: slope.	Severe: piping.	Deep to water	Slope, large stones, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Co, Cs---------- Cobstone	Severe: seepage.	Severe: seepage, large stones.	Deep to water	Large stones, droughty.	Large stones---	Large stones, droughty.
EnC, EnD---------- Enders	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Percs slowly, slope, erodes easily.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
EnE---------- Enders	Severe: slope.	Severe: hard to pack.	Deep to water	Percs slowly, slope, erodes easily.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
EtB---------- Etowah	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
EtC---------- Etowah	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
FuB---------- Fullerton	Moderate: seepage, slope.	Severe: piping, hard to pack.	Deep to water	Slope----------	Large stones---	Large stones.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
FuC2, FuD2, FuE--- Fullerton	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope----------	Slope, large stones.	Large stones, slope.
GpC, GpD, GpE----- Gilpin	Severe: slope.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock, large stones.	Slope, depth to rock, large stones.
Ha---------- Hamblen	Moderate: seepage.	Severe: piping.	Flooding-------	Wetness, flooding.	Wetness--------	Favorable.
HeB---------- Hendon	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
HeC---------- Hendon	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
LyB---------- Lily	Severe: seepage.	Severe: piping.	Deep to water	Depth to rock, slope.	Depth to rock	Depth to rock.
LyC, LyD---------- Lily	Severe: seepage.	Severe: piping.	Deep to water	Depth to rock, slope.	Slope, depth to rock.	Slope, depth to rock.
MnC2, MnD--------- Minvale	Moderate: seepage.	Severe: piping.	Deep to water	Slope----------	Slope----------	Slope.
Mo*: Morehead---------	Moderate: seepage.	Severe: piping.	Favorable------	Erodes easily	Erodes easily, wetness.	Erodes easily.
Bonair-----------	Moderate: seepage, depth to rock.	Severe: piping, wetness.	Flooding-------	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
Ne---------- Newark	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action.	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
PaD, PaE---------- Pailo	Severe: seepage, slope.	Severe: hard to pack.	Deep to water	Slope, droughty.	Slope, large stones.	Large stones, slope, droughty.
RaC, RaE---------- Ramsey	Severe: depth to rock, slope.	Severe: piping.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope, droughty, depth to rock.
RrE*: Ramsey---------- Rock outcrop.	Severe: depth to rock, slope.	Severe: piping.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope, droughty, depth to rock.
Se---------- Sequatchie	Severe: seepage.	Severe: piping.	Deep to water	Favorable------	Favorable------	Favorable.
Su---------- Sullivan	Moderate: seepage.	Severe: piping.	Deep to water	Flooding-------	Favorable------	Favorable.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Sw---------- Swafford	Moderate: seepage.	Severe: piping.	Favorable------	Wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
TaB*: Talbott----------	Moderate: depth to rock, slope.	Severe: hard to pack.	Deep to water	Depth to rock, slope.	Depth to rock, erodes easily.	Erodes easily, depth to rock.
Braxton----------	Moderate: slope.	Severe: hard to pack.	Deep to water	Slope----------	Favorable------	Favorable.
TaC*, TaD*: Talbott----------	Severe: slope.	Severe: hard to pack.	Deep to water	Depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Braxton----------	Severe: slope.	Severe: hard to pack.	Deep to water	Slope----------	Slope----------	Slope.
TrD*, TrE*: Talbott----------	Severe: slope.	Severe: hard to pack.	Deep to water	Depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Braxton----------	Severe: slope.	Severe: hard to pack.	Deep to water	Slope----------	Slope----------	Slope.
Rock outcrop.						
WaB---------- Waynesboro	Moderate: seepage, slope.	Severe: piping, hard to pack.	Deep to water	Slope----------	Favorable------	Favorable.
WaC, WaC2, WaD2, WbD3---------- Waynesboro	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope----------	Slope----------	Slope.
Wh---------- Whitwell	Moderate: seepage.	Severe: piping.	Flooding-------	Wetness, flooding.	Wetness--------	Favorable.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
BaB, BaC--------- Barger	0-7	Silt loam---------	ML, CL-ML	A-4	0	80-95	75-90	65-85	50-75	20-35	1-10
	7-21	Loam, silt loam	ML, CL, CL-ML	A-4, A-6	0	80-95	75-90	70-90	55-80	25-40	3-15
	21-31	Very cherty loam, very cherty clay loam.	GM, GC, ML, CL	A-4, A-6, A-2	0-5	50-75	40-65	35-55	30-55	25-40	3-15
	31-63	Very cherty loam, very cherty clay loam.	GM, GC	A-4, A-6, A-2, A-1	2-10	35-65	25-55	25-50	20-45	25-40	3-15
BeD-------------- Bethesda	0-10	Loam-------------	ML, CL, CL-ML	A-4, A-6	0-5	85-100	80-100	70-100	51-90	25-40	4-14
	10-60	Extremely shaly clay loam, extremely shaly silty clay loam.	GM, GC, ML, CL	A-4, A-6, A-7, A-2	10-30	40-80	25-65	20-65	18-60	24-50	3-23
BhE*: Bethesda-------- Pits.	0-3	Very shaly silt loam.	ML, GM, GM-GC, CL-ML	A-4, A-6	0-15	65-90	55-80	50-80	35-75	25-40	4-14
	3-72	Extremely shaly clay loam, extremely shaly silty clay loam.	GM, GC, ML, CL	A-4, A-6, A-7, A-2	10-30	40-80	25-65	20-65	18-60	24-50	3-23
BoE*: Bouldin--------- Gilpin----------	0-12	Cobbly loam------	SM, ML, SM-SC, GM	A-2, A-4	10-30	65-85	55-85	40-65	30-55	15-25	2-7
	12-70	Very cobbly loam, stony sandy clay 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
	0-6	Cobbly loam------	GC, CL, SC, CL-ML	A-2, A-4, A-6	10-40	50-90	45-85	35-75	30-70	20-40	4-15
	6-22	Shaly silty clay loam, channery loam, silty clay loam.	GM-GC, CL, CL-ML, SC	A-2, A-4, A-5	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	22-30	Channery loam, very channery silt loam, very shaly silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-5	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
Co---------- Cobstone	0-5	Cobbly fine sandy loam.	SM, SM-SC	A-4, A-2	20-35	75-85	65-80	50-70	30-50	<25	NP-6
	5-34	Very cobbly loam, extremely cobbly sandy clay loam, very cobbly sandy loam.	GM-GC, SM-SC, SM, GM	A-4, A-2	35-50	55-85	40-80	35-70	25-55	18-30	3-10
	34-63	Extremely cobbly loam, extremely cobbly fine sandy loam, very cobbly sandy loam.	SM, SM-SC, GM, GM-GC	A-4, A-2, A-1	40-55	50-75	35-70	25-60	15-45	<25	NP-6
Cs---------- Cobstone	0-5	Cobbly fine sandy loam.	SM, SM-SC	A-4, A-2	20-35	75-85	65-80	50-70	30-50	<25	NP-6
	5-34	Very cobbly loam, extremely cobbly sandy clay loam, very cobbly sandy loam.	GM-GC, SM-SC, SM, GM	A-4, A-2	35-50	55-85	40-80	35-70	25-55	18-30	3-10
	34-60	Extremely cobbly loam, extremely cobbly fine sandy loam, very cobbly sandy loam.	SM, SM-SC, GM, GM-GC	A-4, A-2, A-1	40-55	50-75	35-70	25-60	15-45	<25	NP-6
EnC, EnD, EnE---- Enders	0-4	Silt loam--------	ML, SM, SM-SC, CL-ML	A-4	0	80-100	80-97	75-90	40-85	20-35	2-10
	4-15	Clay loam, silty clay loam, loam.	CL	A-6	0	80-100	80-100	80-100	75-95	30-40	11-17
	15-44	Silty clay, clay	CH	A-7	0	95-100	85-100	85-100	70-95	65-80	35-45
	44-48	Silty clay, shaly silty clay loam.	CH	A-7	0	95-100	90-100	85-100	70-95	65-80	35-45
	48-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---
EtB, EtC---------- Etowah	0-9	Silt loam--------	ML, CL, SM-SC, CL-ML	A-4	0	80-100	75-100	70-95	45-70	20-30	3-10
	9-46	Silty clay loam, clay loam, silt loam.	CL	A-6	0	80-100	75-100	70-95	65-85	25-35	10-15
	46-63	Silty clay loam, clay loam, clay.	CL, ML, MH	A-6, A-7	0	80-100	75-100	70-95	65-85	39-60	15-25
FuB, FuC2, FuD2, FuE---------- Fullerton	0-5	Cherty silt loam	GM-GC, CL-ML, CL, GC	A-2, A-4	2-15	60-94	45-80	40-75	30-70	18-30	3-10
	5-12	Cherty silty clay loam, cherty silt loam.	CL, GC, SC, ML	A-2, A-4, A-6, A-7	2-18	60-90	45-80	40-75	30-70	29-42	8-17
	12-65	Cherty clay, cherty silty clay.	MH, ML, GM, SM	A-2, A-7	2-18	60-90	45-80	40-75	30-75	48-78	20-42

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
GpC, GpD, GpE---- Gilpin	0-6	Shaly silt loam	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-90	45-85	35-75	30-70	20-40	4-15
	6-22	Shaly silt loam, shaly 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
	22-29	Very shaly silt loam, very shaly silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-6	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	29-40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Ha---------- Hamblen	0-6	Loam----------	CL, CL-ML, ML	A-4, A-6	0-2	90-100	80-100	65-95	55-85	22-38	3-14
	6-45	Silt loam, loam, clay loam.	CL, CL-ML, ML	A-4, A-6	0-2	80-100	75-100	60-95	55-85	22-40	3-17
	45-60	Silt loam, loam, clay loam.	CL, CL-ML, ML, GC	A-4, A-6, A-2	0-5	55-100	45-95	35-90	30-80	22-40	3-17
HeB, HeC--------- Hendon	0-10	Silt loam--------	ML, CL-ML, CL	A-4	0	100	90-100	85-100	75-90	18-30	1-9
	10-25	Silt loam, loam, clay loam.	ML, CL-ML, CL	A-4, A-6	0	100	90-100	80-100	65-85	20-35	3-12
	25-44	Loam, clay loam	CL	A-4, A-6	0	95-100	85-100	75-100	60-85	25-38	7-15
	44-65	Loam, clay loam	CL	A-4, A-6	0	95-100	85-100	75-100	60-85	25-40	7-16
LyB---------- Lily	0-8	Loam----------	ML, CL-ML	A-4	0-5	90-100	85-100	70-95	55-80	<35	NP-10
	8-35	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
	35	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
LyC, LyD--------- Lily	0-7	Loam----------	ML, CL-ML	A-4	0-5	90-100	85-100	70-95	55-80	<35	NP-10
	7-30	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
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
MnC2, MnD-------- Minvale	0-7	Silt loam--------	ML, CL, CL-ML	A-4	0-5	75-95	75-90	65-85	55-75	<30	NP-10
	7-48	Cherty silty clay loam, cherty silt loam, cherty loam.	CL, CL-ML, GC, GM-GC	A-4, A-6	0-5	50-75	50-75	40-70	36-65	20-40	5-15
	48-62	Cherty silty clay loam, cherty silty clay, cherty clay.	CL, ML, GC, SC	A-4, A-6, A-7	0-5	55-80	50-75	40-70	36-65	25-50	7-23
Mo*:											
Morehead--------	0-11	Silt loam--------	ML	A-4	0	95-100	95-100	90-100	80-100	25-35	2-10
	11-44	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	75-100	25-40	5-20
	44-65	Silt loam, loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	90-100	85-100	70-100	60-95	20-40	2-20
Bonair----------	0-7	Silt loam--------	ML, CL-ML, CL	A-4	0	95-100	90-100	70-95	55-85	16-25	2-8
	7-60	Silt loam, loam, fine sandy loam.	CL-ML, CL	A-4, A-6	0	95-100	90-100	70-95	55-80	20-32	5-12

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
Ne Newark	0-5	Silt loam	ML, CL, CL-ML	A-4	0	95-100	90-100	80-100	55-95	<32	NP-10
	5-27	Silt loam, loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	95-100	90-100	85-100	70-100	22-42	3-20
	27-67	Silt loam, silty clay loam, loam, clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-3	75-100	70-100	65-100	55-95	22-42	3-20
PaD, PaE Pailo	0-12	Very cherty sandy loam.	GM, SM	A-1-b, A-2, A-4	5-10	50-75	45-65	25-55	15-40	<30	NP-6
	12-34	Extremely cherty loam, very cherty clay loam, very cherty sandy clay loam.	GM, GM-GC, GC, SM	A-1-b, A-2, A-4, A-6	5-25	30-65	25-55	20-45	15-40	20-35	3-12
	34-38	Sandy clay loam, clay loam, sandy clay.	CL, ML, SC, SM	A-6, A-7	0-3	85-100	80-95	60-90	36-75	35-45	12-20
	38-72	Clay	CH, MH	A-7	0-3	85-100	80-95	75-95	65-90	51-75	25-40
RaC, RaE Ramsey	0-5	Sandy loam	SM, CL-ML, ML, SM-SC	A-4, A-2	0-10	85-100	75-95	60-75	30-70	<25	NP-7
	5-17	Loam, sandy loam, fine 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
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
RrE*: Ramsey	0-5	Sandy loam	SM, CL-ML, ML, SM-SC	A-4, A-2	0-10	85-100	75-95	60-75	30-70	<25	NP-7
	5-17	Loam, sandy loam, fine 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
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
Se Sequatchie	0-12	Loam	ML, CL-ML, CL, SM	A-2, A-4	0-10	85-100	75-100	65-95	30-70	15-27	2-10
	12-39	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
	39-68	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
Su Sullivan	0-65	Silt loam, loam	ML, CL, CL-ML, SM	A-4	0	80-100	75-100	60-100	36-90	20-31	3-10
Sw Swafford	0-8	Silt loam	ML, CL-ML, CL	A-4	0	90-100	85-100	75-100	55-85	20-35	2-10
	8-24	Loam, clay loam, silt loam.	CL, ML, CL-ML	A-4, A-6	0	90-100	85-100	75-95	51-80	25-40	6-16
	24-44	Loam, clay loam, silt loam.	CL, ML, CL-ML	A-4, A-6	0	90-100	85-100	75-95	51-80	25-40	6-16
	44-65	Loam, clay loam, silt loam.	CL, ML, CL-ML	A-4, A-6	0	90-100	85-100	75-95	51-80	25-40	6-16

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
TaB*, TaC*, TaD*:											
Talbott	0-6	Silt loam	CL, ML	A-4, A-6	0-5	95-100	90-100	85-95	75-95	25-40	8-16
	6-32	Clay, silty clay	CL, MH, CH	A-7	0-10	95-100	90-100	85-95	80-95	41-80	20-45
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Braxton	0-8	Silt loam	CL-ML, CL	A-4, A-6	0	80-100	75-100	70-90	65-85	25-40	7-18
	8-23	Clay, silty clay	CL, MH, CH	A-7	0	80-100	75-100	65-95	60-90	45-62	20-32
	23-65	Clay	CL, CH, MH	A-7	0	80-100	75-100	65-95	60-90	45-65	22-34
TrD*, TrE*:											
Talbott	0-6	Silt loam	CL, ML	A-4, A-6	0-5	95-100	90-100	85-95	75-95	25-40	8-16
	6-32	Clay, silty clay	CL, MH, CH	A-7	0-10	95-100	90-100	85-95	80-95	41-80	20-45
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Braxton	0-8	Silt loam	CL-ML, CL	A-4, A-6	0	80-100	75-100	70-90	65-85	25-40	7-18
	8-23	Clay, silty clay	CL, MH, CH	A-7	0	80-100	75-100	65-95	60-90	45-62	20-32
	23-65	Clay	CL, CH, MH	A-7	0	80-100	75-100	65-95	60-90	45-65	22-34
Rock outcrop.											
WaB, WaC	0-8	Loam	ML, CL-ML, CL, SM	A-4	0-5	85-100	80-100	70-95	43-70	18-30	2-9
Waynesboro	8-12	Clay loam, loam, sandy clay loam.	CL, ML, SC	A-4, A-6, A-7	0-5	90-100	85-100	75-95	45-75	30-41	9-17
	12-65	Clay loam, sandy clay, clay.	MH, CL, ML	A-4, A-6, A-7	0-5	90-100	80-100	70-98	55-75	35-68	9-32
WaC2, WaD2	0-5	Loam	ML, CL-ML, CL, SM	A-4	0-5	85-100	80-100	70-95	43-70	18-30	2-9
Waynesboro	5-9	Clay loam, loam, sandy clay loam.	CL, ML, SC	A-4, A-6, A-7	0-5	90-100	85-100	75-95	45-75	30-41	9-17
	9-65	Clay loam, sandy clay, clay.	MH, CL, ML	A-4, A-6, A-7	0-5	90-100	80-100	70-98	55-75	35-68	9-32
WbD3	0-6	Clay loam	ML, CL-ML, CL, SM	A-4	0-5	85-100	80-100	70-95	43-70	18-30	2-9
Waynesboro	6-65	Clay loam, sandy clay, clay.	MH, CL, ML	A-4, A-6, A-7	0-5	90-100	80-100	70-98	55-75	35-68	9-32
Wh	0-14	Silt loam	ML, CL-ML, CL	A-4	0-3	80-100	75-100	70-100	55-95	18-28	3-10
Whitwell	14-60	Clay loam, loam, silt loam.	CL, CL-ML, ML, SC	A-4, A-6	0-3	80-100	75-100	60-90	40-80	18-35	3-15

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
BaB, BaC----------	0-7	5-20	1.30-1.45	0.6-2.0	0.15-0.20	4.5-5.5	Low----------	0.37	3	1-3
Barger	7-21	10-25	1.35-1.50	0.6-2.0	0.14-0.18	4.5-5.5	Low----------	0.37		
	21-31	15-30	1.45-1.65	0.06-0.2	0.04-0.07	4.5-5.5	Low----------	0.20		
	31-63	20-35	1.45-1.65	0.06-0.2	0.02-0.05	4.5-5.5	Low----------	0.20		
BeD----------	0-10	18-27	1.35-1.50	0.6-2.0	0.15-0.20	4.5-6.0	Low----------	0.43	2	.5-2
Bethesda	10-60	18-35	1.60-1.90	0.2-0.6	0.04-0.10	3.6-5.5	Low----------	0.32		
BhE*:										
Bethesda--------	0-3	18-27	1.40-1.55	0.6-2.0	0.10-0.16	3.6-5.5	Low----------	0.28	5	<.5
	3-72	18-35	1.60-1.90	0.2-0.6	0.04-0.10	3.6-5.5	Low----------	0.32		
Pits.										
BoE*:										
Bouldin----------	0-12	10-20	1.35-1.50	2.0-6.0	0.06-0.10	4.5-5.5	Low----------	0.20	5	---
	12-70	17-35	1.40-1.55	2.0-6.0	0.06-0.10	4.5-5.5	Low----------	0.20		
Gilpin----------	0-6	15-27	1.20-1.40	0.6-2.0	0.08-0.14	4.5-5.5	Low----------	0.24	3	---
	6-22	18-35	1.20-1.50	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.24		
	22-30	15-35	1.20-1.50	0.6-2.0	0.08-0.12	4.5-5.5	Low----------	0.24		
	30	---	---	---	---	---	----------	----		
Co----------	0-5	8-20	1.40-1.60	2.0-6.0	0.08-0.13	4.5-5.5	Low----------	0.17	5	1-3
Cobstone	5-34	15-30	1.40-1.60	2.0-6.0	0.05-0.10	4.5-5.5	Low----------	0.17		
	34-63	5-20	1.45-1.65	2.0-6.0	0.04-0.09	4.5-5.5	Low----------	0.17		
Cs----------	0-5	8-20	1.40-1.60	2.0-6.0	0.08-0.13	4.5-5.5	Low----------	0.17	5	1-3
Cobstone	5-34	15-30	1.40-1.60	2.0-6.0	0.05-0.10	4.5-5.5	Low----------	0.17		
	34-60	5-20	1.45-1.65	2.0-6.0	0.04-0.09	4.5-5.5	Low----------	0.17		
EnC, EnD, EnE----	0-4	10-25	1.25-1.60	0.6-2.0	0.10-0.20	4.5-5.5	Low----------	0.37	3	---
Enders	4-15	15-35	1.25-1.60	0.2-0.6	0.15-0.22	4.5-5.5	Low----------	0.43		
	15-44	35-60	1.15-1.45	<0.06	0.12-0.18	4.5-5.5	High----------	0.37		
	44-48	35-60	1.20-1.45	<0.06	0.08-0.10	4.5-5.5	Moderate-----	0.37		
	48-60	---	---	---	---	---	----------	----		
EtB, EtC----------	0-9	15-27	1.30-1.45	0.6-2.0	0.15-0.20	4.5-5.5	Low----------	0.37	5	1-3
Etowah	9-46	23-35	1.35-1.50	0.6-2.0	0.16-0.20	4.5-5.5	Low----------	0.32		
	46-63	32-45	1.40-1.55	0.6-2.0	0.16-0.20	4.5-5.5	Low----------	0.32		
FuB, FuC2, FuD2, FuE----------	0-5	15-27	1.45-1.55	0.6-2.0	0.10-0.16	4.5-5.5	Low----------	0.28	5	.5-2
Fullerton	5-12	23-35	1.45-1.55	0.6-2.0	0.10-0.15	4.5-5.5	Low----------	0.24		
	12-65	40-70	1.45-1.55	0.6-2.0	0.10-0.14	4.5-5.5	Moderate-----	0.20		
GpC, GpD, GpE----	0-6	15-27	1.20-1.40	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.24	3	.5-4
Gilpin	6-22	18-35	1.20-1.50	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.24		
	22-29	15-35	1.20-1.50	0.6-2.0	0.08-0.12	4.5-5.5	Low----------	0.24		
	29-40	---	---	---	---	---	----------	----		
Ha----------	0-6	15-25	1.30-1.45	0.6-2.0	0.18-0.20	5.1-7.3	Low----------	0.32	5	1-3
Hamblen	6-45	18-32	1.30-1.45	0.6-2.0	0.17-0.20	5.1-7.3	Low----------	0.32		
	45-60	18-32	1.30-1.45	0.6-2.0	0.17-0.20	5.1-7.3	Low----------	0.32		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
HeB, HeC	0-10	12-25	1.30-1.45	0.6-2.0	0.17-0.21	4.5-5.5	Low	0.37	5	1-3
Hendon	10-25	18-32	1.35-1.45	0.6-2.0	0.16-0.20	4.5-5.5	Low	0.37		
	25-44	18-35	1.45-1.60	0.2-0.6	0.13-0.17	4.5-5.5	Low	0.32		
	44-65	20-35	1.45-1.55	0.6-2.0	0.13-0.17	4.5-5.5	Low	0.32		
LyB	0-8	7-27	1.20-1.40	0.6-6.0	0.13-0.18	4.5-5.5	Low	0.28	2	.5-4
Lily	8-35	18-35	1.25-1.35	2.0-6.0	0.12-0.18	4.5-5.5	Low	0.28		
	35	---	---	---	---	---	---	---		
LyC, LyD	0-7	7-27	1.20-1.40	0.6-6.0	0.13-0.18	4.5-5.5	Low	0.28	2	.5-4
Lily	7-30	18-35	1.25-1.35	2.0-6.0	0.12-0.18	4.5-5.5	Low	0.28		
	30	---	---	---	---	---	---	---		
MnC2, MnD	0-7	15-30	1.30-1.45	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.37	5	.5-2
Minvale	7-48	20-35	1.40-1.55	0.6-2.0	0.09-0.14	4.5-5.5	Low	0.28		
	48-62	25-45	1.40-1.55	0.6-2.0	0.08-0.14	4.5-5.5	Low	0.28		
Mo*:										
Morehead	0-11	12-27	1.20-1.50	0.6-2.0	0.19-0.23	4.5-5.5	Low	0.37	4	1-4
	11-44	18-35	1.20-1.50	0.6-2.0	0.18-0.22	4.5-5.5	Low	0.43		
	44-65	7-40	1.20-1.50	0.6-2.0	0.15-0.22	4.5-5.5	Low	0.43		
Bonair	0-7	10-25	1.30-1.45	0.6-2.0	0.17-0.20	4.5-5.5	Low	0.37	4	2-5
	7-60	18-27	1.30-1.45	0.6-2.0	0.17-0.20	4.5-5.5	Low	0.37		
Ne	0-5	7-27	1.20-1.40	0.6-2.0	0.15-0.23	5.6-7.8	Low	0.43	5	1-4
Newark	5-27	18-35	1.20-1.45	0.6-2.0	0.18-0.23	5.6-7.8	Low	0.43		
	27-67	12-40	1.30-1.50	0.6-2.0	0.15-0.22	5.6-7.8	Low	0.43		
PaD, PaE	0-12	5-15	1.40-1.55	6.0-20	0.07-0.12	4.5-5.5	Low	0.20	5	1-3
Pailo	12-34	10-35	1.40-1.55	2.0-6.0	0.04-0.10	4.5-5.5	Low	0.20		
	34-38	30-40	1.35-1.50	0.6-2.0	0.14-0.18	4.5-5.5	Low	0.24		
	38-72	60-80	1.35-1.45	0.2-0.6	0.11-0.15	4.5-5.5	Moderate	0.28		
RaC, RaE	0-5	8-25	1.25-1.50	6.0-20	0.09-0.12	4.5-5.5	Low	0.20	1	---
Ramsey	5-17	8-25	1.20-1.40	6.0-20	0.09-0.12	4.5-5.5	Low	0.17		
	17	---	---	---	---	---	---	---		
RrE*:										
Ramsey	0-5	8-25	1.25-1.50	6.0-20	0.09-0.12	4.5-5.5	Low	0.20	1	---
	5-17	8-25	1.20-1.40	6.0-20	0.09-0.12	4.5-5.5	Low	0.17		
	17	---	---	---	---	---	---	---		
Rock outcrop.										
Se	0-12	10-25	1.50-1.65	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.32	5	1-3
Sequatchie	12-39	18-30	1.55-1.70	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.24		
	39-68	12-25	1.55-1.70	0.6-6.0	0.09-0.14	4.5-5.5	Low	0.24		
Su	0-65	18-25	1.30-1.45	0.6-2.0	0.12-0.20	5.6-7.3	Low	0.32	5	1-3
Sullivan										
Sw	0-8	12-25	1.35-1.50	0.6-2.0	0.15-0.20	5.1-6.0	Low	0.37	5	1-3
Swafford	8-24	18-32	1.40-1.50	0.6-2.0	0.14-0.18	5.1-6.0	Low	0.32		
	24-44	18-32	1.45-1.60	0.2-0.6	0.12-0.16	4.5-5.5	Low	0.32		
	44-65	18-32	1.40-1.55	0.6-2.0	0.13-0.17	4.5-5.5	Low	0.32		
TaB*, TaC*, TaD*:										
Talbott	0-6	15-27	1.35-1.50	0.6-2.0	0.10-0.18	5.1-6.5	Moderate	0.37	2	.5-2
	6-32	40-60	1.40-1.60	0.2-0.6	0.10-0.14	5.1-6.5	Moderate	0.24		
	32	---	---	---	---	---	---	---		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
TaB*, TaC*, TaD*:										
Braxton	0-8	20-35	1.35-1.50	0.6-2.0	0.18-0.22	5.1-6.5	Low	0.32	5	1-3
	8-23	40-60	1.25-1.45	0.6-2.0	0.12-0.17	5.1-6.5	Moderate	0.20		
	23-65	45-65	1.25-1.45	0.2-0.6	0.10-0.15	5.1-6.5	Moderate	0.20		
TrD*, TrE*:										
Talbott	0-6	15-27	1.35-1.50	0.6-2.0	0.10-0.18	5.1-6.5	Moderate	0.37	2	.5-2
	6-32	40-60	1.40-1.60	0.2-0.6	0.10-0.14	5.1-6.5	Moderate	0.24		
	32	---	---	---	---	---	---	---		
Braxton	0-8	20-35	1.35-1.50	0.6-2.0	0.18-0.22	5.1-6.5	Low	0.32	5	1-3
	8-23	40-60	1.25-1.45	0.6-2.0	0.12-0.17	5.1-6.5	Moderate	0.20		
	23-65	45-65	1.25-1.45	0.2-0.6	0.10-0.15	5.1-6.5	Moderate	0.20		
Rock outcrop.										
WaB, WaC	0-8	10-30	1.40-1.55	0.6-2.0	0.16-0.20	4.5-5.5	Low	0.28	5	.5-2
Waynesboro	8-12	23-35	1.40-1.55	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.28		
	12-65	35-50	1.40-1.55	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.28		
WaC2, WaD2	0-5	10-30	1.40-1.55	0.6-2.0	0.16-0.20	4.5-5.5	Low	0.28	5	.5-2
Waynesboro	5-9	23-35	1.40-1.55	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.28		
	9-65	35-50	1.40-1.55	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.28		
WbD3	0-6	10-30	1.40-1.55	0.6-2.0	0.16-0.20	4.5-5.5	Low	0.28	5	.5-2
Waynesboro	6-65	35-50	1.40-1.55	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.28		
Wh	0-14	10-25	1.35-1.55	0.6-2.0	0.15-0.20	4.5-6.0	Low	0.32	5	1-3
Whitwell	14-60	18-32	1.40-1.70	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.32		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "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	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
BaB, BaC---------- Barger	C	None--------	---	---	1.5-2.5	Perched	Jan-Mar	>60	---	Moderate	Moderate.
BeD---------- Bethesda	C	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
BhE*:											
Bethesda---------	C	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
Pits.											
BoE*:											
Bouldin----------	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
Gilpin----------	C	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	High.
Co, Cs---------- Cobstone	B	Rare--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
EnC, EnD, EnE----- Enders	C	None--------	---	---	>6.0	---	---	40-60	Soft	High-----	High.
EtB, EtC---------- Etowah	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
FuB, FuC2, FuD2, FuE---------- Fullerton	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
GpC, GpD, GpE----- Gilpin	C	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	High.
Ha---------- Hamblen	C	Occasional	Very brief	Jan-Mar	2.0-3.0	Apparent	Jan-Mar	>60	---	Moderate	Moderate.
HeB, HeC---------- Hendon	C	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
LyB, LyC, LyD----- Lily	B	None--------	---	---	>6.0	---	---	20-40	Hard	Moderate	High.
MnC2, MnD--------- Minvale	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low.
Mo*:											
Morehead---------	C	Rare--------	---	---	1.5-2.5	Apparent	Jan-Apr	>60	---	Moderate	High.
Bonair----------	D	Occasional	Very brief	Jan-Apr	0-1.0	Apparent	Jan-Apr	40-60	Hard	High-----	High.
Ne---------- Newark	C	Frequent----	Brief to long.	Jan-Apr	0.5-1.5	Apparent	Jan-Apr	>60	---	High-----	Low.
PaD, PaE---------- Pailo	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
RaC, RaE---------- Ramsey	D	None---------	---	---	>6.0	---	---	10-20	Hard	Low------	Moderate.
RrE*: Ramsey----------	D	None---------	---	---	>6.0	---	---	10-20	Hard	Low------	Moderate.
Rock outcrop.											
Se---------- Sequatchie	B	Rare---------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
Su---------- Sullivan	B	Occasional	Very brief to brief.	Jan-Mar	4.0-6.0	Apparent	Jan-Mar	>60	---	Low------	Low.
Sw---------- Swafford	C	Rare---------	---	---	2.0-3.0	Perched	Jan-Mar	>60	---	Moderate	Moderate.
TaB*, TaC*, TaD*: Talbott----------	C	None---------	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
Braxton----------	C	None---------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
TrD*, TrE*: Talbott----------	C	None---------	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
Braxton----------	C	None---------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
Rock outcrop.											
WaB, WaC, WaC2, WaD2, WbD3------- Waynesboro	B	None---------	---	---	>6.0	---	---	>60	---	High-----	High.
Wh---------- Whitwell	C	Occasional	Very brief	Jan-Mar	2.0-3.0	Apparent	Jan-Mar	>60	---	Moderate	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Barger	Fine-loamy, siliceous, thermic Typic Fragiudults
Bethesda	Loamy-skeletal, mixed, acid, mesic Typic Udorthents
*Bonair	Fine-loamy, siliceous, mesic Humic Haplaquepts
Bouldin	Loamy-skeletal, siliceous, mesic Typic Paleudults
*Braxton	Fine, mixed, thermic Typic Paleudalfs
Cobstone	Loamy-skeletal, siliceous, thermic Typic Hapludults
Enders	Clayey, mixed, thermic Typic Hapludults
Etowah	Fine-loamy, siliceous, thermic Typic Paleudults
Fullerton	Clayey, kaolinitic, thermic Typic Paleudults
Gilpin	Fine-loamy, mixed, mesic Typic Hapludults
Hamblen	Fine-loamy, siliceous, thermic Fluvaquentic Eutrochrepts
Hendon	Fine-loamy, siliceous, mesic Fragic Paleudults
Lily	Fine-loamy, siliceous, mesic Typic Hapludults
Minvale	Fine-loamy, siliceous, thermic Typic Paleudults
Morehead	Fine-silty, mixed, mesic Aquic Hapludults
*Newark	Fine-silty, mixed, nonacid, mesic Aeric Fluvaquents
Pailo	Loamy-skeletal over clayey, siliceous, thermic Typic Paleudults
Ramsey	Loamy, siliceous, mesic Lithic Dystrochrepts
Sequatchie	Fine-loamy, siliceous, thermic Humic Hapludults
Sullivan	Fine-loamy, siliceous, thermic Dystric Fluventic Eutrochrepts
Swafford	Fine-loamy, siliceous, thermic Fragiaquic Paleudults
*Talbott	Fine, mixed, thermic Typic Hapludalfs
Waynesboro	Clayey, kaolinitic, thermic Typic Paleudults
Whitwell	Fine-loamy, siliceous, thermic Aquic Hapludults

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