United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with Tennessee Agricultural Experiment Station, Tennessee Department of Agriculture, and Cumberland County Board of Commissioners

Soil Survey of Cumberland County, Tennessee

Persons with disabilities who would like to access this soil survey should contact the local office of the Natural Resources Conservation Service for assistance.

Paper copies of the maps can be obtained from the Natural Resources Conservation Service, Cumberland County Ag Center, 314 Old Jamestown Highway, Crossville TN 38555 (telephone number 931-484-5442, ext. 3).

How To Use This Soil Survey

General Soil Map

The general soil map, which is a color map, 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.

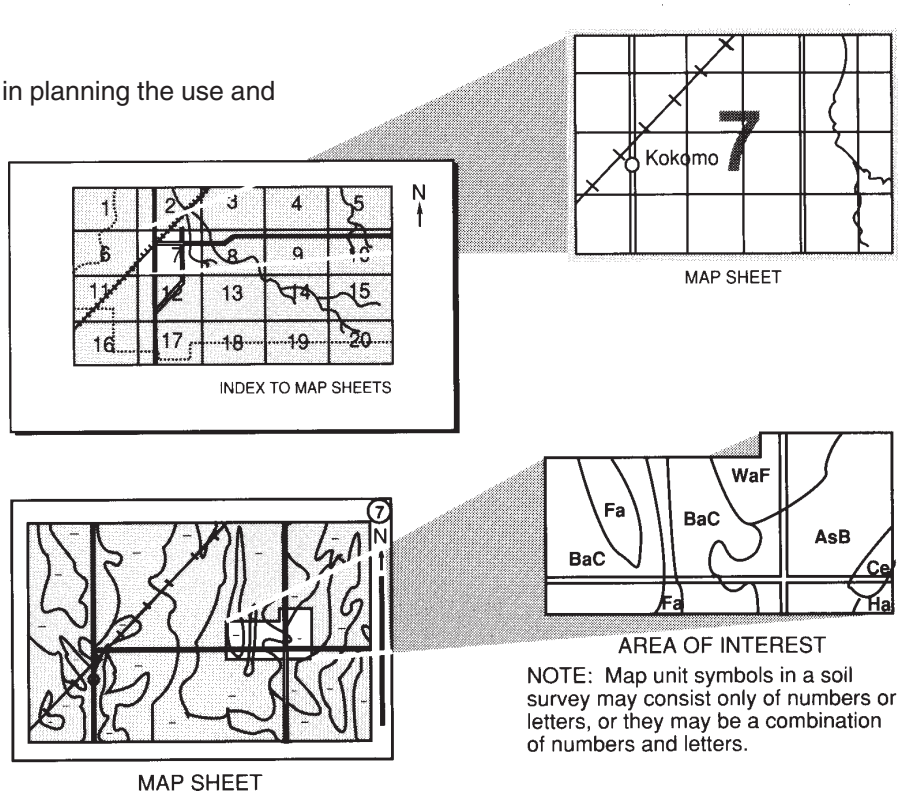
Detailed Soil Maps

The detailed soil maps 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**. Note the number of the map sheet and turn to that sheet.

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

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



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.

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 Natural Resources Conservation Service (formerly 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 1995. Soil names and descriptions were approved in 1998. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1996. This survey was made cooperatively by the Natural Resources Conservation Service, the Tennessee Agricultural Experiment Station, the Tennessee Department of Agriculture, and the Cumberland County Board of Commissioners. The survey is part of the technical assistance furnished to the Cumberland County Soil Conservation District.

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

Cover: A scenic overlook of Grassy Cove. Soils in the cove, such as those in the Waynesboro, Whitwell, and Beason series, have been cleared and planted to row crops or pasture. Rugged, wooded mountains surround the cove.

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service home page on the World Wide Web. The address is http://www.nrcs.usda.gov.

Contents

June 2002 Digital Copy

Foreword

This soil survey contains information that affects land use planning in this survey area. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, 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.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

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 Natural Resources Conservation Service or the Cooperative Extension Service.

James W. Ford
State Conservationist
Natural Resources Conservation Service

Soil Survey of Cumberland County, Tennessee

By Carlie McCowan, Natural Resources Conservation Service

Fieldwork by Carlie McCowan, Darlene M. Dypolt, Gabe S. Krantz, Melissa C. Oliver, and David M. Tatum, Natural Resources Conservation Service

Assistance provided by Anthony R. Khiel and Joe Roach, soil scientists, Cumberland County

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with the Tennessee Agricultural Experiment Station, the Tennessee Department of Agriculture, and the Cumberland County Board of Commissioners

General Nature of the County

Cumberland County is in east-central Tennessee (fig. 1). The forth largest county in the State, it encompasses 436,100 acres, or 681 square miles. It is bordered on the north by Fentress County; on the east by Morgan, Roane, and Rhea Counties; on the south by Bledsoe County; and on the west by Putnam, White, and Van Buren Counties. Crossville, the county seat, is near the center of the county. In 1995, the population of Cumberland County was about 40,000. Crossville had a population of about 7,000, and Fairfield Glade had a population of about 4,000. About 70 percent of the acreage in the county is used as woodland, 2 percent as cropland, and 15 percent for pasture and hay. The remaining acreage in the county has been developed and is used for residential, industrial, or commercial purposes.

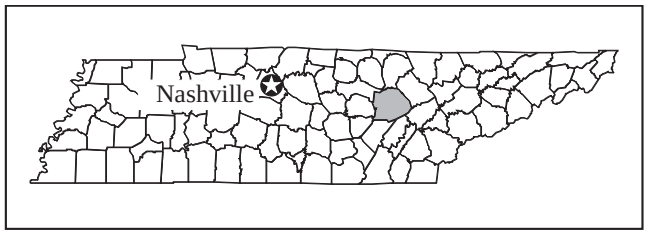


Figure 1.—Location of Cumberland County in Tennessee.

This soil survey updates the survey of Cumberland County published in 1950 (Hubbard and others 1950). It provides additional information and has larger maps, which show the soils in greater detail.

History and Settlement

Jon M. Hall, historian, Cumberland County, helped to prepare this section.

Known as the Western Wilderness by 1790, when the area now known as Tennessee became the Southwest Territory, the Cumberland Plateau was viewed as a formidable barrier to westward travel. The greatest barriers on the plateau were the western and eastern escarpments, which rise to nearly 1,000 feet in elevation and extend from the Tennessee Valley on the east of the plateau to the Highland Rim on the west. Moreover, the plateau extends the width of Tennessee through Kentucky in the north to as far south as the Tennessee River in Alabama.

By 1786, the State of North Carolina had negotiated the extent of the “Cumberland Trace” with the Cherokee Indians. The trace, however, was only a horse path. It was not until 1795 that a road, called the Walton-Emory Road, crossed the plateau. When settlement began on the plateau, it began in the Cumberland and Tennessee River valleys and spread both east and west, respectively, to meet in

Cumberland County. The county, which was named for the Duke of Cumberland, was formed in 1856 from seven other counties.

Since 1802, the main roadway between Nashville and Knoxville has crossed Cumberland County. The community of Crab Orchard, which was chartered by the State in 1801, was established along this roadway, which was called the Cumberland Turnpike. Businesses in Crab Orchard include a lime and gravel quarry operation and the company that originated the sale of Crab Orchard building stone. The community of Crossville was established at the intersection of Robert Burke Stage Road to Nashville and Stock Road to Kentucky in about 1840. It was originally called Scott's Crossroads. The community of Pomona, which is west of Crossville on Sparta Road, was settled by 1850.

As part of the Homestead Act in 1934, Cumberland County was chosen as one of the sites for a Government program to help people devastated by the Great Depression to purchase their own land. Under the plan the Government would provide money to clear the land and build homes and would supply some livestock and equipment on a long-term contract. The money was to be paid back once the homesteader was in a more secure financial position. Stone, which was plentiful, was used extensively to build the homes. An octagonal tower built from stone was used as the project office. A water tank was on top of the tower. The tower and many of the original homes are still standing.

Because agricultural production was limited by the shallow, infertile soils on the plateau, the first industries in the county were those related to timber. Early mills were built and used to cut trees into lumber and crossties. Mills in the county still produce crossties used by the railroad industry. Most of the current industries are manufacturers, including those that produce ceramic tile and automobile parts.

Because of the favorable climate and the pristine beauty of the area, recreational and retirement communities have been developed in the county. These communities, which have been the main developments for the last 30 years, are expected to continue to grow in the future, and the natural beauty of the plateau will continue to attract visitors to the county.

Natural Resources

Cumberland County has an abundance of natural resources. Soil is the most important natural resource in the county. It is the growing medium for crops, pasture, lawns, and trees. It also is used as a site for buildings and roads.

Stone is an economically important resource in the county. Limestone is mined in the county and used for road gravel and as a source of lime and industrial minerals. Sandstone is mined as Crab Orchard building stone. It is also the parent material for the naturally weathered field stones that are picked up from the soil surface and used for construction. Coal has been mined in the past, and although supplies still exist, there is little mining today.

Water is clear and plentiful on the Cumberland Plateau. The mountainous area provides hundreds of miles of fresh, swift-flowing streams. Many water impoundments have been constructed throughout the county, including the 550-acre Lake Tansi. These impoundments are used for recreational activities and as a source of livestock water. They also supply utility water.

Timber is another important natural resource in the county. About 70 percent of the county is woodland, which is the source of a wide variety of wood products.

Physiography, Relief, and Drainage

Cumberland County is in the Cumberland Plateau and Mountains Major Land Resource Area. In Cumberland County this area consists of broad, rolling flats dissected by many dendritic drainageways, some becoming gorges as much as 300 feet deep. The area is underlain by resistant sandstone, with the gorges having cut through the sandstone to the soft shale bedrock underneath. In the eastern part of the county, the Crab Orchard Mountains rise above the plateau. They are underlain by beds of sandstone and shale. The mountains are broken in places by coves of various sizes. The largest cove is Grassy Cove, which has a floor that covers about 2,700 acres. The sides of the coves generally have slopes that range from 30 to 60 percent. The floor of the coves is underlain predominantly by limestone. The extreme southeastern part of the county is in the upper end of the Sequatchie Valley. This deep, wide limestone valley is cut as much as 900 feet below the plateau. The highest point in Cumberland County is Hinch Mountain with an elevation of 3,048 feet. The lowest point is where the Sequatchie River leaves the county. It has an elevation of 940 feet.

Most of the survey area is in the drainage area of the tributaries of the Tennessee River. Clear Creek, Daddys Creek, Caney Fork River, and Obed River, along with their tributaries, drain most of the county. The area south of the Crab Orchard Mountains drains into Piney Creek and Whites Creek, which intersect

with the Tennessee River in Roane County. The extreme western part of the county drains into the Caney Fork River, which is a tributary of the Cumberland River. There are many impoundments of various sizes in the county. Some of the larger impoundments include Meadow Park Lake, Lake St. George, Lake Holiday, and Lake Tansi.

Industry and Transportation Facilities

The major industries in Cumberland County manufacture ceramic tile, paper products, automotive products, and numerous wood products. They employ about 1,500 people. The mining of local sandstone and the collection of field stone provide employment for many local people throughout the county. A large limestone quarry and several sand quarries in the county are also important.

The county has an excellent highway system, with easy access to Knoxville and Nashville via Interstate 40, which crosses the county in an east-west direction. It also is traversed east-west by U.S. Highway 70 and north-south by U.S. Highway 127. There are several state highways and numerous county roads throughout the county.

The eastern side of Cumberland County is also served by a railroad, which runs from Crab Orchard to Rockwood. The trains are used mainly to transport lime products, stone, and crossties out of Crab Orchard.

Climate

In winter, valleys in the county are very cool with occasional cold or warm spells and mountaintops and the upper slopes are generally cold. In summer, the valleys are very warm or frequently hot and the mountains are warm during the day but become cool at night. Precipitation is heavy and evenly distributed throughout the year. In summer, it falls chiefly during thunderstorms. In winter, it is mainly rain with occasional snow in the valleys and snow with frequent rainfall in the mountains. Snow cover does not persist, except at the highest elevations.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Crossville, Tennessee, in the period 1951 to 1990. 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 35 degrees F and the average daily minimum temperature is 24 degrees. The lowest temperature on record, which occurred on January 21, 1985, is -25 degrees. In summer, the average temperature is 71 degrees and the average daily maximum temperature is 83 degrees. The highest recorded temperature, which occurred on August 19, 1954, is 102 degrees.

Growing degree days are shown in table 1. They are equivalent to “heat units.” During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 58 inches. Of this, 27 inches, or nearly 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 27 inches. The heaviest 1-day rainfall during the period of record was 7 inches on May 28, 1973. Thunderstorms occur on about 53 days each year, and most occur in summer. At any time of the year, heavy rains from prolonged storms can occur occasionally throughout the entire area and cause flooding in valleys.

The average seasonal snowfall is about 16 inches. The greatest snow depth at any one time during the period of record was 13 inches. On the average, 10 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 57 percent. Humidity is higher at night, and the average at dawn is about 84 percent. The sun shines 62 percent of the time possible in summer and 45 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 10 miles per hour, in spring.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; 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 in 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 and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept or model of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area 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-vegetation-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. Soil taxonomy, 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 generally are 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 and 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 predict 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.

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those of the soils in adjacent survey areas. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey areas.

General Soil Map Units

The general soil map in 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 or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The components of one map 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 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. Lily-Ramsey

Moderately deep and shallow, well drained and somewhat excessively drained, gently sloping to moderately steep soils; on uplands

This map unit consists of soils on rolling hills dissected by narrow valleys that have a dendritic drainage pattern (fig. 2). It makes up most of the central and northwestern parts of the county. Slopes range from 2 to 20 percent. The natural vegetation is oak-pine forest.

This map unit makes up about 67 percent of the county. It is about 50 percent Lily soils, 20 percent Ramsey soils, and 30 percent minor soils. Of minor extent in the map unit are Lonewood soils on the upland flats, Jefferson and Gilpin soils on the steeper hillsides, and Atkins soils along drainageways.

Lily soils are on ridgetops and side slopes. They are gently sloping and strongly sloping, moderately deep, well drained soils. They have a yellowish brown, medium textured and moderately fine textured subsoil. These soils formed in material weathered from sandstone.

Ramsey soils are on side slopes. They are strongly sloping and moderately steep, shallow, somewhat excessively drained soils. They have a yellowish brown, moderately coarse textured subsoil. These soils formed in material weathered from sandstone having a high content of silica.

About 70 percent of this map unit is used as woodland. Some of the less sloping areas of Lily soils are used for row crops. Most of the remaining areas of cleared land are used for pasture and hay. The trees are dominantly scarlet oak, white oak, Virginia pine, and hickory.

The strongly sloping and moderately steep slopes limit the use of this map unit for most kinds of urban development. The depth to bedrock in the Ramsey soils and in the shallower areas of the Lily soils is a limitation on sites for septic tank absorption fields.

2. Lily-Hendon-Gilpin

Moderately deep to very deep, well drained, gently sloping to steep soils; on broad upland flats and hillsides

This map unit consists of soils on broad, gently sloping ridgetops and steep hillsides dissected by narrow valleys that have a dendritic drainage pattern. It makes up the northeastern part of the county, north of the Obed River. Slopes range from 2 to 35 percent. The natural vegetation is oak-pine forest.

This map unit makes up about 5 percent of the county. It is about 30 percent Lily soils, 25 percent Hendon soils, 25 percent Gilpin soils, and 20 percent minor soils. Of minor extent in the map unit are Lonewood soils on the upland flats and Jefferson, Varilla, and Muse soils on the steeper hillsides.

Lily soils are on ridgetops and side slopes. They are gently sloping and strongly sloping, moderately deep, well drained soils. They have a yellowish brown, medium textured and moderately fine textured subsoil. These soils formed in material weathered from sandstone having a high content of silica.

Hendon soils are on broad interfluves. They are gently sloping and strongly sloping, very deep, well drained soils. They have a yellowish brown, medium

Figure 2.—A typical landscape in the Lily-Ramsey general soil map unit. Lily soils are in the cleared areas in the foreground, and Ramsey soils are in the wooded areas on hills in the background.

textured subsoil. These soils formed in a loamy mantle and the underlying residuum derived from interbedded sandstone, siltstone, and shale. They have a fragic layer in the subsoil.

Gilpin soils are on ridgetops and hillsides. They are strongly sloping to steep, deep, well drained soils. They have a yellowish brown, medium textured subsoil. These soils formed in residuum derived from interbedded shale, mudstone, and some sandstone.

About 85 percent of this map unit is used as woodland. Some of the less sloping areas of Lily and Hendon soils are used for row crops. Most of the remaining areas of cleared land in the map unit are used for pasture and hay. The trees are dominantly scarlet oak, white oak, Virginia pine, and hickory. About 60 percent of the map unit is in the Catoosa Wildlife Management Area.

The strongly sloping to steep slopes limit the use of this map unit for most kinds of urban development. The depth to bedrock in the shallower areas of the Lily and Gilpin soils is a limitation affecting septic tank absorption fields. Hendon soils are severely limited as a site for septic tank absorption fields because of slow permeability in the subsoil.

3. Lily-Gilpin-Jefferson

Moderately deep to very deep, well drained, strongly sloping to very steep soils; on uplands

This map unit consists of soils on strongly sloping ridges dissected by deep valleys that have steep and very steep hillsides (fig. 3). It is in the southern part of the county. Slopes range from 5 to 60 percent. The natural vegetation is oak-hickory forest.

This map unit makes up about 12 percent of the county. It is about 45 percent Lily soils, 30 percent Gilpin soils, 15 percent Jefferson soils, and 10 percent minor soils. Of minor extent in the map unit are Lonewood soils on upland flats and Ramsey and Varilla soils on the steeper hillsides.

Lily soils are on ridgetops and side slopes. They are strongly sloping, moderately deep, well drained soils. They have a yellowish brown, medium textured and

moderately fine textured subsoil. These soils formed in material weathered from sandstone.

Gilpin soils are on ridgetops and hillsides. They are moderately steep to very steep, deep, well drained soils. They have a yellowish brown, medium textured subsoil. These soils formed in residuum derived from interbedded shale, mudstone, and some sandstone.

Jefferson soils are on hillsides along the deep valleys, on footslopes, and in coves. They are moderately steep to very steep, very deep, well drained soils. They have a yellowish brown, medium textured and moderately fine textured subsoil. These soils formed in colluvium derived from interbedded acid sandstone, shale, and siltstone.

About 80 percent of this map unit is used as woodland. Some of the less sloping areas of Lily and Gilpin soils are used for row crops. Most of the remaining areas of cleared land are used for pasture and hay. The trees are dominantly scarlet oak, white oak, yellow poplar, chestnut oak, maple, and hickory.

The strongly sloping to very steep slopes limit the use of this map unit for most kinds of urban development. The depth to bedrock in the shallower areas of the Lily and Gilpin soils is a limitation on sites for septic tank absorption fields.

Figure 3.—Typical topography of the Lily-Gilpin-Jefferson general soil map unit. The top of Brady Mountain (A) is about 1,500 feet above the floor of Grassy Cove. Jefferson soils (B) are on the long mountain side slopes and footslopes. High sandstone escarpments (C) are near the top of the mountain. The scale is about 1:24,000. Photograph provided by the U.S. Department of the Interior, Geological Survey. Use a stereoscope for a three-dimensional view.

4. Ramsey-Lily

Shallow and moderately deep, somewhat excessively drained and well drained, strongly sloping to very steep soils; on uplands

This map unit consists of soils on broad, convex ridges and hilltops dissected by deep, narrow, steep and very steep valleys. It is south of Daddys Creek and extends west to the county line. Slopes range from 5 to 50 percent. The natural vegetation is oak-pine forest.

This map unit makes up about 5 percent of the county. It is about 55 percent Ramsey soils, 30 percent Lily soils, and 15 percent minor soils. Of minor extent in the map unit are Gilpin and Jefferson soils on steep and very steep hillsides.

Ramsey soils are on broad, convex ridgetops. They are strongly sloping to very steep, shallow, somewhat excessively drained soils. They have numerous associated areas of sandstone rock outcrop. They have a yellowish brown, medium textured and moderately coarse textured subsoil. These soils formed in material weathered from sandstone having a high content of silica.

Lily soils are on broad, convex ridgetops. They are strongly sloping, moderately deep, well drained soils. They have a yellowish brown, medium textured subsoil. These soils formed in material weathered from sandstone.

About 85 percent of this map unit is used as woodland. Some of the less sloping areas of Lily soils are used for row crops. Most of the remaining areas of cleared land in the map unit are used for pasture and hay. The trees are dominantly scarlet oak, Virginia pine, chestnut oak, white oak, and hickory.

The depth to bedrock and the slope are limitations affecting most kinds of urban development.

5. Jefferson-Gilpin-Shelocta

Moderately deep and very deep, well drained, steep and very steep soils; on mountainsides

This map unit consists of soils in a rugged, mountainous area with elevation of up to 3,000 feet (fig. 4). It surrounds Grassy Cove and Crab Orchard Cove. Slopes range from 20 to 60 percent. The natural vegetation is oak-hickory with cove hardwoods on north aspects and at the head of hollows.

This map unit makes up about 6 percent of the county. It is about 50 percent Jefferson soils, 20 percent Gilpin soils, 15 percent Shelocta soils, and 15 percent minor soils. Of minor extent in the map unit are Lily and Ramsey soils on the less sloping ridgetops.

Jefferson soils are on mountainsides and in coves. They are steep and very steep, very deep, well drained soils. They have a yellowish brown, medium textured and moderately fine textured subsoil. These soils formed in colluvium derived from interbedded acid sandstone, shale, and siltstone.

Gilpin soils are on convex upper hillsides. They are steep and very steep, moderately deep, well drained soils. They have a yellowish brown, medium textured subsoil. These soils formed in residuum derived from interbedded shale, mudstone, and some sandstone.

Shelocta soils are on hillsides and in coves. They are steep and very steep, moderately deep, well drained soils. They have a yellowish brown, medium textured subsoil. These soils formed in colluvium and in residuum derived from shale and siltstone.

About 90 percent of this map unit is used as woodland. The trees are dominantly black oak, northern red oak, white oak, yellow poplar, chestnut oak, maple, and hickory.

The stones and boulders and the steep and very steep slopes are limitations affecting most kinds of urban development.

6. Talbott-Braxton

Moderately deep and very deep, well drained, strongly sloping to very steep soils; on the lower parts of mountains

This map unit consists of soils on the lower footslopes in mountainous areas that surround large coves. Slopes range from 5 to 70 percent. The natural vegetation is oak-hickory forest.

This map unit makes up about 1 percent of the county. It is about 60 percent Talbott soils, 20 percent Braxton soils, and 20 percent minor soils. Of minor extent in the map unit are Barfield, Ashwood, and Jefferson soils on concave footslopes and in small coves.

Talbott soils are on the lower footslopes in mountainous areas. They are strongly sloping to very steep, moderately deep, well drained soils. They have a red, fine textured subsoil. These soils formed in residuum derived from limestone bedrock.

Braxton soils are on footslopes. They are strongly sloping to very steep, very deep, well drained soils. They have a red, fine textured subsoil. These soils formed in residuum derived from limestone bedrock.

Most areas of this map unit are used as woodland. A few areas are used for pasture and hay. The trees are dominantly black oak, hickory, white oak, chestnut oak, maple, and redcedar.

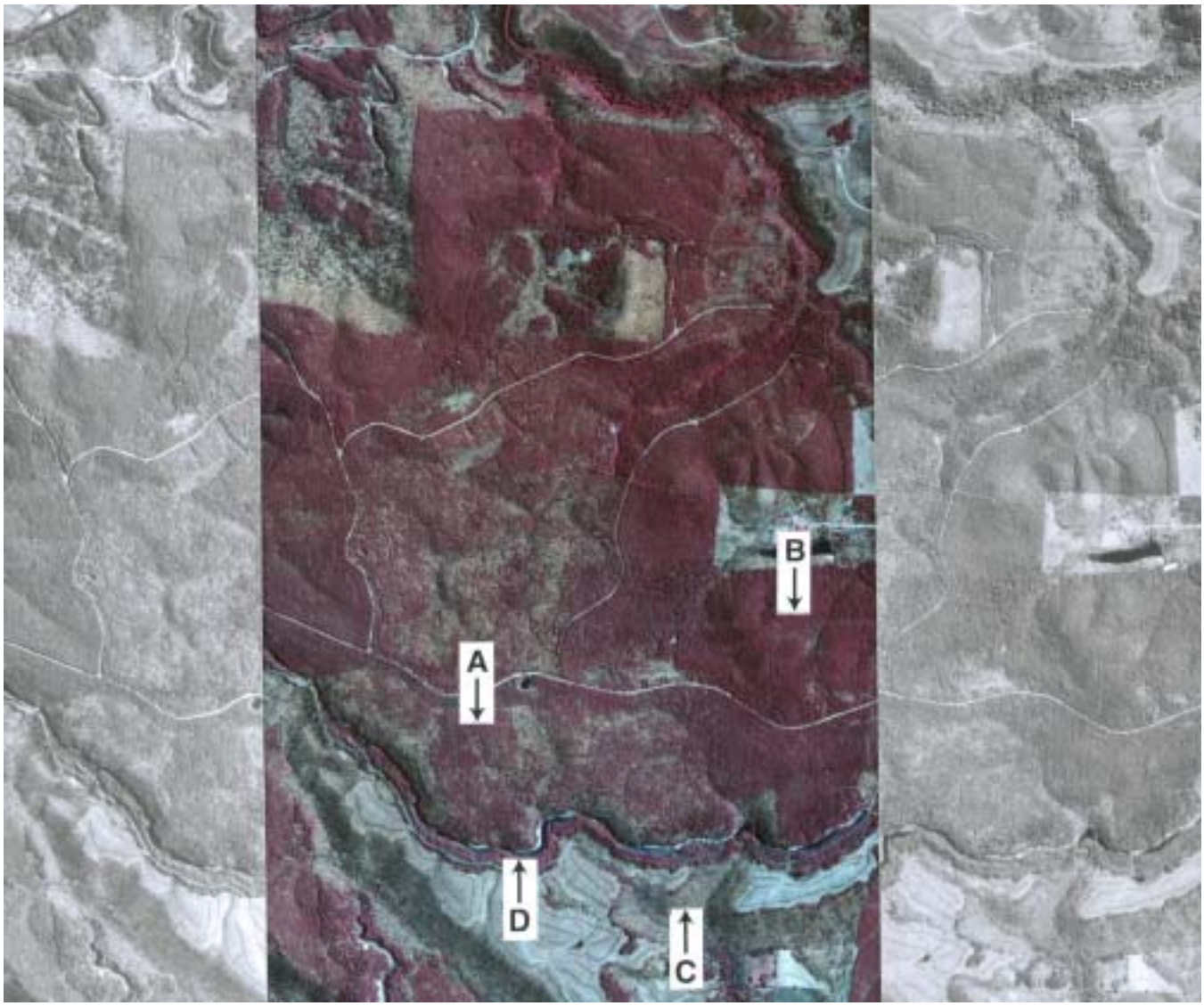


Figure 4.—Typical topography of the Jefferson-Gilpin-Shelocta general soil map unit. Lily soils (A) are on the broad ridgetops. Gilpin soils (B) are on the dissected hillsides. Jefferson soils (C) are on the sides of deep hollows and coves. Areas surfaced mined for coal and nearly bare of vegetation appear light colored (D). Dark areas are pine plantations. The scale is about 1:24,000. Photograph provided by the U.S. Department of the Interior, Geological Survey. Use a stereoscope for a three-dimensional view.

The slope, rock outcrop, and slow or very slow permeability are severe limitations affecting urban development.

7. Waynesboro-Whitwell

Very deep, well drained and moderately well drained, nearly level to moderately steep soils; in large coves and on stream terraces

This map unit consists of soils in large coves surrounded by high mountains. Slopes range from 0 to 20 percent. The natural vegetation is cove hardwood forest.

This map unit makes up about 1 percent of the county. It is about 30 percent Waynesboro soils, 25 percent Whitwell soils, and 45 percent minor soils (fig. 5). Of minor extent in the map unit are Beason, Talbott, Jefferson, Atkins, Ramsey, and Sequatchie soils and rock outcrop.

Waynesboro soils are on high stream terraces. They are gently sloping to moderately steep, very deep, well drained soils. They have a red, fine textured subsoil. These soils formed in old alluvium derived mostly from sandstone and limestone.

Whitwell soils are on low stream terraces. They are nearly level and gently sloping, very deep, moderately

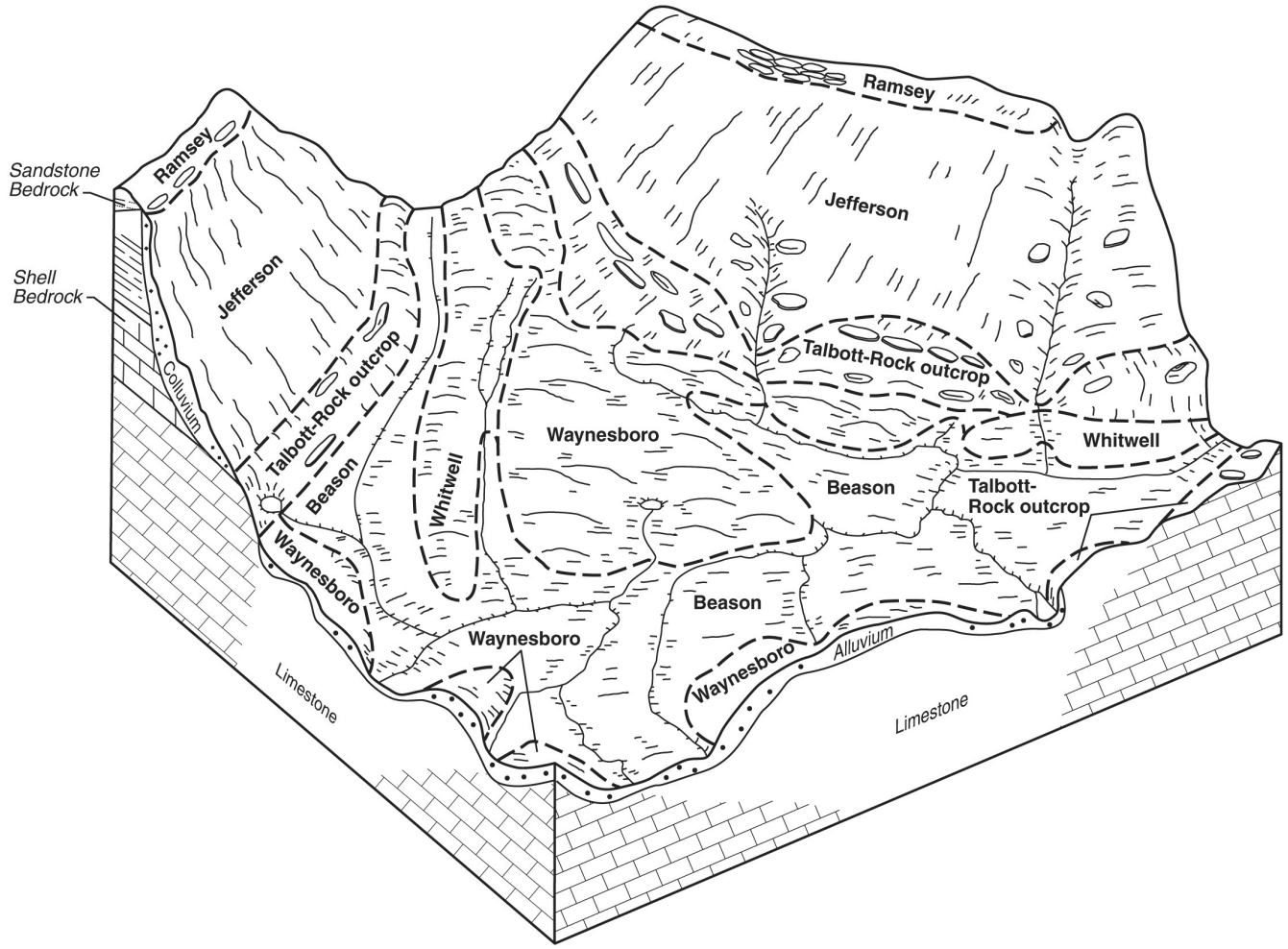


Figure 5.—The pattern of soils and parent material in Grassy Cove. The Waynesboro-Whitwell general soil map unit is in the center of the cove.

well drained soils. They have a yellowish brown, medium textured subsoil. These soils formed in alluvium derived mostly from sandstone.

Most areas of this map unit have been cleared of trees. Most of the cleared areas are used for pasture and hay. Some of the better suited areas are used for row crops. The trees are dominantly black oak, yellow poplar, white oak, maple, and redcedar in the uplands and sweetgum, elm, ash, and yellow poplar on the flood plains.

The higher areas of the Waynesboro soils are better suited to urban development than the lower areas. Slope is the main limitation affecting urban development in areas of the Waynesboro soils. Seasonal wetness and flooding are limitations affecting urban development in most of the lower lying areas of the Whitwell soils.

8. Talbott-Etowah-Barfield

Shallow, moderately deep, and very deep, well drained, gently sloping to steep soils; in the Sequatchie Valley

This map unit consists of soils in a wide valley surrounded by high mountains. Slopes range from 0 to 20 percent. The natural vegetation is cove hardwood forest.

This map unit makes up about 1 percent of the county. It is about 30 percent Talbott soils, 25 percent Etowah soils, 20 percent Barfield soils, and 25 percent minor soils and rock outcrop. Of minor extent in the map unit are Fullerton, Sullivan, and Waynesboro soils.

Talbott soils are on hillsides. They are strongly

sloping and moderately steep, moderately deep, well drained soils. They have a red, fine textured subsoil. These soils formed in residuum derived from limestone bedrock.

Etowah soils are on high stream terraces. They are gently sloping to moderately steep, very deep, well drained soils. They have a red, moderately fine textured subsoil. These soils formed in old alluvium derived mainly from sandstone and limestone.

Barfield soils are on the lower hillsides and footslopes. They are moderately steep and steep, shallow, well drained soils. They have a dark surface layer and a brownish, fine textured subsoil. These soils formed in residuum derived from limestone.

Most areas of this map unit have been cleared of trees. Most of the cleared areas are used for pasture and hay. Some of the better suited areas are used for row crops. The trees are dominantly black oak, yellow poplar, white oak, and maple on the Etowah soils and black oak, hickory, and redcedar on the Talbott and Barfield soils.

The depth to bedrock and slow or very slow permeability in the Talbott and Barfield soils are limitations affecting urban development. Etowah soils are well suited to most urban uses.

9. Jefferson-Varilla-Shelocta

Deep and very deep, well drained and somewhat excessively drained, steep and very steep soils; in deep gorges and on mountainsides

This map unit consists of soils on a rugged plateau escarpment dissected by gorges that are as much as

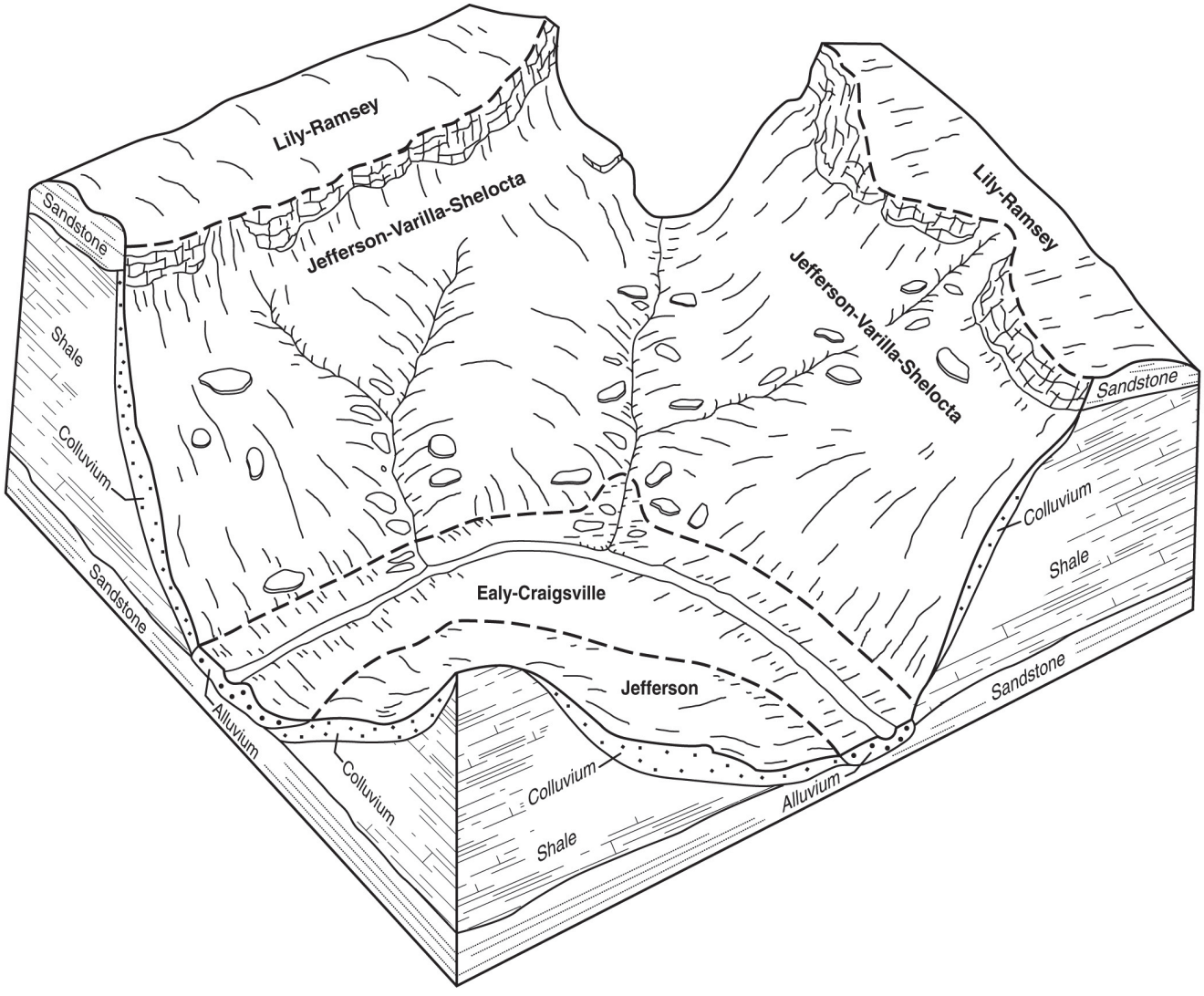


Figure 6.—The pattern of soils and parent material in the Jefferson-Varilla-Shelocta general soil map unit.

300 feet deep. It is along the Obed River and its tributaries. Slopes range from 20 to 60 percent. The natural vegetation is cove hardwoods with oak-hickory type on south aspects.

This map unit makes up about 2 percent of the county. It is about 50 percent Jefferson soils, 20 percent Varilla soils, 15 percent Shelocta soils, and 15 percent minor soils (fig. 6). Of minor extent in the map unit are Ramsey and Lily soils in areas adjacent to the escarpment and Ealy and Craigsville soils on the narrow flood plains.

Jefferson soils are on hillsides and in coves. They are steep and very steep, very deep, well drained soils. They have a yellowish brown, medium textured and moderately fine textured subsoil. These soils formed in colluvium derived from interbedded acid sandstone, shale, and siltstone.

Varilla soils are directly below the rock escarpment and in V-shaped drainageways. They are steep and very steep, very deep, somewhat excessively drained soils. They have a dark yellowish brown, moderately coarse textured subsoil that is very cobbly throughout. These soils formed in colluvium derived from sandstone.

Shelocta soils are on convex slopes between drainageways. They are steep and very steep, deep, well drained soils. They have a yellowish brown, medium textured subsoil. They formed in colluvium underlain by shale residuum.

Nearly all areas of this map unit are used as woodland. The trees are dominantly yellow poplar, black oak, northern red oak, white oak, maple, and hickory.

Stones and boulders and the steep and very steep slopes limit the use of this map unit for most kinds of urban development.

Detailed Soil Map Units

The map units delineated on the detailed soil maps in this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses.

A map unit delineation on a map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. 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 other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some "included" areas that belong to other taxonomic classes.

Most included soils have properties 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, or similar, inclusions. They may or may not be mentioned in the map unit description. Other included soils and miscellaneous areas, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, inclusions. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The included areas of contrasting soils or miscellaneous areas are mentioned in the map unit descriptions. A few included areas may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

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

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit 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, 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, slope, stoniness, salinity, 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, Talbott silt loam, 5 to 12 percent slopes, is a phase of the Talbott series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes. A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Talbott-Braxton-Rock outcrop complex, 5 to 20 percent slopes, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or

no vegetation. The map unit Pits, sandstone quarry, is an example.

Table 4 gives the acreage and proportionate extent of each map unit. Other 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 or miscellaneous areas.

At—Atkins loam, frequently flooded

Composition

Atkins soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Flood plains
Shape of areas: Long and linear
Size of areas: 5 to 25 acres
Slope range: 0 to 2 percent
Parent material: Alluvium

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderate
Flooding: Frequent
Available water capacity: High
Seasonal high water table: At or near the surface in late winter and early spring
Soil reaction: Strongly acid or very strongly acid
Depth to bedrock: More than 60 inches

Typical Profile

Surface layer:
0 to 10 inches—dark gray loam

Subsoil:
10 to 30 inches—dark gray and grayish brown loam
30 to 52 inches—light brownish gray and gray clay loam

Substratum:
52 to 60 inches—gray sandy loam

Contrasting Inclusions

- Small areas of Bonair soils
- Somewhat poorly drained soils in the slightly higher landscape positions

Use and Management

Major use: Pasture
Common woodland vegetation: Bottom-land hardwoods

Cropland

Suitability: Poorly suited
Management considerations:
- The flooding limits the production and harvesting of crops.

Pasture and hay

Suitability: Moderately suited
Management considerations:
- Only hay and pasture plants that can tolerate the periodic inundation by floodwater and the seasonal wetness should be selected for seeding.
- Grazing when the soil is wet results in surface compaction and destruction of the sod.

Woodland

Suitability: Moderately suited
Management considerations:
- Because of the seasonal high water table, equipment should be operated only during dry periods, which generally occur from midsummer through early fall, when the soil is not so wet.
- The seedling mortality rate may be high in areas that are subject to flooding.
- Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Unsuited
Management considerations:
- This soil is not suited to building site development because of the wetness and the flooding.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
- This soil is not suited to septic tank absorption fields because of the flooding and the wetness.

Interpretive Groups

Land capability classification: 4w

BaE—Barfield-Ashwood-Rock outcrop complex, 20 to 40 percent slopes

Composition

Barfield soil and similar components: 45 to 50 percent
Ashwood soil and similar components: 20 to 30 percent
Rock outcrop: 25 to 30 percent

Setting

Landscape position: Hillsides
Shape of areas: Irregular
Size of areas: 5 to 100 acres
Slope range: 20 to 40 percent
Parent material: Limestone residuum

Soil Properties and Qualities

Barfield

Drainage class: Well drained
Permeability: Slow or very slow
Flooding: None
Available water capacity: Very low or low
Seasonal high water table: None
Soil reaction: Slightly acid to moderately alkaline
Depth to bedrock: 8 to 20 inches

Ashwood

Drainage class: Well drained
Permeability: Slow or very slow
Flooding: None
Available water capacity: Moderate
Seasonal high water table: None
Soil reaction: Moderately acid to moderately alkaline
Depth to bedrock: 20 to 40 inches

Typical Profile

Barfield

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

Subsoil:
4 to 10 inches—very dark grayish brown flaggy clay
10 to 14 inches—yellowish brown flaggy clay

Bedrock:
14 to 20 inches—limestone

Ashwood

Surface layer:
0 to 6 inches—very dark brown silt loam

Subsoil:
6 to 12 inches—very dark grayish brown silty clay loam
12 to 19 inches—brown clay
19 to 37 inches—light olive brown clay

Bedrock:
37 to 40 inches—limestone

Rock outcrop

The rock outcrop occurs as limestone bedrock outcroppings that are 2 to 30 feet across and protrude as much as 2 feet above the soil surface. The outcroppings form long, linear bands around the contour of the slope.

Contrasting Inclusions

- Small areas of soils that are more than 40 inches deep over bedrock

Use and Management

Major use: Woodland
Common woodland vegetation: Redcedar-hickory type

Cropland

Suitability: Unsuited
Management considerations:
- The depth to bedrock and the clayey texture severely limit the amount of water available to plants.
- The rock outcrop severely limits tillage.

Pasture and hay

Suitability: Unsuited
Management considerations:
- The rock outcrop severely limits the establishment and maintenance of pasture and forage.

Woodland

Suitability: Poorly suited
Management considerations:
- The moderately steep and steep slopes and the rock outcrop limit the use of equipment.
- Trees are commonly subject to windthrow because rooting depth is restricted by the bedrock.
- Reforestation after harvest must be carefully managed to minimize plant competition.

Building site development

Suitability: Unsuited
Management considerations:
- The steep slopes, a high shrink-swell potential, the limited depth to bedrock, and the rock outcrop are severe limitations affecting building site development.
- Other sites should be considered.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
- The steep slopes, a high shrink-swell potential, the limited depth to bedrock, and the rock outcrop are severe limitations affecting septic tank absorption fields.
- Other sites should be considered.

Interpretive Groups

Land capability classification: Barfield and Ashwood—7s; Rock outcrop—8

Be—Beason silt loam, occasionally flooded

Composition

Beason soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Low stream terraces
Shape of areas: Irregular
Size of areas: 20 to 50 acres
Slope range: 0 to 2 percent
Parent material: Fine textured alluvium

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Permeability: Moderately slow
Flooding: Occasional
Available water capacity: High
Seasonal high water table: At a depth of 1 to 2 feet during late winter and early spring
Soil reaction: Strongly acid or very strongly acid
Depth to bedrock: More than 60 inches

Typical Profile

Surface layer:
0 to 4 inches—grayish brown silt loam

Subsoil:
4 to 13 inches—brown silt loam
13 to 34 inches—light yellowish brown clay with grayish mottles
34 to 38 inches—light brownish gray clay loam

Substratum:
38 to 60 inches—yellowish brown loam

Contrasting Inclusions

- Poorly drained soils in low depressional areas
- Moderately well drained soils

Use and Management

Major use: Pasture (fig. 7)
Common woodland vegetation: Bottom-land hardwoods

Cropland

Suitability: Poorly suited
Management considerations:
- The flooding and the wetness limit the production and harvesting of crops.

Pasture and hay

Suitability: Moderately suited
Management considerations:
- Only hay and pasture plants that can tolerate the periodic inundation by floodwater and the seasonal wetness should be selected for seeding.
- Grazing when the soil is wet results in surface compaction and destruction of the sod.

Woodland

Suitability: Moderately suited
Management considerations:
- Because of the seasonal high water table, equipment should be operated only during dry periods, which generally occur from midsummer through early fall, when the soil is not so wet.
- The seedling mortality rate may be high in areas that are subject to flooding.
- Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Unsuited
Management considerations:
- This soil is not suited to building site development because of the flooding.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
- This soil is unsuited to septic tank absorption fields because of the seasonal high water table and the flooding.
- Other sites should be considered.

Interpretive Groups

Land capability classification: 3w

BM—Bethesda-Mine pits complex, 10 to 80 percent slopes

Composition

Bethesda soil and similar components: 50 to 90 percent
Mine pits: 10 to 50 percent

Setting

Landscape position: Surface mined areas
Shape of areas: Generally long and linear
Size of areas: 5 to 200 acres
Slope range: 10 to 80 percent
Parent material: Acid residue from surface mining operations

Figure 7.—An area of Beason silt loam, occasionally flooded, on the low, broad flats of Grassy Cove. This soil is better suited to pasture and hay than to row crops because of the flooding and the wetness. Water ponds in small areas on the surface in the lower landscape positions.

Soil Properties and Qualities

Bethesda

Drainage class: Well drained
Permeability: Moderately slow
Flooding: None
Available water capacity: Moderate
Seasonal high water table: None
Soil reaction: Strongly acid to extremely acid
Depth to bedrock: More than 60 inches

Typical Profile

Bethesda

Surface layer:
0 to 2 inches—dark grayish brown channery loam

Substratum:
2 to 45 inches—brownish very channery loam and clay loam
45 to 60 inches—yellowish brown cobbly loam

Mine pits

The Mine pits consist of deep holes that were dug in order to mine coal seams from rock strata. A high, vertical rock wall generally comprises one side of the pit.

Contrasting Inclusions

- Small, undisturbed areas of Lily, Ramsey, and Gilpin soils

Use and Management

Major use: Abandoned
Common woodland vegetation: Generally none; a few Virginia pine in some of the older mined areas

Cropland

Suitability: Unsuited
Management considerations:
• This map unit is unsuited to cropland because of the slope and the unfavorable soil properties.

Pasture and hay

Suitability: Unsuited
Management considerations:
• This map unit is unsuited to pasture and hay because of the slope and the unfavorable soil properties.
• Some areas of this map unit can be used as pasture if they are reclaimed.

Woodland

Suitability: Unsuited
Management considerations:
• This map unit is unsuited to woodland because the growth rate of trees is slow, the seedling mortality rate is high, and the use of equipment is limited on steep and very steep slopes.

Building site development

Suitability: Unsuited
Management considerations:
• The slope and the soil properties are severe limitations affecting building site development.
• Other sites should be considered.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
• The slope and the soil properties are severe limitations affecting septic tank absorption fields.
• Other sites should be considered.

Interpretive Groups

Land capability classification: Bethesda—7e

Bo—Bonair loam, occasionally flooded

Composition

Bonair soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Flood plains
Shape of areas: Long and linear
Size of areas: 5 to 15 acres
Slope range: 0 to 2 percent
Parent material: Alluvium

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderate
Flooding: Occasional
Available water capacity: High
Seasonal high water table: At or near the surface in late winter and early spring
Soil reaction: Strongly acid or very strongly acid
Depth to bedrock: More than 40 inches

Typical Profile

Surface layer:
0 to 10 inches—very dark gray loam

Subsoil:
10 to 36 inches—dark gray loam

Substratum:
36 to 48 inches—dark gray loam

Contrasting Inclusions

• Small areas of Atkins soils
• Somewhat poorly drained soils in the slightly higher landscape positions

Use and Management

Major use: Pasture
Common woodland vegetation: Bottom-land hardwoods

Cropland

Suitability: Poorly suited
Management considerations:
• The flooding limits the production and harvesting of crops.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Only hay and pasture plants that can tolerate the periodic inundation by floodwater and the seasonal wetness should be selected for seeding.
• Grazing when the soil is wet results in surface compaction and destruction of the sod.

Woodland

Suitability: Moderately suited

Management considerations:
• Because of the seasonal high water table, equipment should be operated only during dry periods, which generally occur from midsummer through early fall, when the soil is not so wet.
• The seedling mortality rate may be high in areas that are subject to flooding.
• Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Unsuited
Management considerations:
• This soil is not suited to building site development because of the wetness and the flooding.
• Other sites should be considered.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
• This soil is unsuited to septic tank absorption fields because of the flooding.
• Other sites should be considered.

Interpretive Groups

Land capability classification: 4w

Ea—Ealy loam, occasionally flooded

Composition

Ealy soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Flood plains
Shape of areas: Long and narrow
Size of areas: 5 to 20 acres
Slope range: 0 to 3 percent
Parent material: Recent alluvium

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately rapid
Flooding: Occasional
Available water capacity: High
Seasonal high water table: At a depth of 5 to 6 feet during late winter and early spring
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches

Typical Profile

Surface layer:
0 to 3 inches—dark brown fine sandy loam
3 to 10 inches—dark yellowish brown fine sandy loam

Subsoil:
10 to 39 inches—dark yellowish brown fine sandy loam

Substratum:
39 to 60 inches—dark yellowish brown loam and fine sandy loam

Contrasting Inclusions

• Soils that have more than 15 percent rock fragments in the surface layer and subsoil
• Moderately well drained soils

Use and Management

Major use: Woodland or pasture
Common woodland vegetation: Bottom-land hardwoods

Cropland

Suitability: Well suited
Management considerations:
• Most crops commonly grown in the county respond to applications of lime and fertilizer.
• The flooding limits the production and harvesting of some crops.

Pasture and hay

Suitability: Well suited
Management considerations:
• The quality and quantity of forage can be maintained by a rotation grazing system, weed control by mowing and clipping, and applications of fertilizer and lime.
• Only hay and pasture plants that can tolerate the periodic inundation by floodwater and the seasonal wetness should be selected for seeding.

Woodland

Suitability: Well suited
Management considerations:
• Few limitations affect woodland use and management.
• Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Unsuited

Management considerations:
• This soil is unsuited to building site development because of the flooding.
• Other sites should be considered.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
• This soil is unsuited to septic tank absorption fields because of the flooding.
• Other sites should be considered.

Interpretive Groups

Land capability classification: 2w

EcB—Ealy-Craigsville complex, 0 to 5 percent slopes, occasionally flooded

Composition

Ealy soil and similar components: 60 percent
Craigsville soil and similar components: 40 percent

Setting

Landscape position: Flood plains and alluvial fans
Shape of areas: Long and narrow
Size of areas: 10 to 50 acres
Slope range: Ealy—0 to 3 percent; Craigsville—0 to 5 percent
Parent material: Alluvium

Soil Properties and Qualities

Ealy

Drainage class: Well drained
Permeability: Moderately rapid
Flooding: Occasional
Available water capacity: High
Seasonal high water table: At a depth of 5 to 6 feet during late winter and early spring
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches

Craigsville

Drainage class: Well drained
Permeability: Moderately rapid
Flooding: Rare
Available water capacity: Low
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches

Typical Profile

Ealy

Surface layer:
0 to 3 inches—dark brown fine sandy loam
3 to 10 inches—dark yellowish brown fine sandy loam

Subsoil:
10 to 39 inches—dark yellowish brown fine sandy loam

Substratum:
39 to 60 inches—dark yellowish brown loam and fine sandy loam

Craigsville

Surface layer:
0 to 3 inches—dark brown cobbly fine sandy loam

Subsoil:
3 to 9 inches—brown cobbly sandy loam
9 to 21 inches—dark yellowish brown very cobbly sandy loam

Substratum:
21 to 60 inches—dark yellowish brown and yellowish brown extremely cobbly loamy sand

Contrasting Inclusions

• Soils that have clay loam in the subsoil

Use and Management

Major use: Woodland
Common woodland vegetation: Bottom-land hardwoods

Cropland

Suitability: Poorly suited
Management considerations:
• The flooding limits the production and harvesting of some crops.
• The stones or cobbles on the surface and in the subsoil hinder tillage.

Pasture and hay

Suitability: Poorly suited
Management considerations:
• Only hay and pasture plants that can tolerate the periodic inundation by floodwater and the seasonal wetness should be selected for seeding.
• The stones or cobbles on the surface limit many management practices.

Woodland

Suitability: Moderately suited

Management considerations:
• The seedling mortality rate may be high in areas that are subject to flooding.
• Because of the size and volume of rock fragments in the Craigsville soil, the soil is droughty and thus the seedling survival rate is decreased.
• Planting larger trees or more trees than normal increases the seedling survival rate.
• Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Unsuited
Management considerations:
• This soil is not suited to building site development because of the flooding.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
• This soil is unsuited to septic tank absorption fields because of the flooding.

Interpretive Groups

Land capability classification: 2w

EtB—Etowah silt loam, 2 to 5 percent slopes

Composition

Etowah soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Footslopes and high stream terraces
Shape of areas: Irregular
Size of areas: 5 to 20 acres
Slope range: 2 to 5 percent
Parent material: Old alluvium

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Flooding: None
Available water capacity: High
Seasonal high water table: None
Soil reaction: Strongly acid or very strongly acid
Depth to bedrock: More than 60 inches

Typical Profile

Surface layer:
0 to 7 inches—dark yellowish brown silt loam

Subsoil:
7 to 16 inches—dark yellowish brown silt loam
16 to 25 inches—strong brown silty clay loam
25 to 48 inches—yellowish red silty clay loam
48 to 60 inches—yellowish red clay

Contrasting Inclusions

• The clayey Waynesboro soils in landscape positions similar to those of the Etowah soil

Use and Management

Major use: Pasture or cropland
Common woodland vegetation: Oak-hickory type

Cropland

Suitability: Well suited
Management considerations:
• This soil can produce high yields of most crops; however, erosion is a moderate hazard.
• Minimum tillage, crop rotations that include grasses and legumes, and crop residue management help to control erosion.
• Site-specific recommendations are needed.

Pasture and hay

Suitability: Well suited
Management considerations:
• The quality and quantity of forage can be maintained by a rotation grazing system, weed control by mowing and clipping, and applications of fertilizer.

Woodland

Suitability: Well suited
Management considerations:
• Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Well suited
Management considerations:
• Only slight limitations affect most kinds of building site development.
• Low strength is a moderate limitation on sites for local roads and streets.

Septic tank absorption fields

Suitability: Moderately suited

Management considerations:
• Increasing the size of the absorption area helps to compensate for the restricted permeability.

Interpretive Groups

Land capability classification: 2e

EtC—Etowah silt loam, 5 to 12 percent slopes

Composition

Etowah soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Footslopes and high stream terraces
Shape of areas: Irregular
Size of areas: 5 to 20 acres
Slope range: 5 to 12 percent
Parent material: Old alluvium

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Flooding: None
Available water capacity: High
Seasonal high water table: None
Soil reaction: Strongly acid or very strongly acid
Depth to bedrock: More than 60 inches

Typical Profile

Surface layer:
0 to 7 inches—dark yellowish brown silt loam

Subsoil:
7 to 16 inches—dark yellowish brown silt loam
16 to 25 inches—strong brown silty clay loam
25 to 48 inches—yellowish red silty clay loam
48 to 60 inches—yellowish red clay

Contrasting Inclusions

• The clayey Waynesboro soils in landscape positions similar to those of the Etowah soil

Use and Management

Major use: Pasture or cropland
Common woodland vegetation: Oak-hickory type

Cropland

Suitability: Moderately suited
Management considerations:
• Minimum tillage, crop rotations that include grasses and legumes, and crop residue management help to control erosion.
• Site-specific recommendations are needed.

Pasture and hay

Suitability: Well suited
Management considerations:
• The quality and quantity of forage can be maintained by applying a rotation grazing system, mowing and clipping, and applying fertilizer.

Woodland

Suitability: Well suited
Management considerations:
• Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Moderately suited
Management considerations:
• Structures should be designed so that they conform to the natural slope of the land.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
• Increasing the size of the absorption area helps to compensate for the restricted permeability.
• Installing the distribution lines on the contour helps to overcome the slope.

Interpretive Groups

Land capability classification: 3e

EtD2—Etowah silt loam, 12 to 20 percent slopes, eroded

Composition

Etowah soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Footslopes and high stream terraces
Shape of areas: Irregular
Size of areas: 5 to 20 acres
Slope range: 12 to 20 percent
Parent material: Old alluvium

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Flooding: None
Available water capacity: High
Seasonal high water table: None
Soil reaction: Strongly acid or very strongly acid
Depth to bedrock: More than 60 inches

Typical Profile

Surface layer:
0 to 4 inches—dark yellowish brown silt loam with brownish mottles

Subsurface layer:
4 to 7 inches—dark yellowish brown silt loam with strong brown mottles

Subsoil:
7 to 16 inches—dark yellowish brown silt loam
16 to 25 inches—strong brown silty clay loam
25 to 48 inches—yellowish red silty clay loam
48 to 60 inches—yellowish red clay

Contrasting Inclusions

• The clayey Waynesboro soils in landscape positions similar to those of the Etowah soil

Use and Management

Major use: Pasture
Common woodland vegetation: Oak-hickory type

Cropland

Suitability: Moderately suited
Management considerations:
• Minimum tillage, crop rotations that include grasses and legumes for long periods of time, and crop residue management help to control erosion.
• Site-specific recommendations are needed.

Pasture and hay

Suitability: Well suited
Management considerations:
• The quality and quantity of forage can be maintained by a rotation grazing system, weed control by mowing and clipping, and applications of fertilizer.

Woodland

Suitability: Moderately suited
Management considerations:
• Constructing water bars and seeding cut and filled areas help to protect log landings, skid trails, and roads.
• Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Poorly suited
Management considerations:
• The slope is a limitation affecting building site development.
• Other sites should be considered.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Distribution lines for septic tank absorption fields should be installed in the less sloping areas.

Interpretive Groups

Land capability classification: 4e

FuE—Fullerton gravelly silt loam, 20 to 35 percent slopes

Composition

Fullerton soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Hillsides
Shape of areas: Irregular
Size of areas: 5 to 20 acres
Slope range: 20 to 35 percent
Parent material: Cherty limestone residuum

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Flooding: None
Available water capacity: Moderate
Seasonal high water table: None
Soil reaction: Strongly acid to very strongly acid
Depth to bedrock: More than 60 inches

Typical Profile

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

Subsurface layer:
5 to 12 inches—strong brown gravelly silt loam

Subsoil:
12 to 65 inches—red gravelly and cobbly clay

Contrasting Inclusions

- Soils that have a loamy subsoil
- Soils that have more than 35 percent rock fragments in the subsoil

Use and Management

Major use: Woodland
Common woodland vegetation: Oak-hickory type

Cropland

Suitability: Unsuited
Management considerations:
- This soil is unsuited to row crops because of a very severe erosion hazard on the steep slopes.

Pasture and hay

Suitability: Moderately suited
Management considerations:
- Overgrazing reduces the extent of the plant cover, increases the hazard of erosion, and results in surface compaction and the growth of weeds.
- Deferred grazing, proper stocking rates, and a good fertilization program help to keep the soil and forage in good condition.

Woodland

Suitability: Moderately suited
Management considerations:
- Constructing diversions and water bars and seeding cut and filled areas help to control erosion on roads and landings.
- The moderately steep slope limits the use of equipment.
- Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Poorly suited
Management considerations:
- The moderately steep slope is a limitation affecting building site development.
- Other sites should be considered.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
- Distribution lines for septic tank absorption fields should be installed in the less sloping areas.

Interpretive Groups

Land capability classification: 6e

GpC—Gilpin loam, 5 to 12 percent slopes

Composition

Gilpin soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Ridgetops
Shape of areas: Irregular
Size of areas: 5 to 40 acres
Slope range: 5 to 12 percent
Parent material: Residuum derived from shale and mudstone

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Flooding: None
Available water capacity: Moderate
Seasonal high water table: None
Soil reaction: Strongly acid or very strongly acid
Depth to bedrock: 20 to 40 inches

Typical Profile

Surface layer:
0 to 1 inch—dark grayish brown loam

Subsoil:
1 to 5 inches—yellowish brown loam
5 to 21 inches—yellowish brown channery silty clay loam
21 to 34 inches—yellowish brown channery silty clay loam with strong brown mottles

Substratum:
34 to 38 inches—yellowish brown channery clay with strong brown mottles

Bedrock:
38 to 50 inches—soft shale

Contrasting Inclusions

- Soils that have clayey textures throughout the subsoil
- Soils that are underlain by hard sandstone bedrock

Use and Management

Major use: Woodland
Common woodland vegetation: Oak-pine type

Cropland

Suitability: Moderately suited
Management considerations:
- Minimum tillage, crop rotations that include grasses

and legumes, and crop residue management help to control erosion.
• Site-specific recommendations are needed.

Pasture and hay

Suitability: Well suited
Management considerations:
• The quality and quantity of forage can be maintained by a rotation grazing system, proper stocking rates, and measures that prevent overgrazing.

Woodland

Suitability: Well suited
Management considerations:
• Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Moderately suited
Management considerations:
• Structures should be designed so that they conform to the natural slope of the land.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installation of septic tank absorption fields is hindered and permeability is restricted because of the limited depth to bedrock.

Interpretive Groups

Land capability classification: 3e

GpD—Gilpin loam, 12 to 20 percent slopes

Composition

Gilpin soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Hillsides
Shape of areas: Irregular
Size of areas: 10 to 50 acres
Slope range: 12 to 20 percent
Parent material: Residuum derived from shale and mudstone

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Flooding: None
Available water capacity: Moderate
Seasonal high water table: None
Soil reaction: Strongly acid or very strongly acid
Depth to bedrock: 20 to 40 inches

Typical Profile

Surface layer:
0 to 1 inch—dark grayish brown loam

Subsoil:
1 to 5 inches—yellowish brown loam
5 to 21 inches—yellowish brown channery silty clay loam
21 to 34 inches—yellowish brown channery silty clay loam with strong brown mottles

Substratum:
34 to 38 inches—yellowish brown channery clay with strong brown mottles

Bedrock:
38 to 50 inches—soft shale

Contrasting Inclusions

• Soils that have clayey textures throughout the subsoil
• Soils that are underlain by hard sandstone bedrock
• The deep Shelocta and very deep Jefferson soils on the lower hillsides

Use and Management

Major use: Woodland
Common woodland vegetation: Oak-pine type

Cropland

Suitability: Poorly suited
Management considerations:
• Minimum tillage, crop rotations that include grasses and legumes for long periods of time, and crop residue management help to control erosion.
• Site-specific recommendations are needed.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• The quality and quantity of forage can be maintained by a rotation grazing system, proper stocking rates, and measures that prevent overgrazing.
• The slope is a limitation affecting many management practices.

Woodland

Suitability: Moderately suited
Management considerations:
• Without intensive site preparation and maintenance,

undesirable plants may prevent adequate reforestation by seedlings.
• Constructing water bars and seeding cut and filled areas help to control erosion on log landings, skid trails, and roads.
• The slope limits the use of equipment.

Building site development

Suitability: Poorly suited
Management considerations:
• The slope is a limitation affecting building site development.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
• Installation of septic tank absorption fields is hindered and permeability is restricted because of the limited depth to bedrock.
• Distribution lines for septic tank absorption fields should be installed in the less sloping areas.

Interpretive Groups

Land capability classification: 4e

GpF—Gilpin loam, 20 to 60 percent slopes

Composition

Gilpin soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Hillsides
Shape of areas: Irregular
Size of areas: 10 to 500 acres
Slope range: 20 to 60 percent
Parent material: Residuum derived from shale and mudstone

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Flooding: None
Available water capacity: Moderate
Seasonal high water table: None
Soil reaction: Strongly acid or very strongly acid
Depth to bedrock: 20 to 40 inches

Typical Profile

Surface layer:
0 to 1 inch—dark grayish brown loam

Subsoil:
1 to 5 inches—yellowish brown loam
5 to 21 inches—yellowish brown channery silty clay loam
21 to 34 inches—yellowish brown channery silty clay loam with strong brown mottles

Substratum:
34 to 38 inches—yellowish brown channery clay with strong brown mottles

Bedrock:
38 to 50 inches—soft shale

Contrasting Inclusions

• Soils that have clayey textures throughout the subsoil
• The deep Shelocta and very deep Jefferson soils on the lower hillsides
• Soils that are more than 40 inches deep over shale bedrock

Use and Management

Major use: Woodland
Common woodland vegetation: Oak-pine type

Cropland

Suitability: Unsuited
Management considerations:
• This soil is unsuited to row crops because of a very severe erosion hazard on the steep and very steep slopes.

Pasture and hay

Suitability: Unsuited
Management considerations:
• The steep and very steep slopes are severe limitations affecting most management practices.

Woodland

Suitability: Moderately suited
Management considerations:
• Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.
• Constructing diversions and water bars and seeding cut and filled areas help to control erosion on roads and landings.
• The steep and very steep slope limits the use of equipment.

Building site development

Suitability: Unsuited

Management considerations:
• The slope is a limitation affecting building site development.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
• Distribution lines for septic tank absorption fields should be installed in the less sloping areas.

Interpretive Groups

Land capability classification: 7e

HaD—Hayter loam, 10 to 20 percent slopes

Composition

Hayter soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Footslopes and benches
Shape of areas: Irregular
Size of areas: 10 to 50 acres
Slope range: 10 to 20 percent
Parent material: Colluvium underlain by limestone residuum

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately rapid
Flooding: None
Available water capacity: Moderate or high
Seasonal high water table: None
Soil reaction: Strongly acid or moderately acid
Depth to bedrock: More than 48 inches

Typical Profile

Surface layer:
0 to 1 inch—dark brown loam

Subsoil:
1 to 7 inches—dark yellowish brown loam
7 to 30 inches—strong brown gravelly loam
30 to 40 inches—yellowish red silty clay loam
40 to 60 inches—yellowish red clay

Contrasting Inclusions

• Soils that are underlain by limestone bedrock at a depth of less than 4 feet
• Some small areas of limestone rock outcrop

Use and Management

Major use: Woodland
Common woodland vegetation: Cove hardwoods

Cropland

Suitability: Poorly suited
Management considerations:
• Erosion is a severe hazard because of the slope.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• The quality and quantity of forage can be maintained by applications of fertilizer, weed control by mowing and clipping, and measures that prevent overgrazing.

Woodland

Suitability: Well suited
Management considerations:
• Species that are climatically adapted to the county have a very high rate of growth.
• Constructing diversions and water bars and seeding cut and filled areas help to control erosion on roads and landings.
• Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Poorly suited
Management considerations:
• Structures should be designed so that they conform to the natural slope of the land.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Installing the distribution lines on the contour helps to overcome the slope.

Interpretive Groups

Land capability classification: 4e

HaE—Hayter loam, 20 to 40 percent slopes

Composition

Hayter soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Footslopes and benches
Shape of areas: Irregular

Size of areas: 10 to 50 acres
Slope range: 20 to 40 percent
Parent material: Colluvium underlain by limestone residuum

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately rapid
Flooding: None
Available water capacity: Moderate or high
Seasonal high water table: None
Soil reaction: Strongly acid or moderately acid, except the horizons near bedrock may be slightly acid
Depth to bedrock: More than 48 inches

Typical Profile

Surface layer:
0 to 1 inch—dark brown loam

Subsoil:
1 to 7 inches—dark yellowish brown loam
7 to 30 inches—strong brown gravelly loam
30 to 40 inches—yellowish red silty clay loam
40 to 60 inches—yellowish red clay

Contrasting Inclusions

- Soils that are underlain by limestone bedrock at a depth of less than 4 feet
- Some small areas of limestone rock outcrop

Use and Management

Major use: Woodland
Common woodland vegetation: Cove hardwoods

Cropland

Suitability: Unsuited
Management considerations:
- Because of a very severe erosion hazard on the steep slopes, this soil is not suitable as cropland.

Pasture and hay

Suitability: Moderately suited
Management considerations:
- Because of the steep slopes, applying good grazing management is difficult.
- The quality and quantity of forage can be maintained by a rotation grazing system, applications of fertilizer, and proper stocking rates.

Woodland

Suitability: Moderately suited
Management considerations:
- Species that are climatically adapted to the county have a very high rate of growth.
- The steep slope limits the use of equipment.
- Constructing diversions and water bars and seeding cut and filled areas help to control erosion on roads and landings.
- Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Poorly suited
Management considerations:
- The slope is a limitation affecting building site development.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
- Distribution lines for septic tank absorption fields should be installed in the less sloping areas.

Interpretive Groups

Land capability classification: 6e

HeB—Hendon silt loam, 2 to 5 percent slopes

Composition

Hendon soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Broad ridgetops
Shape of areas: Irregular
Size of areas: 5 to 50 acres
Slope range: 2 to 5 percent
Parent material: Loess underlain by residuum derived from interbedded shale and sandstone

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately slow
Flooding: None
Available water capacity: High
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches

Typical Profile

Surface layer:
0 to 1 inch—very dark grayish brown silt loam

Subsurface layer:
1 to 6 inches—yellowish brown silt loam

Subsoil:
6 to 16 inches—dark yellowish brown silt loam
16 to 23 inches—yellowish brown silt loam
23 to 29 inches—yellowish brown silt loam with pale brown mottles
29 to 60 inches—strong brown silt loam and clay loam

Contrasting Inclusions

- The moderately deep Gilpin and Lily soils
- Soils that have a fragipan

Use and Management

Major use: Woodland or pasture
Common woodland vegetation: Oak-pine type

Cropland

Suitability: Well suited
Management considerations:
- This soil is well suited to most of the climatically adapted crops grown in the county.
- Minimum tillage, crop rotations that include grasses and legumes, and crop residue management help to control erosion.
- Site-specific recommendations are needed.

Pasture and hay

Suitability: Well suited
Management considerations:
- The quality and quantity of forage can be maintained by a rotation grazing system, weed control by mowing and clipping, applications of fertilizer and lime, and measures that prevent overgrazing.

Woodland

Suitability: Well suited
Management considerations:
- Few limitations affect woodland use and management.
- Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Well suited
Management considerations:
- This soil is well suited to most kinds of building site development.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
- This soil is poorly suited to septic tank absorption fields because of the moderately slow permeability in the subsoil.

Interpretive Groups

Land capability classification: 2e

HeC—Hendon silt loam, 5 to 12 percent slopes

Composition

Hendon soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Broad ridgetops
Shape of areas: Irregular
Size of areas: 5 to 50 acres
Slope range: 5 to 12 percent
Parent material: Loess underlain by residuum derived from interbedded shale and sandstone

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately slow
Flooding: None
Available water capacity: High
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches

Typical Profile

Surface layer:
0 to 1 inch—very dark grayish brown silt loam

Subsurface layer:
1 to 6 inches—yellowish brown silt loam

Subsoil:
6 to 16 inches—dark yellowish brown silt loam
16 to 23 inches—yellowish brown silt loam
23 to 29 inches—yellowish brown silt loam with pale brown mottles
29 to 60 inches—strong brown silt loam and clay loam

Contrasting Inclusions

- The moderately deep Gilpin and Lily soils
- Soils that have a fragipan

Use and Management

Major use: Woodland or pasture
Common woodland vegetation: Oak-pine type

Cropland

Suitability: Moderately suited
Management considerations:
- This soil is well suited to most of the climatically adapted crops grown in the county.

• Minimum tillage, crop rotations that include grasses and legumes, and crop residue management help to control erosion.
• Site-specific recommendations are needed.

Pasture and hay

Suitability: Well suited
Management considerations:
• The quality and quantity of forage can be maintained by a rotation grazing system, weed control by mowing and clipping, applications of fertilizer and lime, and measures that prevent overgrazing.

Woodland

Suitability: Well suited
Management considerations:
• Few limitations affect woodland use and management.
• Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Moderately suited
Management considerations:
• Buildings should be designed so that they conform to the natural slope of the land.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
• Because of the moderately slow permeability in the subsoil, this soil is poorly suited to septic tank absorption fields.

Interpretive Groups

Land capability classification: 3e

JeC—Jefferson cobbly loam, 5 to 12 percent slopes

Composition

Jefferson soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Side slopes and footslopes
Shape of areas: Irregular
Size of areas: 5 to 50 acres
Slope range: 5 to 12 percent
Parent material: Colluvium derived from sandstone and shale

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately rapid
Flooding: None
Available water capacity: Low
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches

Typical Profile

Surface layer:
0 to 1 inch—very dark grayish brown cobbly loam

Subsurface layer:
1 to 7 inches—yellowish brown cobbly loam

Subsoil:
7 to 40 inches—yellowish brown cobbly loam
40 to 56 inches—yellowish brown very cobbly clay loam

Substratum:
56 to 60 inches—yellowish brown very gravelly sandy loam

Contrasting Inclusions

• The moderately deep Gilpin soils
• Areas of rock outcrop on the upper hillsides
• Soils that are in drainageways and have stones on the surface

Use and Management

Major use: Woodland or pasture
Common woodland vegetation: Oak-hickory type

Cropland

Suitability: Moderately suited
Management considerations:
• Minimum tillage, crop rotations that include grasses and legumes, and crop residue management help to control erosion.
• Site-specific recommendations are needed.
• The coarse fragments in the surface layer make seedbed preparation difficult and hinder cultivation.
• Crops may be stressed during dry periods because of the low available water capacity.

Pasture and hay

Suitability: Well suited
Management considerations:
• The quality and quantity of forage can be maintained by a rotation grazing system, weed control by mowing and clipping, and applications of fertilizer and lime.

Woodland

Suitability: Well suited
Management considerations:
• Few limitations affect woodland use and management.
• Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Moderately suited
Management considerations:
• Structures should be designed so that they conform to the natural slope of the land.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
• Installing the distribution lines on the contour helps to overcome the slope.

Interpretive Groups

Land capability classification: 4s

JeD—Jefferson cobbly loam, 12 to 20 percent slopes

Composition

Jefferson soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Hillsides and footslopes
Shape of areas: Irregular
Size of areas: 5 to 50 acres
Slope range: 12 to 20 percent
Parent material: Colluvium derived from sandstone and shale

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately rapid
Flooding: None
Available water capacity: Low
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches

Typical Profile

Surface layer:
0 to 1 inch—very dark grayish brown cobbly loam

Subsurface layer:
1 to 7 inches—yellowish brown cobbly loam

Subsoil:
7 to 40 inches—yellowish brown cobbly loam
40 to 56 inches—yellowish brown very cobbly clay loam

Substratum:
56 to 60 inches—yellowish brown very gravelly sandy loam

Contrasting Inclusions

• The moderately deep Gilpin soils
• Areas of rock outcrop on the upper hillsides
• Soils that are in drainageways and have stones on the surface.

Use and Management

Major use: Woodland
Common woodland vegetation: Oak-hickory type with cove hardwoods on north aspects

Cropland

Suitability: Unsuited
Management considerations:
• The low available water capacity, the slope, the hazard of erosion, and the coarse fragments on the surface and in the subsoil are limitations affecting cropland.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• The quality and quantity of forage can be maintained by a rotation grazing system, weed control by mowing and clipping, and applications of fertilizer and lime.
• Forage and hay yields may be reduced in dry years because of the low available water capacity.

Woodland

Suitability: Moderately suited
Management considerations:
• Constructing diversions and water bars and seeding cut and filled areas help to control erosion on roads and landings.
• Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Poorly suited
Management considerations:
• The slope is a limitation affecting building site development.

• The steepness of slope hinders the construction of streets and roads.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
• Distribution lines for septic tank absorption fields should be installed in the less sloping areas.

Interpretive Groups

Land capability classification: 6s

JnD—Jefferson cobbly loam, 12 to 20 percent slopes, stony

Composition

Jefferson soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Benches, footslopes, and coves
Shape of areas: Irregular
Size of areas: 5 to 50 acres
Slope range: 12 to 20 percent
Parent material: Colluvium derived from sandstone and shale

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately rapid
Flooding: None
Available water capacity: Low
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches

Typical Profile

Surface layer:
0 to 1 inch—very dark grayish brown cobbly loam

Subsurface layer:
1 to 7 inches—yellowish brown cobbly loam

Subsoil:
7 to 40 inches—yellowish brown cobbly loam
40 to 56 inches—yellowish brown very cobbly clay loam

Substratum:
56 to 60 inches—yellowish brown very gravelly sandy loam

Contrasting Inclusions

• Moderately deep soils that are underlain by shale bedrock
• Areas of rock outcrop on the upper hillsides

Use and Management

Major use: Woodland
Common woodland vegetation: Oak-hickory type with cove hardwoods on north aspects and at the head of hollows

Cropland

Suitability: Unsuited
Management considerations:
• The stones or cobbles on the surface and in the subsoil hinder tillage and reduce yields.

Pasture and hay

Suitability: Poorly suited
Management considerations:
• The stones or cobbles on the surface limit many management practices.

Woodland

Suitability: Moderately suited
Management considerations:
• Constructing diversions and water bars and seeding cut and filled areas help to control erosion on roads and landings.
• Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Poorly suited
Management considerations:
• The slope and the stoniness are limitations affecting building site development.
• The steepness of slope hinders the construction of streets and roads.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
• Distribution lines for septic tank absorption fields should be installed in the less sloping areas.

Interpretive Groups

Land capability classification: 6s

JnF—Jefferson cobbly loam, 20 to 50 percent slopes, stony

Composition

Jefferson soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Hillsides, footslopes, and coves
Shape of areas: Irregular
Size of areas: 10 to 1,000 acres
Slope range: 20 to 50 percent
Parent material: Colluvium derived from sandstone and shale

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately rapid
Flooding: None
Available water capacity: Low
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches

Typical Profile

Surface layer:
0 to 1 inch—very dark grayish brown cobbly loam

Subsurface layer:
1 to 7 inches—yellowish brown cobbly loam

Subsoil:
7 to 40 inches—yellowish brown cobbly loam
40 to 56 inches—yellowish brown very cobbly clay loam

Substratum:
56 to 60 inches—yellowish brown very gravelly sandy loam

Contrasting Inclusions

- The moderately deep Gilpin soils
- Areas of rock outcrop on the upper hillsides

Use and Management

Major use: Woodland
Common woodland vegetation: Oak-hickory type with cove hardwoods on north aspects and at the head of hollows

Cropland

Suitability: Unsuited
Management considerations:
- This soil is unsuited to row crops because of the very steep slopes, the stones and cobbles on the surface and in the subsoil, and the low available water capacity.

Pasture and hay

Suitability: Unsuited
Management considerations:
- The stones and cobbles on the surface and the steep slopes are limitations affecting most management practices.

Woodland

Suitability: Moderately suited
Management considerations:
- Constructing water bars or broad-based dips to direct water and sediment away from roads and streams and into duff layers or filter strips helps to prevent damage to roads and skid trails and sedimentation of streams.
- Cut and filled areas should be seeded to help establish a permanent cover of vegetation.
- Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.
- The steep slope limits the use of equipment.

Building site development

Suitability: Unsuited
Management considerations:
- The steep slope is a limitation affecting building site development.
- The steepness of slope hinders the construction of streets and roads.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
- Distribution lines for septic tank absorption fields should be installed in the less sloping areas.

Interpretive Groups

Land capability classification: 7s

JsD—Jefferson-Shelocta complex, 10 to 20 percent slopes

Composition

Jefferson soil and similar components: 60 percent
Shelocta soil and similar components: 40 percent

Setting

Landscape position: Hillsides and footslopes
Shape of areas: Irregular

Size of areas: 10 to 100 acres
Slope range: 10 to 20 percent
Parent material: Colluvium derived from sandstone and shale

Soil Properties and Qualities

Jefferson

Drainage class: Well drained
Permeability: Moderately rapid
Flooding: None
Available water capacity: Low
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches

Shelocta

Drainage class: Well drained
Permeability: Moderate
Flooding: None
Available water capacity: Moderate
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 48 inches

Typical Profile

Jefferson

Surface layer:
0 to 1 inch—very dark grayish brown cobbly loam

Subsurface layer:
1 to 7 inches—yellowish brown cobbly loam

Subsoil:
7 to 40 inches—yellowish brown cobbly loam
40 to 56 inches—yellowish brown very cobbly clay loam

Substratum:
56 to 60 inches—yellowish brown very gravelly sandy loam

Shelocta

Surface layer:
0 to 1 inch—dark brown loam

Subsurface layer:
1 to 3 inches—yellowish brown loam

Subsoil:
3 to 11 inches—yellowish brown loam
11 to 40 inches—yellowish brown silty clay loam
40 to 50 inches—brownish yellow channery silty clay loam

Substratum:
50 to 60 inches—soft, multicolored shale bedrock

Contrasting Inclusions

- Small areas of Varilla soils
- Areas of rock outcrop on the upper hillsides
- Small areas of soils that are less than 40 inches deep over bedrock

Use and Management

Major use: Woodland
Common woodland vegetation: Oak-hickory type

Cropland

Suitability: Unsuited
Management considerations:
- These soils are unsuited to row crops because of the slope, the hazard of erosion, and the coarse fragments on the surface and in the subsoil.

Pasture and hay

Suitability: Moderately suited
Management considerations:
- The quality and quantity of forage can be maintained by a rotation grazing system, weed control by mowing and clipping, and applications of fertilizer and lime.

Woodland

Suitability: Moderately suited
Management considerations:
- The slope is a limitation affecting forest management.
- Constructing diversions and water bars and seeding cut and filled areas help to control erosion on roads and landings.
- Carefully managing reforestation after harvest minimizes plant competition.

Building site development

Suitability: Poorly suited
Management considerations:
- Structures should be designed so that they conform to the natural slope of the land.
- The steepness of slope hinders the construction of streets and roads.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
- Installing the distribution lines on the contour helps to overcome the slope.

Interpretive Groups

Land capability classification: 6s

JsF—Jefferson-Shelocta complex, 20 to 45 percent slopes

Composition

Jefferson soil and similar components: 60 percent
Shelocta soil and similar components: 40 percent

Setting

Landscape position: Hillsides and footslopes
Shape of areas: Irregular
Size of areas: 10 to 100 acres
Slope range: 20 to 45 percent
Parent material: Colluvium derived from sandstone and shale

Soil Properties and Qualities

Jefferson

Drainage class: Well drained
Permeability: Moderately rapid
Flooding: None
Available water capacity: Low
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches

Shelocta

Drainage class: Well drained
Permeability: Moderate
Flooding: None
Available water capacity: Moderate
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 48 inches

Typical Profile

Jefferson

Surface layer:
0 to 1 inch—very dark grayish brown cobbly loam

Subsurface layer:
1 to 7 inches—yellowish brown cobbly loam

Subsoil:
7 to 40 inches—yellowish brown cobbly loam
40 to 56 inches—yellowish brown very cobbly clay loam

Substratum:
56 to 60 inches—yellowish brown very gravelly sandy loam

Shelocta

Surface layer:
0 to 1 inch—dark brown loam

Subsurface layer:
1 to 3 inches—yellowish brown loam

Subsoil:
3 to 11 inches—yellowish brown loam
11 to 40 inches—yellowish brown silty clay loam
40 to 50 inches—brownish yellow channery silty clay loam

Substratum:
50 to 60 inches—soft, multicolored shale bedrock

Contrasting Inclusions

- Small areas of Varilla soils
- Areas of rock outcrop on the upper hillsides
- Small areas of soils that are less than 40 inches deep over bedrock

Use and Management

Major use: Woodland
Common woodland vegetation: Oak-hickory type

Cropland

Suitability: Unsuited
Management considerations:
- These soils are unsuited to row crops because of the steep and very steep slopes.

Pasture and hay

Suitability: Unsuited
Management considerations:
- Because of the steep and very steep slopes, the establishment and management of pasture and hay are difficult.

Woodland

Suitability: Moderately suited
Management considerations:
- Constructing water bars or broad-based dips to direct water and sediment away from roads and streams and into duff layers or filter strips helps to prevent damage to roads and skid trails and sedimentation of streams.
- Cut and filled areas should be seeded to help establish a permanent cover of vegetation.
- The steep slope limits the use of equipment.
- Carefully managing reforestation after harvest minimizes plant competition.

Building site development

Suitability: Unsuited
Management considerations:
- The slope is a limitation affecting building site development.

• The steepness of slope hinders the construction of streets and roads.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
• Distribution lines for septic tank absorption fields should be installed in the less sloping areas.

Interpretive Groups

Land capability classification: 7s

JvD—Jefferson-Varilla-Shelocta complex, 10 to 20 percent slopes, very stony

Composition

Jefferson soil and similar components: 60 percent
Varilla soil and similar components: 25 percent
Shelocta soil and similar components: 15 percent

Setting

Landscape position: Deep gorges
Shape of areas: Irregular
Size of areas: 20 to 100 acres
Slope range: 10 to 20 percent
Parent material: Colluvium derived from sandstone and shale and residuum derived from shale and siltstone

Soil Properties and Qualities

Jefferson

Drainage class: Well drained
Permeability: Moderately rapid
Flooding: None
Available water capacity: Low
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches

Varilla

Drainage class: Somewhat excessively drained
Permeability: Moderately rapid
Flooding: None
Available water capacity: Low
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: 48 to more than 60 inches

Shelocta

Drainage class: Well drained
Permeability: Moderate
Flooding: None
Available water capacity: Moderate
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 48 inches

Typical Profile

Jefferson

Surface layer:
0 to 1 inch—very dark grayish brown cobbly loam

Subsurface layer:
1 to 7 inches—yellowish brown cobbly loam

Subsoil:
7 to 40 inches—yellowish brown cobbly loam
40 to 56 inches—yellowish brown very cobbly clay loam

Substratum:
56 to 60 inches—yellowish brown very gravelly sandy loam

Varilla

Surface layer:
0 to 1 inch—very dark grayish brown very cobbly sandy loam

Subsoil:
1 to 7 inches—brown very cobbly sandy loam
7 to 44 inches—dark yellowish brown very cobbly sandy loam

Substratum:
44 to 60 inches—yellowish brown very cobbly sandy loam

Shelocta

Surface layer:
0 to 1 inch—dark brown loam

Subsurface layer:
1 to 3 inches—yellowish brown loam

Subsoil:
3 to 11 inches—yellowish brown loam
11 to 40 inches—yellowish brown silty clay loam
40 to 50 inches—brownish yellow channery silty clay loam

Substratum:
50 to 60 inches—soft, multicolored shale bedrock

Contrasting Inclusions

• Areas of rock outcrop on the upper hillsides

• Soils that are less than 40 inches deep over bedrock
• Soils that have very large boulders on the surface

Use and Management

Major use: Woodland
Common woodland vegetation: Cove hardwoods

Cropland

Suitability: Unsuited
Management considerations:
• These soils are unsuited to row crops because of the severely dissected landscape, the slope, the low available water capacity, and the stones and cobbles on the surface.

Pasture and hay

Suitability: Poorly suited
Management considerations:
• The stones and cobbles on the surface limit many management practices.

Woodland

Suitability: Moderately suited
Management considerations:
• Constructing diversions and water bars and seeding cut and filled areas help to control erosion on roads and landings.
• The stones on the surface can interfere with harvesting, yarding, and other logging operations that involve the use of equipment.
• Carefully managing reforestation after harvest minimizes plant competition.

Building site development

Suitability: Poorly suited
Management considerations:
• Because of the large number of stones on the surface, these soils are severely limited as a site for most urban development.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
• Contamination of ground water is possible because the soils have a high content of sand and coarse fragments and thus do not sufficiently filter effluent.
• Distribution lines for septic tank absorption fields should be installed in the less sloping areas.

Interpretive Groups

Land capability classification: 6s

JvF—Jefferson-Varilla-Shelocta complex, 20 to 60 percent slopes, very stony

Composition

Jefferson soil and similar components: 60 percent
Varilla soil and similar components: 25 percent
Shelocta soil and similar components: 15 percent

Setting

Landscape position: Deep gorges
Shape of areas: Irregular
Size of areas: 20 to 1,000 acres
Slope range: 20 to 60 percent
Parent material: Colluvium derived from sandstone and shale and residuum derived from shale and siltstone

Soil Properties and Qualities

Jefferson

Drainage class: Well drained
Permeability: Moderately rapid
Flooding: None
Available water capacity: Low
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 60 inches

Varilla

Drainage class: Somewhat excessively drained
Permeability: Moderately rapid
Flooding: None
Available water capacity: Low
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 48 inches

Shelocta

Drainage class: Well drained
Permeability: Moderate
Flooding: None
Available water capacity: Moderate
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 48 inches

Typical Profile

Jefferson

Surface layer:
0 to 1 inch—very dark grayish brown cobbly loam

Subsurface layer:
1 to 7 inches—yellowish brown cobbly loam

Subsoil:
7 to 40 inches—yellowish brown cobbly loam
40 to 56 inches—yellowish brown very cobbly clay loam

Substratum:
56 to 60 inches—yellowish brown very gravelly sandy loam

Varilla

Surface layer:
0 to 1 inch—very dark grayish brown very cobbly sandy loam

Subsoil:
1 to 7 inches—brown very cobbly sandy loam
7 to 44 inches—dark yellowish brown very cobbly sandy loam

Substratum:
44 to 60 inches—yellowish brown very cobbly sandy loam

Shelocta

Surface layer:
0 to 1 inch—dark brown loam

Subsurface layer:
1 to 3 inches—yellowish brown loam

Subsoil:
3 to 11 inches—yellowish brown loam
11 to 40 inches—yellowish brown silty clay loam
40 to 50 inches—brownish yellow channery silty clay loam

Substratum:
50 to 60 inches—soft, multicolored shale bedrock

Contrasting Inclusions

- Areas of rock outcrop on the upper hillsides
- Soils that are less than 40 inches deep over bedrock
- Soils that have very large boulders on the surface

Use and Management

Major use: Woodland
Common woodland vegetation: Cove hardwoods

Cropland

Suitability: Unsuited
Management considerations:
- This soil is unsuited to row crops because of the steep and very steep slopes and the stones and cobbles on the surface and in the subsoil.

Pasture and hay

Suitability: Unsuited
Management considerations:
- The steep and very steep slopes and the stones and cobbles on the surface are limitations affecting most management practices.

Woodland

Suitability: Moderately suited
Management considerations:
- Constructing diversions and water bars and seeding cut and filled areas help to control erosion on roads and landings.
- The steep and very steep slopes limit the use of equipment.
- The stones on the surface can interfere with harvesting, yarding, and other logging operations that involve the use of equipment (fig. 8).
- Carefully managing reforestation after harvest minimizes plant competition.

Building site development

Suitability: Unsuited
Management considerations:
- The steep and very steep slopes and the large number of stones on the surface are severe limitations affecting most urban development.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
- Contamination of ground water is possible because the soils have a high content of sand and coarse fragments and thus do not sufficiently filter effluent.
- Distribution lines for septic tank absorption fields should be installed in the less sloping areas.

Interpretive Groups

Land capability classification: 7s

LIB—Lily loam, 2 to 5 percent slopes

Composition

Lily soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Broad ridgetops
Shape of areas: Irregular
Size of areas: 5 to 25 acres
Slope range: 2 to 5 percent
Parent material: Sandstone residuum

Soil Properties and Qualities

Drainage class: Well drained

Figure 8.—An area of Jefferson-Varilla-Shelocta complex, 20 to 60 percent slopes, very stony. Stones and boulders are common on the surface in areas of this map unit.

Permeability: Moderately rapid
Flooding: None
Available water capacity: Low or moderate
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: 20 to 40 inches

Typical Profile

Surface layer:
0 to 2 inches—brown loam

Subsoil:
2 to 31 inches—yellowish brown loam

Substratum:
31 to 35 inches—brownish yellow cobbly sandy loam

Bedrock:
35 inches—hard sandstone

Contrasting Inclusions

- Soils that are more than 40 inches deep over bedrock
- Soils that are less than 20 inches deep over hard bedrock
- Soils that are underlain by soft bedrock

Use and Management

Major use: Woodland or pasture
Common woodland vegetation: Oak-pine type

Cropland

Suitability: Well suited
Management considerations:
- Most crops commonly grown in the county respond to applications of lime and fertilizer.
- Minimum tillage, crop rotations that include grasses and legumes, and crop residue management help to control erosion.
- The depth to bedrock limits the amount of water available to plants.
- Site-specific recommendations are needed.

Pasture and hay

Suitability: Well suited
Management considerations:
- The quality and quantity of forage can be maintained by applications of fertilizer and lime, weed control by mowing and clipping, and measures that prevent overgrazing.

Woodland

Suitability: Well suited
Management considerations:
- Reforestation is limited mainly by low fertility.

Building site development

Suitability: Moderately suited
Management considerations:
- Excavation is difficult because of the limited depth to bedrock.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
- Installation of septic tank absorption fields is hindered and permeability is restricted because of the limited depth to bedrock.

Interpretive Groups

Land capability classification: 2e

LIC—Lily loam, 5 to 12 percent slopes

Composition

Lily soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Ridgetops and side slopes
Shape of areas: Irregular
Size of areas: 5 to 1,000 acres
Slope range: 5 to 12 percent
Parent material: Sandstone residuum

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately rapid
Flooding: None
Available water capacity: Low or moderate
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: 20 to 40 inches

Typical Profile

Surface layer:
0 to 2 inches—brown loam

Subsoil:
2 to 31 inches—yellowish brown loam

Substratum:
31 to 35 inches—brownish yellow cobbly sandy loam

Bedrock:
35 inches—hard sandstone

Contrasting Inclusions

- Soils that are more than 40 inches deep over bedrock
- Soils that are less than 20 inches deep over hard bedrock
- Soils that are underlain by soft bedrock

Use and Management

Major use: Woodland or pasture
Common woodland vegetation: Oak-pine type

Cropland

Suitability: Moderately suited
Management considerations:
- Most crops commonly grown in the county respond to applications of lime and fertilizer.
- Minimum tillage, stripcropping, crop rotations that include grasses and legumes, and crop residue management help to control erosion (fig. 9).
- Site-specific recommendations are needed.
- The depth to bedrock limits the amount of water available to plants.

Pasture and hay

Suitability: Well suited
Management considerations:
- The quality and quantity of forage can be maintained by applications of fertilizer, weed control by mowing and clipping, and measures that prevent overgrazing.

Figure 9.—An area of Lily loam, 5 to 12 percent slopes, used for the stripcropping of corn and hay. Stripcropping and other conservation measures help to control erosion in areas that are row cropped.

Woodland

Suitability: Well suited
Management considerations:
- Reforestation is limited mainly by low fertility.
- The seedling survival rate is lower on the drier, south-facing slopes.

Building site development

Suitability: Moderately suited
Management considerations:
- Excavation is difficult because of the limited depth to bedrock.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
- Installation of septic tank absorption fields is hindered and permeability is restricted because of the limited depth to bedrock.

Interpretive Groups

Land capability classification: 3e

LID—Lily loam, 12 to 20 percent slopes

Composition

Lily soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Hillsides
Shape of areas: Irregular
Size of areas: 5 to 200 acres
Slope range: 12 to 20 percent
Parent material: Sandstone residuum

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately rapid
Flooding: None
Available water capacity: Low or moderate
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: 20 to 40 inches

Typical Profile

Surface layer:
0 to 2 inches—brown loam

Subsoil:
2 to 31 inches—yellowish brown loam

Substratum:
31 to 35 inches—brownish yellow cobbly sandy loam

Bedrock:
35 inches—hard sandstone

Contrasting Inclusions

- Soils that are more than 40 inches deep over bedrock
- Soil that are less than 20 inches deep over hard bedrock
- Soils that are underlain by soft bedrock

Use and Management

Major use: Woodland
Common woodland vegetation: Oak-pine type

Cropland

Suitability: Poorly suited
Management considerations:
- Minimum tillage, crop rotations that include grasses and legumes for long periods of time, and crop residue management help to control erosion.
- Site-specific recommendations are needed.
- The depth to bedrock limits the amount of water available to plants.

Pasture and hay

Suitability: Moderately suited
Management considerations:
- The quality and quantity of forage can be maintained by applications of fertilizer, weed control by mowing and clipping, and measures that prevent overgrazing.

Woodland

Suitability: Moderately suited
Management considerations:
- Reforestation is limited mainly by low fertility.
- The seedling survival rate is lower on drier, south-facing slopes.
- Constructing diversions and water bars and seeding cut and filled areas help to control erosion on roads and landings.

Building site development

Suitability: Poorly suited
Management considerations:
- Excavation is difficult because of the limited depth to bedrock.
- The slope is a limitation affecting building site development.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
- Installation of septic tank absorption fields is hindered and permeability is restricted because of the limited depth to bedrock.
- Distribution lines for septic tank absorption fields should be installed in the less sloping areas.

Interpretive Groups

Land capability classification: 4e

LIE—Lily loam, 20 to 35 percent slopes

Composition

Lily soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Hillsides
Shape of areas: Irregular
Size of areas: 5 to 100 acres
Slope range: 20 to 35 percent
Parent material: Sandstone residuum

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderately rapid
Flooding: None
Available water capacity: Low or moderate

Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: 20 to 40 inches

Typical Profile

Surface layer:
0 to 2 inches—brown loam

Subsoil:
2 to 31 inches—yellowish brown loam

Substratum:
31 to 35 inches—brownish yellow cobbly sandy loam

Bedrock:
35 to 40 inches—hard sandstone

Contrasting Inclusions

- Small areas of soils that are more than 40 inches deep over bedrock
- Small areas of the shallow Ramsey soils
- Soils that are underlain by soft bedrock

Use and Management

Major use: Woodland
Common woodland vegetation: Oak-pine type

Cropland

Suitability: Unsuited
Management considerations:
- Because of the moderately steep slopes and a very severe erosion hazard, this soil should not be used as cropland.

Pasture and hay

Suitability: Poorly suited
Management considerations:
- The quality and quantity of forage can be maintained by applications of fertilizer, weed control by mowing and clipping, and measures that prevent overgrazing.
- The moderately steep slope is a limitation affecting most management practices.

Woodland

Suitability: Moderately suited
Management considerations:
- Reforestation is limited mainly by low fertility.
- The seedling survival rate is lower on drier, south-facing slopes.
- Constructing diversions and water bars and seeding cut and filled areas help to control erosion on roads and landings.
- The moderately steep slope limits the use of equipment.

Building site development

Suitability: Unsuited
Management considerations:
- Excavation is difficult because of the limited depth to bedrock.
- The moderately steep slope is a limitation affecting building site development.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
- Distribution lines for septic tank absorption fields should be installed in the less sloping areas.

Interpretive Groups

Land capability classification: 6e

LnC—Lily-Lonewood complex, 5 to 12 percent slopes, rocky

Composition

Lily soil and similar components: 60 percent
Lonewood soil and similar components: 30 percent
Rock outcrop: 1 to 7 percent
Contrasting components: 3 to 9 percent

Setting

Landscape position: Broad ridgetops
Shape of areas: Irregular
Size of areas: 10 to 50 acres
Slope range: 5 to 12 percent
Parent material: Residuum derived from interbedded sandstone and shale

Soil Properties and Qualities

Lily

Drainage class: Well drained
Permeability: Moderately rapid
Flooding: None
Available water capacity: Low or moderate
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: 20 to 40 inches

Lonewood

Drainage class: Well drained
Permeability: Moderate
Flooding: None
Available water capacity: High
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid

Depth to bedrock: 40 to more than 60 inches

Typical Profile

Lily

Surface layer:
0 to 2 inches—brown loam

Subsoil:
2 to 31 inches—yellowish brown loam

Substratum:
31 to 35 inches—brownish yellow cobbly sandy loam

Bedrock:
35 inches—hard sandstone

Lonewood

Surface layer:
0 to 1 inch—dark brown loam

Subsoil:
1 to 10 inches—yellowish brown loam
10 to 37 inches—yellowish brown clay loam
37 to 55 inches—strong brown, mottled silty clay loam
55 to 72 inches—strong brown, mottled clay loam
72 to 80 inches—soft sandstone bedrock

Rock outcrop

The rock outcrop occurs as sandstone bedrock outcroppings that are 1 to 5 feet across and commonly protrude less than 1 foot above the soil surface.

Contrasting Inclusions

- The moderately deep Gilpin soils
- The clayey Muse soils

Use and Management

Major use: Woodland or pasture
Common woodland vegetation: Oak-pine type

Cropland

Suitability: Poorly suited
Management considerations:
- The rock outcrop is a severe limitation affecting cultivation.
- Minimum tillage, crop rotations that include grasses and legumes, and crop residue management help to control erosion.
- Site-specific recommendations are needed.

Pasture and hay

Suitability: Moderately suited
Management considerations:
- The quality and quantity of forage can be maintained by a rotation grazing system, weed control by mowing and clipping, and applications of fertilizer and lime.
- The rock outcrop is a limitation affecting many management practices.

Woodland

Suitability: Well suited
Management considerations:
- Carefully managing reforestation after harvest minimizes plant competition.

Building site development

Suitability: Moderately suited
Management considerations:
- Excavation is difficult because of the limited depth to bedrock and the rock outcrop.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
- Installation of septic tank absorption fields is hindered and permeability is restricted because of the limited depth to bedrock.
- Installing the distribution lines on the contour helps to overcome the slope.

Interpretive Groups

Land capability classification: 4s

LwB—Lonewood loam, 2 to 5 percent slopes

Composition

Lonewood soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Ridgetops and broad flats
Shape of areas: Irregular
Size of areas: 5 to 100 acres
Slope range: 2 to 5 percent
Parent material: Loess underlain by residuum derived from interbedded shale and sandstone

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Flooding: None
Available water capacity: High
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: 40 to more than 60 inches

Typical Profile

Surface layer:
0 to 1 inch—dark brown loam

Subsoil:
1 to 10 inches—yellowish brown loam
10 to 37 inches—yellowish brown clay loam
37 to 55 inches—strong brown, mottled silty clay loam
55 to 72 inches—strong brown, mottled clay loam
72 to 80 inches—soft sandstone bedrock

Contrasting Inclusions

- Moderately deep Lily soils in landscape positions similar to those of the Lonewood soil
- Moderately deep clayey soils in landscape positions similar to those of the Lonewood soil

Use and Management

Major use: Pasture and woodland
Common woodland vegetation: Oak-hickory type

Cropland

Suitability: Well suited
Management considerations:
- This soil is well suited to most of the climatically adapted crops grown in the county.
- Minimum tillage, crop rotations that include grasses and legumes, and crop residue management help to control erosion.
- Site-specific recommendations are needed.

Pasture and hay

Suitability: Well suited
Management considerations:
- Overgrazing reduces the extent of the plant cover, increases the hazard of erosion, and results in surface compaction and the growth of weeds.
- Deferred grazing, proper stocking rates, and a good fertilization program help to keep the soil and forage in good condition.

Woodland

Suitability: Well suited
Management considerations:
- Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Moderately suited
Management considerations:
- This soil is severely limited as a site for local roads and streets because of low strength.
- Providing suitable subgrade or base material helps to prevent the damage caused by low strength.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
- Increasing the size of the absorption area helps to compensate for the restricted permeability.

Interpretive Groups

Land capability classification: 2e

LwC—Lonewood loam, 5 to 12 percent slopes

Composition

Lonewood soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Ridgetops
Shape of areas: Irregular
Size of areas: 5 to 100 acres
Slope range: 5 to 12 percent
Parent material: Loess underlain by residuum derived from interbedded shale and sandstone

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Flooding: None
Available water capacity: High
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: 40 to more than 60 inches

Typical Profile

Surface layer:
0 to 1 inch—dark brown loam

Subsoil:
1 to 10 inches—yellowish brown loam
10 to 37 inches—yellowish brown clay loam
37 to 55 inches—strong brown, mottled silty clay loam
55 to 72 inches—strong brown, mottled clay loam
72 to 80 inches—soft sandstone bedrock

Contrasting Inclusions

- Moderately deep Lily soils in landscape positions similar to those of the Lonewood soil
- Moderately deep clayey soils in landscape positions similar to those of the Lonewood soil

Use and Management

Major use: Pasture and woodland
Common woodland vegetation: Oak-hickory type

Cropland

Suitability: Moderately suited
Management considerations:
• This soil is well suited to most of the climatically adapted crops grown in the county.
• Minimum tillage, crop rotations that include grasses and legumes, and crop residue management help to control erosion.
• Site-specific recommendations are needed.

Pasture and hay

Suitability: Well suited
Management considerations:
• Overgrazing reduces the extent of the plant cover, increases the hazard of erosion, and results in surface compaction and the growth of weeds.
• Deferred grazing, proper stocking rates, and a good fertilization program help to keep the soil and forage in good condition.

Woodland

Suitability: Well suited
Management considerations:
• Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Moderately suited
Management considerations:
• This soil is severely limited as a site for local roads and streets because of low strength.
• Providing suitable subgrade or base material helps to prevent the damage caused by low strength.
• Structures should be designed so that they conform to the natural slope of the land.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
• Increasing the size of the absorption area helps to compensate for the restricted permeability.
• Installing the distribution lines on the contour helps to overcome the slope.

Interpretive Groups

Land capability classification: 3e

MuD—Muse silt loam, 10 to 20 percent slopes

Composition

Muse soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Hillsides
Shape of areas: Irregular
Size of areas: 5 to 25 acres
Slope range: 10 to 20 percent
Parent material: Shale residuum

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Slow
Flooding: None
Available water capacity: Moderate
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: 40 to 80 inches

Typical Profile

Surface layer:
0 to 1 inch—very dark grayish brown silt loam

Subsoil:
1 to 5 inches—dark yellowish brown silt loam
5 to 13 inches—yellowish brown silty clay loam
13 to 47 inches—yellowish brown, mottled clay

Substratum:
47 to 54 inches—brownish and grayish, mottled channery clay
54 to 60 inches—soft, multicolored shale bedrock

Contrasting Inclusions

• The moderately deep Gilpin soils
• Soils that are less than 40 inches deep over hard bedrock

Use and Management

Major use: Woodland
Common woodland vegetation: Oak-hickory type

Cropland

Suitability: Poorly suited
Management considerations:
• This soil is poorly suited to row crops because of a severe erosion hazard on slopes.

Pasture and hay

Suitability: Moderately suited

Management considerations:
• Overgrazing reduces the extent of the plant cover, increases the hazard of erosion, and results in surface compaction and the growth of weeds.
• Deferred grazing, proper stocking rates, and a good fertilization program help to keep the soil and forage in good condition.

Woodland

Suitability: Moderately suited
Management considerations:
• Constructing diversions and water bars and seeding cut and filled areas help to control erosion on roads and landings.
• Carefully managing reforestation after harvest minimizes plant competition.

Building site development

Suitability: Poorly suited
Management considerations:
• Structures should be designed so that they conform to the natural slope of the land.
• Excavation is difficult because of the clayey subsoil.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
• The slope and the slow permeability in the subsoil are limitations affecting septic tank absorption fields.
• Other sites should be considered.

Interpretive Groups

Land capability classification: 4e

PI—Pits, limestone quarry

Composition

Bare limestone rock: 95 to 100 percent
Contrasting components: 0 to 5 percent

Setting

Landscape position: Mined sites
Shape of areas: Irregular
Size of areas: 5 to 200 acres
Slope range: Varies

Description of Map Unit

This map unit consists of areas where large, deep pits have been dug during the mining of limestone for gravel and lime. Areas of the map unit consist almost entirely of bare rock.

Use and Management

This map unit is unsuited to most uses except recreation.

Interpretive Groups

Land capability classification: None assigned

Ps—Pits, sandstone quarry

Composition

Bare sandstone rock: 95 to 100 percent
Contrasting components: 0 to 5 percent

Setting

Landscape position: Mined sites
Shape of areas: Irregular
Size of areas: 5 to 200 acres
Slope range: Varies

Description of Map Unit

This map unit consists of areas where pits and trenches of varying depths have been dug during the mining of sandstone rock. The rock is known locally as Crab Orchard sandstone. It is used as building stone. Areas of the map unit consist almost entirely of bare rock.

Use and Management

This map unit is unsuited to most uses except recreation.

Interpretive Groups

Land capability classification: None assigned

RaC—Ramsey loam, 5 to 12 percent slopes

Composition

Ramsey soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Ridgetops
Shape of areas: Irregular
Size of areas: 10 to 200 acres
Slope range: 5 to 12 percent
Parent material: Sandstone residuum

Soil Properties and Qualities

Drainage class: Somewhat excessively drained
Permeability: Rapid

Flooding: None
Available water capacity: Very low
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: Less than 20 inches

Typical Profile

Surface layer:
0 to 2 inches—dark yellowish brown loam

Subsoil:
2 to 15 inches—dark yellowish brown loam
15 to 18 inches—yellowish brown sandy loam

Bedrock:
18 inches—hard sandstone

Contrasting Inclusions

- Soils that are more than 20 inches deep over bedrock
- Soils that have more clay in the subsoil than the Ramsey soil

Use and Management

Major use: Woodland
Common woodland vegetation: Oak-pine type

Cropland

Suitability: Unsuited
Management considerations:
- The depth to bedrock severely limits the rooting depth of plants and the amount of water available to plants.

Pasture and hay

Suitability: Poorly suited
Management considerations:
- The low available water capacity reduces yields and limits the response of plants to fertilizer.
- Only plants that can withstand droughty conditions during the summer should be planted.

Woodland

Suitability: Poorly suited
Management considerations:
- Reforestation is limited by the depth to bedrock, a low fertility level, and the droughtiness of the soil.
- Trees are commonly subject to windthrow because rooting depth is restricted by the bedrock.

Building site development

Suitability: Unsuited
Management considerations:
- Excavation is difficult because of the limited depth to bedrock.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
- Installation of septic tank absorption fields is hindered and permeability is restricted because of the limited depth to bedrock.

Interpretive Groups

Land capability classification: 6e

RaD—Ramsey loam, 12 to 20 percent slopes

Composition

Ramsey soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Hillsides
Shape of areas: Irregular
Size of areas: 10 to 200 acres
Slope range: 12 to 20 percent
Parent material: Sandstone residuum

Soil Properties and Qualities

Drainage class: Somewhat excessively drained
Permeability: Rapid
Flooding: None
Available water capacity: Very low
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: Less than 20 inches

Typical Profile

Surface layer:
0 to 2 inches—dark yellowish brown loam

Subsoil:
2 to 15 inches—dark yellowish brown loam
15 to 18 inches—yellowish brown sandy loam

Bedrock:
18 inches—hard sandstone

Contrasting Inclusions

- Soils that are more than 20 inches deep over bedrock
- Soils that have more clay in the subsoil than the Ramsey soil

Use and Management

Major use: Woodland
Common woodland vegetation: Oak-pine type

Cropland

Suitability: Unsuited
Management considerations:
• The depth to bedrock severely limits the rooting depth of plants and the amount of water available to plants.

Pasture and hay

Suitability: Poorly suited
Management considerations:
• The low available water capacity reduces yields and limits the response of plants to fertilizer.
• Only plants that can withstand droughty conditions during the summer should be planted.

Woodland

Suitability: Poorly suited
Management considerations:
• Reforestation is limited by the depth to bedrock, a low fertility level, and the droughtiness of the soil.
• Trees are commonly subject to windthrow because rooting depth is restricted by the bedrock.

Building site development

Suitability: Unsuited
Management considerations:
• Excavation is difficult because of the limited depth to bedrock.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
• Installation of septic tank absorption fields is hindered and permeability is restricted because of the limited depth to bedrock.

Interpretive Groups

Land capability classification: 6e

RaF—Ramsey loam, 20 to 50 percent slopes

Composition

Ramsey soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Hillsides
Shape of areas: Irregular
Size of areas: 10 to 100 acres
Slope range: 20 to 50 percent
Parent material: Sandstone residuum

Soil Properties and Qualities

Drainage class: Somewhat excessively drained
Permeability: Rapid
Flooding: None
Available water capacity: Very low
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: Less than 20 inches

Typical Profile

Surface layer:
0 to 2 inches—dark yellowish brown loam

Subsoil:
2 to 15 inches—dark yellowish brown loam
15 to 18 inches—yellowish brown sandy loam

Bedrock:
18 inches—hard sandstone

Contrasting Inclusions

• Soils that are more than 20 inches deep over bedrock
• Soils that have more clay in the subsoil than the Ramsey soil

Use and Management

Major use: Woodland
Common woodland vegetation: Oak-pine type

Cropland

Suitability: Unsuited
Management considerations:
• The depth to bedrock severely limits the rooting depth of plants and the amount of water available to plants.
• This soil is unsuited to row crops because of a very severe erosion hazard on the steep and very steep slopes.

Pasture and hay

Suitability: Unsuited
Management considerations:
• Because of the steep and very steep slopes, applying good grazing management is difficult.

Woodland

Suitability: Poorly suited
Management considerations:
• Constructing water bars or broad-based dips to direct water and sediment away from roads and streams and into duff layers or filter strips helps to prevent damage to roads and skid trails and sedimentation of streams.

• Cut and filled areas should be seeded to help establish a permanent cover of vegetation.
• Reforestation is limited by the depth to bedrock, a low fertility level, and the droughtiness of the soil.
• Trees are commonly subject to windthrow because rooting depth is restricted by the bedrock.

Building site development

Suitability: Unsuited
Management considerations:
• The slope is a limitation affecting building site development.
• Excavation is difficult because of the limited depth to bedrock.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
• Installation of septic tank absorption fields is hindered and permeability is restricted because of the limited depth to bedrock.
• Distribution lines for septic tank absorption fields should be installed in the less sloping areas.

Interpretive Groups

Land capability classification: 7e

RrC—Ramsey-Rock outcrop complex, 5 to 12 percent slopes

Composition

Ramsey soil and similar components: 85 percent
Rock outcrop: 15 percent

Setting

Landscape position: Broad ridgetops
Shape of areas: Irregular
Size of areas: 10 to 200 acres
Slope range: 5 to 12 percent
Parent material: Sandstone residuum

Soil Properties and Qualities

Ramsey

Drainage class: Somewhat excessively drained
Permeability: Rapid
Flooding: None
Available water capacity: Very low
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: Less than 20 inches

Typical Profile

Ramsey

Surface layer:
0 to 2 inches—dark yellowish brown loam

Subsoil:
2 to 15 inches—dark yellowish brown loam
15 to 18 inches—yellowish brown sandy loam

Bedrock:
18 inches—hard sandstone

Rock outcrop

The rock outcrop occurs as bedrock outcroppings that are 2 to 20 feet across and protrude as much as 4 feet above the soil surface.

Contrasting Inclusions

• Soils that are more than 20 inches deep over bedrock
• Soils that have more clay in the subsoil than the Ramsey soil

Use and Management

Major use: Woodland
Common woodland vegetation: Oak-pine type

Cropland

Suitability: Unsuited
Management considerations:
• The depth to bedrock severely limits the rooting depth of plants and the amount of water available to plants.
• The rock outcrop restricts cultivation in most areas.

Pasture and hay

Suitability: Unsuited
Management considerations:
• The low available water capacity reduces yields and limits the response of plants to fertilizer.
• Only plants that can withstand droughty conditions during the summer should be planted.
• The rock outcrop is a limitation affecting many management practices.

Woodland

Suitability: Poorly suited
Management considerations:
• Reforestation is limited by the depth to bedrock, a low fertility level, and the droughtiness of the soil.
• Trees are commonly subject to windthrow because rooting depth is restricted by the bedrock.

Building site development

Suitability: Unsuited
Management considerations:
• Excavation is difficult because of the rock outcrop and the limited depth to bedrock.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
• Installation of septic tank absorption fields is hindered and permeability is restricted because of the rock outcrop and the limited depth to bedrock.

Interpretive Groups

Land capability classification: Ramsey—6s

RrD—Ramsey-Rock outcrop complex, 12 to 20 percent slopes

Composition

Ramsey soil and similar components: 85 percent
Rock outcrop: 15 percent

Setting

Landscape position: Hillsides
Shape of areas: Irregular
Size of areas: 10 to 100 acres
Slope range: 12 to 20 percent
Parent material: Sandstone residuum

Soil Properties and Qualities

Ramsey

Drainage class: Somewhat excessively drained
Permeability: Rapid
Flooding: None
Available water capacity: Very low
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: Less than 20 inches

Typical Profile

Ramsey

Surface layer:
0 to 2 inches—dark yellowish brown loam

Subsoil:
2 to 15 inches—dark yellowish brown loam
15 to 18 inches—yellowish brown sandy loam

Bedrock:
18 inches—hard sandstone

Rock outcrop

The rock outcrop occurs as bedrock outcroppings that are 2 to 20 feet across and commonly protrude as much as 10 feet above the soil surface (fig. 10).

Contrasting Inclusions

• Soils that are more than 20 inches deep over bedrock
• Soils that have more clay in the subsoil than the Ramsey soil

Use and Management

Major use: Woodland
Common woodland vegetation: Oak-pine type

Cropland

Suitability: Unsuited
Management considerations:
• The depth to bedrock severely limits the rooting depth of plants and the amount of water available to plants.
• The rock outcrop restricts cultivation in most areas.

Pasture and hay

Suitability: Unsuited
Management considerations:
• The low available water capacity reduces yields and limits the response of plants to fertilizer.
• Only plants that can withstand droughty conditions during the summer should be planted.
• The rock outcrop is a limitation affecting many management practices.

Woodland

Suitability: Unsuited
Management considerations:
• Reforestation is limited by the depth to bedrock, a low fertility level, and the droughtiness of the soil.
• Trees are commonly subject to windthrow because rooting depth is restricted by the bedrock.

Building site development

Suitability: Unsuited
Management considerations:
• Excavation is difficult because of the rock outcrop and the limited depth to bedrock.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
• Installation of septic tank absorption fields is hindered and permeability is restricted because of the rock outcrop and the limited depth to bedrock.

Figure 10.—An area of Ramsey-Rock outcrop complex, 12 to 20 percent slopes. This map unit has severe limitations affecting most uses because of the large areas of sandstone rock outcrop.

Interpretive Groups

Land capability classification: Ramsey—7s

RrF—Ramsey-Rock outcrop complex, 20 to 50 percent slopes

Composition

Ramsey soil and similar components: 85 percent
Rock outcrop: 15 percent

Setting

Landscape position: Hillsides
Shape of areas: Irregular
Size of areas: 10 to 300 acres
Slope range: 20 to 50 percent
Parent material: Sandstone residuum

Soil Properties and Qualities

Ramsey

Drainage class: Somewhat excessively drained
Permeability: Rapid
Flooding: None
Available water capacity: Very low
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: Less than 20 inches

Typical Profile

Ramsey

Surface layer:
0 to 2 inches—dark yellowish brown loam

Subsoil:
2 to 15 inches—dark yellowish brown loam
15 to 18 inches—yellowish brown sandy loam

Bedrock:
18 inches—hard sandstone

Rock outcrop

The rock outcrop occurs as bedrock outcroppings that are 2 to 20 feet across and

commonly protrude as much as 10 feet above the soil surface.

Contrasting Inclusions

- Soils that are more than 20 inches deep over bedrock
- Soils that have more clay in the subsoil than the Ramsey soil

Use and Management

Major use: Woodland
Common woodland vegetation: Oak-pine type

Cropland

Suitability: Unsuited
Management considerations:
- Because of the steep and very steep slopes, the limited depth to bedrock, and the rock outcrop, this map unit is unsuited to cultivated crops.

Pasture and hay

Suitability: Unsuited
Management considerations:
- The low available water capacity reduces yields and limits the response of plants to fertilizer.
- Only plants that can withstand droughty conditions during the summer should be planted.
- The steep and very steep slopes and the rock outcrop are limitations affecting most management practices.

Woodland

Suitability: Unsuited
Management considerations:
- Constructing water bars or broad-based dips to direct water and sediment away from roads and streams and into duff layers or filter strips helps to prevent damage to roads and skid trails and sedimentation of streams.
- Cut and filled areas should be seeded to help establish a permanent cover of vegetation.
- Reforestation is limited by the depth to bedrock, low fertility, and the droughtiness of the Ramsey soil.
- The moderately steep to very steep slopes and the rock outcrop limit the use of equipment.
- Trees are commonly subject to windthrow because rooting depth is restricted by the bedrock.

Building site development

Suitability: Unsuited
Management considerations:
- Excavation is difficult because of the limited depth to bedrock and the rock outcrop.
- The slope is a limitation affecting building site development.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
- Installation of septic tank absorption fields is hindered and permeability is restricted because of the limited depth to bedrock, the steep slopes, and the rock outcrop.

Interpretive Groups

Land capability classification: Ramsey—7s

SeB—Sequatchie loam, 2 to 5 percent slopes

Composition

Sequatchie soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Low stream terraces
Shape of areas: Irregular
Size of areas: 5 to 20 acres
Slope range: 2 to 5 percent
Parent material: Alluvium

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Flooding: None
Available water capacity: High
Seasonal high water table: None
Soil reaction: Strongly acid or very strongly acid
Depth to bedrock: More than 60 inches

Typical Profile

Surface layer:
0 to 7 inches—dark brown loam

Subsoil:
7 to 12 inches—brown loam
12 to 28 inches—brown loam
28 to 39 inches—brown loam
39 to 51 inches—brown fine sandy loam

Substratum:
51 to 60 inches—brown sandy loam
60 to 68 inches—yellowish brown very gravelly sandy loam

Contrasting Inclusions

- Sullivan soils in the slightly lower landscape positions

Use and Management

Major use: Pasture or cropland
Common woodland vegetation: Oak-hickory type

Cropland

Suitability: Well suited
Management considerations:
- This soil can produce high yields of most crops; however, erosion is a moderate hazard.
- Minimum tillage, crop rotations that include grasses and legumes, and crop residue management help to control erosion.
- Site-specific recommendations are needed.

Pasture and hay

Suitability: Well suited
Management considerations:
- The quality and quantity of forage can be maintained by a rotation grazing system, weed control by mowing and clipping, and applications of fertilizer.

Woodland

Suitability: Well suited
Management considerations:
- Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Well suited
Management considerations:
- Only slight limitations affect most kinds of building site development.
- Low strength is a moderate limitation on sites for local roads and streets.

Septic tank absorption fields

Suitability: Well suited
Management considerations:
- Few limitations affect septic tank absorption fields.

Interpretive Groups

Land capability classification: 2e

Su—Sullivan loam, occasionally flooded

Composition

Sullivan soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Flood plains
Shape of areas: Long and linear
Size of areas: 5 to 20 acres
Slope range: 0 to 2 percent
Parent material: Alluvium

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Flooding: Occasional
Available water capacity: High
Seasonal high water table: At a depth of 4 to 6 feet in late winter
Soil reaction: Moderately acid or slightly acid
Depth to bedrock: More than 60 inches

Typical Profile

Surface layer:
0 to 8 inches—dark brown loam

Subsoil:
8 to 20 inches—dark yellowish brown loam
20 to 29 inches—dark brown silt loam
29 to 42 inches—brown loam

Substratum:
42 to 60 inches—dark yellowish brown loam

Contrasting Inclusions

- Moderately well drained soils in the slightly lower landscape positions
- Soils that have a surface layer of gravelly loam

Use and Management

Major use: Pasture and hay
Common woodland vegetation: Bottom-land hardwoods

Cropland

Suitability: Well suited
Management considerations:
- This soil is well suited to most of the climatically adapted crops grown in the county.

Pasture and hay

Suitability: Well suited
Management considerations:
- The quality and quantity of forage can be maintained by a rotation grazing system, weed control by mowing and clipping, applications of fertilizer and lime, and measures that prevent overgrazing.

Woodland

Suitability: Well suited

Management considerations:
• The seedling mortality rate may be high in areas that are subject to flooding.
• Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Unsuited
Management considerations:
• This soil is not suited to building site development because of the flooding.
• Other sites should be considered.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
• This soil is unsuited to septic tank absorption fields because of the flooding.
• Other sites should be considered.

Interpretive Groups

Land capability classification: 2w

TaC—Talbott silt loam, 5 to 12 percent slopes

Composition

Talbott soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Footslopes
Shape of areas: Irregular
Size of areas: 5 to 40 acres
Slope range: 5 to 12 percent
Parent material: Limestone residuum

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Slow or very slow
Flooding: None
Available water capacity: Moderate
Seasonal high water table: None
Soil reaction: Slightly acid to strongly acid, except the horizons near bedrock may be neutral
Depth to bedrock: 20 to 40 inches

Typical Profile

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

Subsurface layer:
3 to 7 inches—yellowish brown silt loam

Subsoil:
7 to 10 inches—strong brown silty clay loam
10 to 26 inches—yellowish red clay
26 to 33 inches—dark yellowish brown clay

Bedrock:
33 inches—limestone

Contrasting Inclusions

• Small areas of Braxton soils
• Small areas of soils that are less than 40 inches deep over bedrock
• A few scattered areas of rock outcrop

Use and Management

Major use: Pasture and hay
Common woodland vegetation: Oak-hickory

Cropland

Suitability: Poorly suited
Management considerations:
• The high content of clay limits the available water capacity and thus reduces crop yields.
• Minimum tillage, crop rotations that include grasses and legumes, and crop residue management help to control erosion.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Overgrazing reduces the extent of the plant cover, increases the hazard of erosion, and results in surface compaction and the growth of weeds.
• Deferred grazing, proper stocking rates, and a good fertilization program help to keep the soil and forage in good condition.

Woodland

Suitability: Well suited
Management considerations:
• Undesirable plants may curtail adequate reforestation by seedlings.
• Intensive site preparation and maintenance generally are not needed.

Building site development

Suitability: Poorly suited
Management considerations:
• Excavation is difficult because of the limited depth to bedrock.
• The high shrink-swell potential is a limitation affecting building site development.
• Footings should be specially designed to help prevent the damage caused by shrinking and swelling.

• This soil is poorly suited to local roads and streets because of the low load-bearing strength.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
• This soil is unsuited to septic tank absorption fields because of the limited depth to bedrock and the slow or very slow permeability.

Interpretive Groups

Land capability classification: 4e

TbD—Talbott-Braxton-Rock outcrop complex, 5 to 20 percent slopes

Composition

Talbott soil and similar components: 45 percent
Braxton soil and similar components: 35 percent
Rock outcrop: 20 percent

Setting

Landscape position: Side slopes and footslopes
Shape of areas: Irregular
Size of areas: 10 to 100 acres
Slope range: 5 to 20 percent
Parent material: Colluvium underlain by limestone residuum

Soil Properties and Qualities

Talbott

Drainage class: Well drained
Permeability: Slow or very slow
Flooding: None
Available water capacity: Moderate
Seasonal high water table: None
Soil reaction: Slightly acid to strongly acid, except the horizons near bedrock may be slightly acid or neutral
Depth to bedrock: 20 to 40 inches

Braxton

Drainage class: Well drained
Permeability: Slow or very slow
Flooding: None
Available water capacity: Moderate
Seasonal high water table: None
Soil reaction: Moderately acid or strongly acid, except the horizons near bedrock may be slightly acid
Depth to bedrock: More than 60 inches

Typical Profile

Talbott

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

Subsurface layer:
3 to 7 inches—yellowish brown loam

Subsoil:
7 to 10 inches—strong brown silty clay loam
10 to 26 inches—yellowish red clay
26 to 33 inches—dark yellowish brown clay

Bedrock:
33 inches—limestone

Braxton

Surface layer:
0 to 4 inches—dark grayish brown loam

Subsurface layer:
4 to 8 inches—strong brown loam

Subsoil:
8 to 60 inches—yellowish red clay

Rock outcrop

The rock outcrop occurs as bedrock outcroppings that are 2 to 15 feet across and protrude as much as 5 feet above the soil surface. The outcroppings form long, linear bands around the contour of the hillsides. The bands of outcrop are as much as 100 feet long.

Contrasting Inclusions

• Soils that are less than 20 inches deep over bedrock
• Soils that have less clay in the subsoil than the Talbott and Braxton soils

Use and Management

Major use: Woodland
Common woodland vegetation: Oak-hickory type

Cropland

Suitability: Unsuited
Management considerations:
• Because of the rock outcrop, a severe erosion hazard, and the dense clayey subsoil, this map unit is unsuitable as cropland.

Pasture and hay

Suitability: Unsuited
Management considerations:
• The rock outcrop is a limitation affecting most management practices.

Woodland

Suitability: Poorly suited
Management considerations:
• The slope and the rock outcrop limit the use of equipment.
• Trees are commonly subject to windthrow because rooting depth is restricted by the bedrock.

Building site development

Suitability: Unsuited
Management considerations:
• The rock outcrop, the high shrink-swell potential, and the slope are limitations affecting most kinds of building site development.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
• The rock outcrop, the slow or very slow permeability, and the slope are very severe limitations affecting septic tank absorption fields.

Interpretive Groups

Land capability classification: 6e

ToE—Talbott-Rock outcrop-Braxton complex, 20 to 40 percent slopes

Composition

Talbott soil and similar components: 35 to 40 percent
Rock outcrop: 30 to 40 percent
Braxton soil and similar components: 15 to 20 percent

Setting

Landscape position: Hillsides
Shape of areas: Irregular
Size of areas: 10 to 100 acres
Slope range: 20 to 40 percent
Parent material: Colluvium underlain by limestone residuum

Soil Properties and Qualities

Talbott

Drainage class: Well drained
Permeability: Slow or very slow
Flooding: None
Available water capacity: Moderate
Seasonal high water table: None
Soil reaction: Slightly acid to strongly acid, except the horizons near bedrock may be neutral
Depth to bedrock: 20 to 40 inches

Braxton

Drainage class: Well drained
Permeability: Slow or very slow
Flooding: None
Available water capacity: Moderate
Seasonal high water table: None
Soil reaction: Moderately acid or strongly acid, except the horizons near bedrock may be slightly acid
Depth to bedrock: More than 60 inches

Typical Profile

Talbott

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

Subsurface layer:
3 to 7 inches—yellowish brown loam

Subsoil:
7 to 10 inches—strong brown silty clay loam
10 to 26 inches—yellowish red clay
26 to 33 inches—dark yellowish brown clay

Bedrock:
33 inches—limestone

Braxton

Surface layer:
0 to 4 inches—dark grayish brown loam

Subsurface layer:
4 to 8 inches—strong brown loam

Subsoil:
8 to 60 inches—yellowish red clay

Rock outcrop

The rock outcrop occurs as bedrock outcroppings that are 2 to 15 feet across and protrude as much as 5 feet above the soil surface. The outcroppings form long, linear bands around the contour of the hillsides. The bands of outcrop are as much as 100 feet long.

Contrasting Inclusions

• Soils that are less than 20 inches deep over bedrock
• Soils that have less clay in the subsoil than the Talbott and Braxton soils

Use and Management

Major use: Woodland
Common woodland vegetation: Oak-hickory type

Cropland

Suitability: Unsuited

Management considerations:
• Because of the rock outcrop and the steep slopes, tillage is impractical.

Pasture and hay

Suitability: Unsuited
Management considerations:
• The rock outcrop and the steep slopes are limitations affecting use and management.

Woodland

Suitability: Poorly suited
Management considerations:
• The steep slopes and the rock outcrop limit the use of equipment.
• Trees are commonly subject to windthrow because rooting depth is restricted by the bedrock.

Building site development

Suitability: Unsuited
Management considerations:
• The rock outcrop, the high shrink-swell potential, and the steep slopes are limitations affecting most kinds of building site development.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
• The rock outcrop, the slow or very slow permeability, and the steep slopes are very severe limitations affecting septic tank absorption fields.

Interpretive Groups

Land capability classification: 7s

TrF—Talbott-Rock outcrop complex, 40 to 70 percent slopes

Composition

Talbott soil and similar components: 65 percent
Rock outcrop: 35 percent

Setting

Landscape position: Steep hillsides
Shape of areas: Irregular
Size of areas: 10 to 100 acres
Slope range: 40 to 70 percent
Parent material: Colluvium underlain by limestone residuum

Soil Properties and Qualities

Talbott

Drainage class: Well drained
Permeability: Slow or very slow
Flooding: None
Available water capacity: Moderate
Seasonal high water table: None
Soil reaction: Slightly acid to strongly acid, except the horizons near bedrock may be neutral
Depth to bedrock: 20 to 40 inches

Typical Profile

Talbott

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

Subsurface layer:
3 to 7 inches—yellowish brown loam

Subsoil:
7 to 10 inches—strong brown silty clay loam
10 to 26 inches—yellowish red clay
26 to 33 inches—dark yellowish brown clay

Bedrock:
33 inches—limestone

Rock outcrop

The rock outcrop occurs as bedrock outcroppings that are as much as several hundred feet long. The outcroppings extend around the sides of the mountains. They may have scarps as much as 50 feet high.

Contrasting Inclusions

• Soils that are less than 20 inches deep over bedrock
• Soils that have less clay in the subsoil than the Talbott soil

Use and Management

Major use: Woodland
Common woodland vegetation: Oak-hickory type

Cropland

Suitability: Unsuited
Management considerations:
• This map unit is unsuited to cropland because of the rock outcrop and the very steep slopes.

Pasture and hay

Suitability: Unsuited
Management considerations:
• The rock outcrop and the very steep slopes make the establishment and management of pasture and hay impractical.

Woodland

Suitability: Unsuited

Management considerations:
• The use of conventional equipment is limited because of the very steep slopes and the rock outcrop.
• Cable logging is a necessary management practice on the steeper parts of the slopes.

Building site development

Suitability: Unsuited
Management considerations:
• The very steep slopes and the rock outcrop greatly restrict most kinds of building site development.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
• The very steep slopes and the rock outcrop are very severe limitations affecting septic tank absorption fields.

Interpretive Groups

Land capability classification: Talbott—7s

VsE—Varilla-Shelocta complex, 15 to 30 percent slopes, very rocky

Composition

Varilla soil and similar components: 60 percent
Shelocta soil and similar components: 30 percent
Sandstone rock outcrop: Less than 10 percent

Setting

Landscape position: Hillsides
Shape of areas: Irregular
Size of areas: 10 to 50 acres
Slope range: 15 to 30 percent
Parent material: Colluvium derived from sandstone and shale

Soil Properties and Qualities

Varilla

Drainage class: Somewhat excessively drained
Permeability: Moderately rapid
Flooding: None
Available water capacity: Low
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: 48 to more than 60 inches

Shelocta

Drainage class: Well drained
Permeability: Moderate
Flooding: None
Available water capacity: Moderate
Seasonal high water table: None
Soil reaction: Very strongly acid or strongly acid
Depth to bedrock: More than 40 inches

Typical Profile

Varilla

Surface layer:
0 to 1 inch—very dark grayish brown very cobbly sandy loam

Subsoil:
1 to 7 inches—brown very cobbly sandy loam
7 to 44 inches—dark yellowish brown very cobbly sandy loam

Substratum:
44 to 60 inches—yellowish brown very cobbly sandy loam

Shelocta

Surface layer:
0 to 1 inch—dark brown loam

Subsurface layer:
1 to 3 inches—yellowish brown loam

Subsoil:
3 to 11 inches—yellowish brown loam
11 to 40 inches—yellowish brown silty clay loam
40 to 50 inches—brownish yellow channery silty clay loam

Substratum:
50 to 60 inches—soft interbedded shale and sandstone

Contrasting Inclusions

• Soils that have stones on the surface
• Small areas of the moderately deep Lily soils
• Small areas of the shallow Ramsey soils
• Sandstone outcroppings that are 2 to 10 feet high and as much as 50 feet long

Use and Management

Major use: Woodland
Common woodland vegetation: Oak-hickory type

Cropland

Suitability: Unsuited
Management considerations:
• These soils are unsuited to row crops because of a very severe erosion hazard on the moderately steep slopes, the stones and cobbles on the surface and in the subsoil, and the rock outcrop.

Pasture and hay

Suitability: Unsuited
Management considerations:
• The rock outcrop and the stones on the surface are limitations affecting most management practices.
• Because of the moderately steep slopes, applying good grazing management practices is difficult.

Woodland

Suitability: Poorly suited
Management considerations:
• The moderately steep slopes and the rock outcrop limit the use of equipment.
• The stones on the surface can interfere with harvesting, yarding, and other logging operations that involve the use of equipment.
• Carefully managing reforestation after harvest minimizes plant competition.

Building site development

Suitability: Unsuited
Management considerations:
• The moderately steep slopes, the stones and cobbles on the surface and in the subsoil, and the rock outcrop are limitations affecting building site development.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
• Contamination of ground water is possible because the soils have a high content of sand and coarse fragments and thus do not sufficiently filter effluent.
• Distribution lines for septic tank absorption fields should be installed in the less sloping areas.

Interpretive Groups

Land capability classification: 7s

W—Water

This map unit consists of areas inundated with water for most of the year. It generally includes rivers, lakes, and ponds.

No interpretations are given for this map unit.

WaC—Waynesboro loam, 5 to 12 percent slopes

Composition

Waynesboro soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Footslopes and high stream terraces
Shape of areas: Irregular
Size of areas: 5 to 20 acres
Slope range: 5 to 12 percent
Parent material: Old alluvium

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Flooding: None
Available water capacity: High
Seasonal high water table: None
Soil reaction: Strongly acid or very strongly acid
Depth to bedrock: More than 60 inches

Typical Profile

Surface layer:
0 to 9 inches—dark yellowish brown loam

Subsoil:
9 to 20 inches—yellowish red clay loam
20 to 42 inches—yellowish red and red clay
42 to 60 inches—red sandy clay

Contrasting Inclusions

• Etowah soils in landscape positions similar to those of the Waynesboro soil

Use and Management

Major use: Pasture or cropland (fig. 11)
Common woodland vegetation: Oak-hickory type

Cropland

Suitability: Moderately suited
Management considerations:
• Minimum tillage, crop rotations that include grasses and legumes, and crop residue management help to control erosion.
• Site-specific recommendations are needed.

Pasture and hay

Suitability: Well suited
Management considerations:
• The quality and quantity of forage can be maintained by a rotation grazing system, weed control by mowing and clipping, and applications of fertilizer.

Woodland

Suitability: Well suited

Figure 11.—An area of Waynesboro loam, 5 to 12 percent slopes, in the foreground. This soil is used mostly for pasture, hay, or row crops. Jefferson soils are on the wooded mountainsides in the background, and Ramsey soils are on the mountain crest.

Management considerations:
• Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Moderately suited
Management considerations:
• Structures should be designed so that they conform to the natural slope of the land.

Septic tank absorption fields

Suitability: Moderately suited
Management considerations:
• Increasing the size of the absorption area helps to compensate for the restricted permeability.
• Installing the distribution lines on the contour helps to overcome the slope.

Interpretive Groups

Land capability classification: 3e

WaD2—Waynesboro loam, 12 to 20 percent slopes, eroded

Composition

Waynesboro soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Footslopes and high stream terraces
Shape of areas: Irregular
Size of areas: 5 to 20 acres
Slope range: 12 to 20 percent
Parent material: Old alluvium

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Flooding: None

Available water capacity: High
Seasonal high water table: None
Soil reaction: Strongly acid or very strongly acid
Depth to bedrock: More than 60 inches

Typical Profile

Surface layer:
0 to 9 inches—dark yellowish brown loam

Subsoil:
9 to 20 inches—yellowish red clay loam
20 to 42 inches—yellowish red and red clay
42 to 60 inches—red sandy clay

Contrasting Inclusions

- Etowah soils in landscape positions similar to those of the Waynesboro soil

Use and Management

Major use: Pasture
Common woodland vegetation: Oak-hickory type

Cropland

Suitability: Moderately suited
Management considerations:
- Minimum tillage, crop rotations that include grasses and legumes for long periods of time, and crop residue management help to control erosion.
- Site-specific recommendations are needed.

Pasture and hay

Suitability: Well suited
Management considerations:
- The quality and quantity of forage can be maintained by a rotation grazing system, weed control by mowing and clipping, and applications of fertilizer and lime.

Woodland

Suitability: Well suited
Management considerations:
- Constructing water bars and seeding cut and filled areas help to control erosion on log landings, skid trails, and roads.
- Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Poorly suited
Management considerations:
- The slope is a limitation affecting building site development.

Septic tank absorption fields

Suitability: Poorly suited
Management considerations:
- Distribution lines for septic tank absorption fields should be installed in the less sloping areas.

Interpretive Groups

Land capability classification: 4e

WaD3—Waynesboro clay loam, 12 to 20 percent slopes, severely eroded

Composition

Waynesboro soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Footslopes and high stream terraces
Shape of areas: Irregular
Size of areas: 5 to 25 acres
Slope range: 12 to 20 percent
Parent material: Old alluvium

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Flooding: None
Available water capacity: High or moderate
Seasonal high water table: None
Soil reaction: Strongly acid or very strongly acid
Depth to bedrock: More than 60 inches

Typical Profile

Surface layer:
0 to 6 inches—yellowish red clay loam

Subsoil:
6 to 42 inches—yellowish red and red clay
42 to 60 inches—red sandy clay

Contrasting Inclusions

- Etowah soils in landscape positions similar to those of the Waynesboro soil

Use and Management

Major use: Pasture
Common woodland vegetation: Oak-hickory type

Cropland

Suitability: Unsuited

Management considerations:
• Minimum tillage, crop rotations that include grasses and legumes for long periods of time, and crop residue management help to control erosion.
• Site-specific recommendations are needed.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Overgrazing reduces the extent of the plant cover, increases the hazard of erosion, and results in surface compaction and the growth of weeds.
• Deferred grazing, proper stocking rates, and a good fertilization program help to keep the soil and forage in good condition.
• Grazing when the soil is wet results in surface compaction and destruction of the sod.

Woodland

Suitability: Moderately suited
Management considerations:
• Constructing water bars and seeding cut and filled areas help to control erosion on log landings, skid trails, and roads.
• Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Poorly suited
Management considerations:
• The slope is a limitation affecting building site development.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
• Distribution lines for septic tank absorption fields should be installed in the less sloping areas.

Interpretive Groups

Land capability classification: 6e

WhA—Whitwell loam, 0 to 2 percent slopes, occasionally flooded

Composition

Whitwell soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Low stream terraces
Shape of areas: Irregular
Size of areas: 5 to 20 acres
Slope range: 0 to 2 percent
Parent material: Alluvium

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Flooding: Occasional
Available water capacity: High
Seasonal high water table: At a depth of 2 to 3 feet in late winter and early spring
Soil reaction: Strongly acid or very strongly acid
Depth to bedrock: More than 60 inches

Typical Profile

Surface layer:
0 to 7 inches—brown loam

Subsoil:
7 to 16 inches—yellowish brown loam
16 to 45 inches—yellowish brown clay loam with brownish and grayish mottles
45 to 50 inches—yellowish brown clay loam with brownish and grayish mottles

Substratum:
50 to 60 inches—yellowish brown sandy loam with brownish and grayish mottles

Contrasting Inclusions

• Small areas of somewhat poorly drained Beason soils in landscape positions similar to those of the Whitwell soil
• Poorly drained Atkins soils in slight depressions and narrow drainageways

Use and Management

Major use: Cropland
Common woodland vegetation: Cove hardwoods

Cropland

Suitability: Moderately suited
Management considerations:
• The flooding and the seasonal wetness limit the production and harvesting of crops.

Pasture and hay

Suitability: Moderately suited
Management considerations:
• Grazing when the soil is wet results in surface compaction and destruction of the sod.
• Overgrazing reduces the extent of the plant cover, increases the hazard of erosion, and results in surface compaction and the growth of weeds.

• Deferred grazing, proper stocking rates, and a good fertilization program help to keep the soil and forage in good condition.
• Only hay and pasture plants that can tolerate the periodic inundation by floodwater and the seasonal wetness should be selected for seeding.

Woodland

Suitability: Well suited
Management considerations:
• The seedling mortality rate may be high in areas that are subject to flooding.

Building site development

Suitability: Unsuited
Management considerations:
• This soil is not suited to building site development because of the flooding.
• Other sites should be considered.

Septic tank absorption fields

Suitability: Unsuited
Management considerations:
• The flooding and the seasonal high water table are limitations affecting septic tank absorption fields.

Interpretive Groups

Land capability classification: 2w

WhB—Whitwell loam, 2 to 5 percent slopes

Composition

Whitwell soil and similar components: 90 to 95 percent
Contrasting components: 5 to 10 percent

Setting

Landscape position: Low stream terraces
Shape of areas: Irregular
Size of areas: 5 to 50 acres
Slope range: 2 to 5 percent
Parent material: Alluvium

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Flooding: None
Available water capacity: High
Seasonal high water table: At a depth of 2 to 3 feet in late winter and early spring
Soil reaction: Strongly acid or very strongly acid
Depth to bedrock: More than 60 inches

Typical Profile

Surface layer:
0 to 7 inches—brown loam

Subsoil:
7 to 16 inches—yellowish brown loam
16 to 45 inches—yellowish brown clay loam with brownish and grayish mottles
45 to 50 inches—yellowish brown clay loam with brownish and grayish mottles

Substratum:
50 to 60 inches—yellowish brown sandy loam with brownish and grayish mottles

Contrasting Inclusions

• Small areas of the somewhat poorly drained Beason soils in the slightly lower landscape positions

Use and Management

Major use: Cropland (fig. 12)
Common woodland vegetation: Cove hardwoods

Cropland

Suitability: Moderately suited
Management considerations:
• Minimum tillage, crop rotations that include grasses and legumes, and crop residue management help to control erosion.
• Site-specific recommendations are needed.

Pasture and hay

Suitability: Well suited
Management considerations:
• Grazing when the soil is wet results in surface compaction and destruction of the sod.
• Overgrazing reduces the extent of the plant cover, increases the hazard of erosion, and results in surface compaction and the growth of weeds.
• Deferred grazing, proper stocking rates, and a good fertilization program help to keep the soil and forage in good condition.

Woodland

Suitability: Well suited
Management considerations:
• Without intensive site preparation and maintenance, undesirable plants may prevent adequate reforestation by seedlings.

Building site development

Suitability: Moderately suited

Figure 12.—An area of Whitwell loam, 2 to 5 percent slopes, from which corn has been harvested. Most areas of this soil have been cleared and planted to row crops. In the background are areas of Talbott soils on the lower foothills, Jefferson soils on the mountainsides, and Ramsey soils on the mountain crest.

Management considerations:
- Installing a drainage system around buildings and land shaping so that surface water moves away from the buildings help to overcome the wetness.

Septic tank absorption fields

Suitability: Poorly suited

Management considerations:
- The seasonal high water table is a limitation affecting septic tank absorption fields.
- A drainage system is needed on sites for septic tank systems.

Interpretive Groups

Land capability classification: 2e

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 to prevent soil-related failures in land uses.

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

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The estimated yields of the main crops and pasture plants are listed, the system of land capability classification used by the Natural Resources Conservation Service is explained, and prime farmland is described.

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

In 1993, farmers in the county planted about 3,000 acres of corn, 1,100 acres of small grain, 100 acres of grain sorghum, 700 acres of soybeans, and 90 acres of tobacco. In 1995, according to the “Tennessee Agricultural Statistics” (Tennessee Department of Agriculture 1995) and local agricultural agencies, about 9,000 acres was used for row crops and 62,000 acres was used for pasture and hay. Snap beans are the main cash crop in the county. About 4,000 acres is planted to snap beans annually. The yearly income from the sale of the beans is about $5 million.

The field crops suited to the soils and climate of Cumberland County include many that are not presently grown. Corn, burley tobacco, and snap beans are the dominant row crops. Grain sorghum, sunflowers, canola, nursery crops, and similar crops can be grown if economic conditions are favorable. Less sloping areas of moderately deep or deep, well drained soils, such as the Lily, Lonewood, Waynesboro, Etowah, Hendon, Ealy, and Sullivan soils, are well suited to most row crops. Tobacco should only be grown on the well drained upland soils that have a good surface drainage system.

About 1,700 acres of specialty crops are grown in the survey area. These crops include sweet corn, tomatoes, turnips, bell and pimento peppers, squash, pumpkins, blueberries, and other vegetables and small fruits. Apples are the most common tree fruit. Moderately deep and deep soils that are have good natural drainage and warm up in early spring are especially well suited to many vegetables and small fruits. They include Lily, Lonewood, Waynesboro, and Etowah soils. Most of the well drained soils in the survey area are suited to orchard crops and nursery plants. Soils in low areas, where frost is frequent and

air drainage is poor, generally are poorly suited to early vegetables, small fruits, and orchard crops.

The latest information about growing specialty crops can be obtained from the local office of the University of Tennessee, Cooperative Extension Service, or the Natural Resources Conservation Service.

The soils in Cumberland County are better suited to pasture than to row crops. Most of the soils are too sloping for intensive row cropping. Crop yields could be increased by applying the latest crop production technology to all cropland in the county. This soil survey can help facilitate the application of such technology.

Cropland Management

Erosion is a major management concern in the county because of the large acreage of highly erodible soils. It is a hazard with most cropping systems if slope is 2 percent or more.

Soil loss through erosion is damaging for a number of reasons. Productivity is reduced as the surface layer, which has a higher content of organic matter than the subsoil, is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils that are underlain by bedrock. As more soil is lost through erosion, the root zone becomes thinner, the amount of available water is reduced, and yields may be lower than is typical if crops do not have an adequate supply of moisture. The extent of exposed sandstone bedrock in fields also gradually increases if fields are continually subjected to high rates of erosion. Loss of the original surface layer also results in the formation of puddles and of a crust on the soil surface. Most of the plant nutrients in the soil are in the surface layer. These nutrients can easily be lost during the erosion process. Control of erosion minimizes the pollution of streams by sediments, herbicides, and fertilizers and improves the quality of water for recreational activities and for fish and wildlife.

Erosion-control practices help to provide a protective surface cover, control runoff, and increase the rate of water infiltration. A cropping system that keeps a plant cover on the surface for extended periods generally can help to hold soil losses to an amount that does not reduce the productivity of the soil. Including grasses and legumes in the cropping sequence on livestock farms helps to control erosion, provide nitrogen, and improve tilth.

Conservation tillage systems that leave protective amounts of crop residue on the surface and winter cover crops help to increase the rate of water infiltration and reduce the hazard of erosion and the runoff rate. They also increase the amount of organic matter in the surface layer, minimize compaction, and save time and fuel. Contour farming, contour stripcropping, crop residue management, field borders, filter strips, a crop rotation that includes grasses and legumes, and grassed waterways also help to keep soil losses to an acceptable level. These practices can be effective on most of the soils in the county.

Information about erosion-control measures for each kind of soil in the county is available at the local office of the Natural Resources Conservation Service.

Wetness is a management concern on a small part of the acreage in the county used for crops and pasture. Some soils, such as the Bonair, Atkins, and Beason soils, are so wet that production of the crops commonly grown in the county is difficult.

Many soils in the county are strongly acid or very strongly acid unless they are limed. Applications of agricultural limestone are needed to raise the pH level sufficiently for the production of most crops. Most soils in the county also respond favorably to the application of commercial fertilizer. Additions of lime and fertilizer should be based on the results of soil tests, the needs of the crop, and a realistic yield expectation. The Cooperative Extension Service can test soils, provide the test results, and make recommendations for the kinds and amounts of fertilizer and lime to apply.

Pasture and Hay Management

In 1995, there were about 23,000 beef and dairy cattle in Cumberland County (Tennessee Department of Agriculture 1995). Most of the hay and pasture in the county is a mixture of grasses and legumes. Much of the hay is grown in rotation with pasture. The main grasses are tall fescue, orchardgrass, and timothy. The most common legumes are white clover, red clover, alfalfa, annual lespedeza, and sericea lespedeza. Legumes should be included in the seeding mixture when establishing pasture. They also should be reintroduced in perennial grass stands if they are not in the stands.

The soils in the survey area vary widely in their ability to produce grasses and legumes because of differences in depth to bedrock, drainage, available water capacity, and many other properties. The forage species selected for planting should be suited to the different kinds of soils.

The less sloping, deep and very deep, well drained soils should be planted to the highest producing crops, such as corn silage, alfalfa, orchardgrass, and timothy. Sod-forming grasses, such as tall fescue, minimize erosion in the steeper areas. Alfalfa should be planted

only in areas where the soils are at least 2 feet deep over bedrock and are well drained. The more poorly drained soils, such as Beason, Bonair, and Atkins soils, are best suited to tall fescue and white clover.

Some annual grasses and legumes are used for hay or supplemental grazing. Millet and soybeans are commonly planted together and cut for hay. Sudan/sorghum crosses, pearl millet, and sudangrass make good summer pasture and can also be used for hay or silage. Small grain and annual ryegrass provide excellent grazing in late fall and early spring. Most hay harvested is the surplus growth of grass-legume pastures. Hay crops should be cut at the stage of growth that provides the best quality feed and does not damage the grass-legume stand. Hay cut late, after seed heads are mature, produces extra tonnage but is less palatable and much lower in protein content than hay cut at the proper stage of growth. The tonnage gained by cutting late does not offset the loss of the nutritional value. When cutting perennial hay crops, care should be taken so that the stubble is of an adequate height to help prevent premature loss of the stand.

Warm-season grasses and legumes help to alleviate the "summer slump" of cool-season grasses, such as tall fescue and orchardgrass (Capel 1991). Their greatest growth occurs from May to September, which is the period when growth of cool-season grasses is slowest. Examples of warm-season grasses are switchgrass, indiangrass, big bluestem, and eastern gamagrass. These grasses are highly palatable to livestock and produce very high yields. The major disadvantage of these grasses is the high level of management required to establish an adequate stand. In the first year, growth is minimal and practices that help to control the competing grasses and weeds are needed. Thereafter, the stand needs minimal maintenance and is drought tolerant and winter hardy. Warm-season grasses produce high yields with a minimal amount of fertilizer. They should be grazed no closer than 10 inches, and if mowed for hay, they should be left with a 6- to 8-inch stubble.

Warm-season legumes provide excellent summer grazing when seeded in established grass stands. They include Korean and Kobe lespedeza.

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 map units in the survey area also is shown in the table. Absence of a yield indicates that the map unit is not suited to the crop or pasture or that the crop or pasture is not commonly grown in areas of the map unit.

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 also are 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 the table 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 Natural Resources 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 most kinds of field crops. 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 or 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 numerals 1 through 8. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have few limitations that restrict their use.

Class 2 soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class 5 soils are not likely to erode but have other limitations, impractical to remove, that limit their use. There are no class 5 soils in Cumberland County.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation.

Class 7 soils have very severe limitations that make them unsuitable for cultivation.

Class 8 soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, 2e. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w, s,* or *c* because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The capability classification of map units in this survey area is given in the section "Detailed Soil Map Units" and in the yields table.

Prime Farmland

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. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forest land, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 50,882 acres in the survey area, or nearly 12 percent of the total acreage, meets the soil requirements for prime farmland. Most of the prime farmland is used for crops, pasture, or hay.

A recent trend in land use in some parts of the survey area has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 6. This list does not constitute a recommendation for a particular land use. On some soils included in the list, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Woodland Management and Productivity

Originally, all of Cumberland County was forested, with the exception of a few upland meadows and open coves that were covered with native tall grasses. Currently, about 300,000 acres in the county, or nearly 70 percent of the total acreage, is woodland. About 254,000 acres of the woodland is privately owned, and about 46,000 acres is in State parks and wildlife management areas.

The woodland is in several diverse areas. Most of the woodland is in areas on the rolling and hilly Cumberland Plateau. The soils on the plateau are underlain by hard sandstone bedrock. They include Lily and Ramsey soils. These soils are very infertile and seem to have a high aluminum saturation that adversely affects tree growth. The forest type is oak-pine. Scarlet oak, white oak, and Virginia pine are the dominant species. Large areas on the plateau are planted to loblolly pine, which is used in pulpwood production.

Other large areas of woodland are on the steeper mountainsides and in deep gorges. Soils in these areas are deep and very deep cobbly and stony soils or are moderately deep soils underlain by shale bedrock. Jefferson, Shelocta, Gilpin, and Varilla soils are predominant in these areas. These soils are well suited to trees. The steep and very steep slopes and the large stones in some areas are limitations affecting woodland. The soils generally are covered by a mixture of red oak, yellow poplar, hickory, and sugar maple. White pine and hemlock also are common on the north- and east-facing slopes and on the lower third of side slopes. Most of the hardwood timber harvested in the county comes from these areas.

A small acreage of highly productive woodland is on flood plains in the county. Very deep, well drained, loamy and cobbly soils, such as the Ealy and Craigsville soils, are in some of these areas. They are dominated by yellow poplar, basswood, hemlock, white pine, and red maple. In other areas of the flood plains, the soils are poorly drained. These soils, which include the Atkins soils, are dominated by red maple and sweetgum.

The woodland in the county is valuable not only for timber and pulpwood production but also because it provides wildlife habitat, opportunities for recreation, natural beauty, and soil and water conservation.

Table 7 can help woodland owners or forest managers plan the use of soils for wood crops. In the table, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed also are subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment and season of use are not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils 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, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high

water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods.

Plant competition ratings indicate the degree to which undesirable species are expected to invade and grow when openings are made in the tree canopy. The main factors that affect plant competition are depth to the water table and the available water capacity. A rating of *slight* indicates that competition from undesirable plants is not likely to prevent natural regeneration or suppress the more desirable species. Planted seedlings can become established without undue competition. A rating of *moderate* indicates that competition may delay the establishment of desirable species. Competition may hamper stand development, but it will not prevent the eventual development of fully stocked stands. A rating of *severe* indicates that competition can be expected to prevent regeneration unless precautionary measures are applied.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *volume* number. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *volume*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic feet per acre per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It generally is the most common species on the soil and is the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

Recreation

Cumberland County provides abundant opportunities for recreational activities. It is a county of dense forests, clear streams, majestic overlooks, and cool summer temperatures.

Many of the recreational and retirement communities are nationally known (fig. 13). Fairfield Glade, one of the more popular areas, is more than 12,000 acres in size. It has 4 golf courses, 12 lakes, a riding stable, pools, tennis courts, marinas, and a guest lodge. Cumberland Cove, which is more than 16,000 acres in size, includes a golf course and numerous lakes. Lake Tansi Village, which is a 5,000-acre development, has a 550-acre lake and golf course, and Cumberland Gardens, which is a 9,000-acre area, has a golf course and lodge. Other recreational communities include Thunder Hollow Resort, Timberline Resort, Breckenridge, Deercreek, Cumberland Mountain Retreat, and The Lakes.

Cumberland County has a total of eight golf courses. There are also several day camps in addition to city and community parks. Several recreational vehicle camping areas have large facilities in the county.

Four State parks and natural areas are in the county. Cumberland Mountain State Rustic Park is one of the larger areas with 1,720 acres of woodland, 50-acre Byrd Lake, and numerous hiking trails. Other areas include Mt. Roosevelt State Forest, Bledsoe State Forest, and the Ozone Falls State Natural Area.

The Catoosa Wildlife Management Area is made up of about 79,000 acres, of which about 40,000 acres is in Cumberland County. It is a rugged, scenic mountainous area with clear, swift streams. It provides a vast area for hunting, fishing, canoeing, and hiking. Cumberland County, which is known as the “land of the lakes,” provides abundant opportunities for fishing with its hundreds of lakes and miles of streams.

Recreation is very important to the economy of Cumberland County, and its potential for recreational activities will continue to grow and expand. The natural beauty, climate, and central location of the area make it a desirable vacation and recreation destination.

The soils of the survey area are rated in table 8 according to 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 also are important. Soils that are 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

Figure 13.—An aerial view of one of the recreational and retirement communities in Cumberland County. Most of these communities include residential homesites, lakes, and golf courses and other recreational facilities.

the height, duration, intensity, and frequency of flooding is essential.

In the table, 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 a combination of these.

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

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and

installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing 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 or 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

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

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

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

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

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

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture also are considerations. Examples of grasses and legumes are fescue, orchardgrass, ryegrass, clover, 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 also are 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, 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, 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 and eastern 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 cattails.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous and/or coniferous plants 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, and deer.

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

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

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

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

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

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank

absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

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

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

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, or other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock or a very firm dense layer, stone content, soil texture, and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, and shrinking and swelling can cause the movement of footings. A high water table, depth to bedrock, large stones, slope, 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, 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, a high water table, depth to bedrock, and the available water capacity in the upper 40 inches affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 11 shows the degree and 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.

The table also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and 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, 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.

The table 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, a high water table, depth to bedrock, flooding, and large stones.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. Slope and bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in the table 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, and soil reaction affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

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 the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal

compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

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

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In the table, 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, and bedrock.

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

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel 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 nutrients for plant growth.

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and

aquifer-fed excavated ponds. 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 for each soil the restrictive features that affect 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 even 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. 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, and susceptibility to flooding. 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. Availability of drainage outlets is not considered in the ratings.

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

Soil properties are ascertained by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine particle-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties are shown in tables. They include engineering index properties, physical and chemical properties, and pertinent soil and water features.

Engineering Index Properties

Table 14 gives the engineering classifications and the range of index properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

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 15 percent or more, 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 (ASTM 1993) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO 1986).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-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 particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

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

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 particle-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is generally omitted in the table.

Physical Properties

Table 15 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In table 15, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $^1/_3$- or $^1/_{10}$-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each 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. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity refers to the ability of a soil to transmit water or air. The term "permeability," as used in soil surveys, indicates saturated hydraulic conductivity (K_{sat}). The estimates in the table indicate the rate of water movement, in micrometers per second (um/sec), when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. 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.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 15, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and

tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in table 15 as the K factor (Kw and Kf) and the T factor. 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) and the Revised Universal Soil Loss Equation (RUSLE) 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 and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

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

Chemical Properties

Table 16 shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of extractable bases 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. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Effective cation-exchange capacity refers to the sum of extractable bases plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

Soil reaction is a measure of acidity or alkalinity. The pH of each soil 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.

Water Features

Table 17 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, 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 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.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

Water table refers to a saturated zone in the soil. The table indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

Flooding is the temporary inundation of an area

caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are 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.

Soil Features

Table 18 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete 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 also is expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and 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 (Soil Survey Staff 1975, 1994). 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 from laboratory measurements. Table 19 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Twelve 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 Alfisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning humid, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizonation, plus *udult*, the suborder of the Ultisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup 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 taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle size, mineral content, soil temperature regime, soil depth, and reaction. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, siliceous, mesic Typic Hapludalfs.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each 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" (Soil Survey Division Staff 1993). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (Soil Survey Staff 1975) and in "Keys to Soil Taxonomy" (Soil Survey Staff 1994). Unless otherwise indicated, 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."

Ashwood Series

The Ashwood series consists of moderately deep, well drained soils with slow and very slow permeability. These steep soils are on foothills in the Sequatchie Valley. They formed in limestone residuum. Slopes range from 20 to 40 percent.

A typical pedon of Ashwood silt loam, in an area of

Barfield-Ashwood-Rock outcrop complex, 20 to 40 percent slopes; 0.7 mile east of old Highway 28 on Parham Chapel Road, 200 feet east and 300 feet north of Wilson Cemetery:

A—0 to 6 inches; very dark brown (10YR 2/2) silt loam; moderate medium granular structure; friable; many fine to coarse roots; few limestone flagstones up to 12 inches in length; neutral; clear smooth boundary.
BA—6 to 12 inches; very dark grayish brown (10YR 3/2) silty clay loam; moderate medium and fine subangular blocky structure; firm; many fine to coarse roots; few limestone flagstones up to 12 inches in length; neutral; gradual smooth boundary.
Bt1—12 to 19 inches; brown (10YR 4/3) clay; moderate medium and fine subangular blocky structure; firm; common fine and medium roots; common distinct clay films on faces of peds; few limestone flagstones up to 12 inches in length; neutral; gradual smooth boundary.
Bt2—19 to 29 inches; light olive brown (2.5Y 5/6) clay; weak medium subangular blocky structure; firm; few fine roots; many distinct clay films on faces of peds; few limestone flagstones up to 12 inches in length; neutral; gradual smooth boundary.
BC—29 to 37 inches; light olive brown (2.5Y 5/6) flaggy clay; few fine distinct yellowish brown (10YR 5/4) mottles; weak coarse subangular blocky structure; firm; 20 percent limestone flagstones up to 12 inches in length; neutral; abrupt irregular boundary.
R—37 to 40 inches; limestone bedrock.

The depth to hard bedrock ranges from 20 to 40 inches. The content of rock fragments ranges from 0 to 10 percent in the A and B horizons and from 5 to 25 percent in the BC and C horizons. Reaction ranges from moderately acid to neutral.

The A and BA horizons have hue of 10YR and value and chroma of 2 or 3. They are silt loam or silty clay loam.

The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 to 6. It is silty clay or clay.

The BC horizon has hue of 10YR or 2.5YR, value of 4 or 5, and chroma of 4 or 6. In most pedons it is mottled in shades of brown, olive, or gray. It is clay or silty clay.

Atkins Series

The Atkins series consists of very deep, poorly drained, moderately permeable soils. These nearly level soils are on flood plains. Slopes range from 0 to 2 percent.

A typical pedon of Atkins loam, frequently flooded; 2.1 miles west of Highway 68 on Grassy Cove Road, 200 feet south of the road:

Oi—1 inch to 0; partially decomposed grass, sedge stems, and leaves.
Ap—0 to 10 inches; dark gray (10YR 4/1) loam; moderate medium granular structure; friable; many fine and very fine roots; many reddish iron accumulations lining root channels; moderately acid; clear smooth boundary.
Bg1—10 to 20 inches; dark gray (10YR 4/1) loam; weak medium subangular blocky structure; friable; common fine roots; few small manganese concretions; many reddish iron accumulations lining root channels; very strongly acid; gradual smooth boundary.
Bg2—20 to 30 inches; grayish brown (10YR 5/2) loam; weak coarse subangular blocky structure; friable; common very fine roots; few small manganese concretions; common reddish iron accumulations lining root channels and in the matrix; very strongly acid; gradual smooth boundary.
Bg3—30 to 36 inches; light brownish gray (10YR 6/2) clay loam; weak coarse subangular blocky structure; friable; few very fine roots; few manganese concretions; common medium prominent yellowish brown (10YR 5/6) iron concentrations; very strongly acid; gradual smooth boundary.
Bg4—36 to 52 inches; gray (10YR 6/1) clay loam; weak coarse subangular blocky structure; friable; many fine and medium prominent brownish yellow (10YR 6/8) iron concentrations; very strongly acid; gradual smooth boundary.
C—52 to 60 inches; gray (10YR 6/1) sandy loam; massive; friable; very strongly acid.

Depth to bedrock is more than 6 feet. Reaction is strongly acid or very strongly acid throughout the profile, except for in the surface layer, which is not so acid in areas where lime has been applied.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. It is loam.

The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. In most pedons it has redoximorphic features in shades of brown. It is loam or clay loam.

The C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. In some pedons it has redoximorphic features in shades of brown. It is loam or sandy loam.

Barfield Series

The Barfield series consists of shallow, well drained soils with slow and very slow permeability. These steep soils are on foothills in the Sequatchie Valley. They formed in limestone residuum. Slopes range from 20 to 40 percent.

A typical pedon of Barfield flaggy silty clay loam, in an area of Barfield-Ashwood-Rock outcrop complex, 20 to 40 percent slopes; 0.7 mile east of old Highway 28 on Parham Chapel Road, 200 feet east and 100 feet north of Wilson Cemetery:

A—0 to 4 inches; very dark brown (10YR 2/2) flaggy silty clay loam; moderate medium granular structure; friable; many fine to coarse roots; 20 percent limestone flagstones up to 20 inches in length; neutral; clear smooth boundary.

Bw—4 to 10 inches; very dark grayish brown (10YR 3/2) flaggy clay; moderate medium and fine subangular blocky structure; firm; many fine to coarse roots; 20 percent limestone flagstones up to 20 inches in length; neutral; abrupt smooth boundary.

BC—10 to 14 inches; yellowish brown (10YR 5/4) flaggy clay; weak medium subangular blocky structure; firm; few fine roots; 35 percent limestone flagstones up to 20 inches in length; neutral; abrupt wavy boundary.

R—14 to 20 inches; limestone bedrock.

The depth to bedrock ranges from 8 to 20 inches. The content of rock fragments ranges from 0 to 20 percent in the A horizon and from 15 to 35 percent in the Bw horizon. The thickness of the mollic epipedon ranges from 8 to 12 inches. Reaction ranges from slightly acid to moderately alkaline.

The A and Bw horizons typically have hue of 10YR and value and chroma of 2 or 3, but in some pedons the lower part of the Bw horizon has hue of 10YR, value of 4, and chroma of 3 or 4. Texture is silty clay loam, silty clay, or clay.

The BC and C horizons have hue of 10YR, value of 4 or 5, and chroma of 4 or 6. They are clay or silty clay.

Beason Series

The Beason series consists of very deep, somewhat poorly drained, moderately slowly permeable soils. These nearly level soils are on low terraces. They formed in moderately fine and fine textured alluvium. Slopes range from 0 to 2 percent.

A typical pedon of Beason silt loam, occasionally flooded; 300 yards southeast of J.C. Kemmer's store on Highway 68 in Grassy Cove:

Ap—0 to 4 inches; grayish brown (10YR 5/2) silt loam; moderate medium granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

BA—4 to 13 inches; brown (10YR 5/3) silt loam; moderate medium subangular blocky structure; friable; common fine roots; common fine distinct light brownish gray (10YR 6/2) iron depletions; moderately acid; clear smooth boundary.

Bt1—13 to 18 inches; light yellowish brown (2.5Y 6/4) clay; moderate medium and coarse subangular blocky structure; firm; few fine roots; few distinct clay films on faces of peds; common medium distinct light brownish gray (10YR 6/2) and grayish brown (10YR 5/2) iron depletions; strongly acid; gradual smooth boundary.

Bt2—18 to 22 inches; light yellowish brown (2.5Y 6/4) clay; moderate medium and coarse subangular blocky structure; firm; few fine roots; few distinct clay films on faces of peds; few manganese concretions; common fine distinct light brownish gray (10YR 6/2) iron depletions; common medium prominent strong brown (7.5YR 5/6) iron concentrations; strongly acid; gradual smooth boundary.

Bt3—22 to 34 inches; light yellowish brown (2.5Y 6/4) clay; moderate medium and coarse subangular blocky structure; firm; few distinct clay films on faces of peds; common manganese concretions; common fine distinct light brownish gray (10YR 6/2) iron depletions and common medium prominent strong brown (7.5YR 5/6) iron accumulations; strongly acid; gradual smooth boundary.

BC—34 to 38 inches; light brownish gray (10YR 6/2) clay loam; weak medium subangular blocky structure; firm; few manganese concretions; many medium distinct brownish yellow (10YR 6/6) iron concentrations; strongly acid; gradual smooth boundary.

C—38 to 60 inches; yellowish brown (10YR 5/4) loam; massive; friable; strongly acid.

Depth to bedrock is more than 60 inches. Reaction is strongly acid or very strongly acid throughout the profile, except for in the surface layer, which is not so acid in areas where lime has been applied.

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

The BA horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. It is silt loam or silty clay loam.

The upper part of the Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6. The lower part has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 6. The Bt horizon has few to many redoximorphic features in shades of brown, yellow, or gray. It is silty clay loam, silty clay, or clay.

The BC horizon, if it occurs, has colors similar to those in the lower part of the B horizon. It is clay loam, silty clay loam, or clay.

The C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4. It is silt loam, silty clay loam, loam, or clay loam.

Bethesda Series

The Bethesda series consists of deep, well drained, moderately slowly permeable soils. These moderately steep to very steep soils formed in acid soil material and coal residue from surface mine operations. Slopes range from 10 to 80 percent.

A typical pedon of Bethesda channery loam, in an area of Bethesda-Mine pits complex, 10 to 80 percent slopes; 1.3 miles south of Grassy Cove on Highway 68, about 300 feet southwest of the road:

A—0 to 2 inches; dark grayish brown (10YR 4/2) channery loam; weak medium granular structure; friable; 20 percent dark shale and coal fragments less than 3 inches in diameter; very strongly acid; clear smooth boundary.

C1—2 to 23 inches; brown (10YR 4/3) very channery loam; massive; friable; 40 percent dark shale and coal fragments less than 3 inches in diameter; very strongly acid; gradual smooth boundary.

C2—23 to 38 inches; dark yellowish brown (10YR 4/4) very channery clay loam; massive; friable; 40 percent dark shale and coal fragments less than 3 inches in diameter; strongly acid; gradual smooth boundary.

C3—38 to 45 inches; yellowish brown (10YR 5/4) very channery loam; massive; friable; 50 percent shale fragments less than 3 inches in diameter; very strongly acid; gradual smooth boundary.

C4—45 to 60 inches; yellowish brown (10YR 5/4) cobbly loam; massive; friable; 25 percent sandstone fragments up to 6 inches in diameter; very strongly acid.

The depth to sandstone or shale bedrock is more than 60 inches. The content of fragments ranges from 0 to 50 percent in the A horizon to as much as 70 percent in the C horizon. The fragments generally are within the 2-millimeter to 25-centimeter range but may include stones and boulders also. Reaction ranges from strongly acid to extremely acid throughout the profile, except for in the surface layer, which is not so acid where lime has been applied.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 2 to 6. The texture of the fine-earth fraction is loam.

The C horizon has hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 2 to 6. The texture of the fine-earth fraction is loam, clay loam, silt loam, or silty clay loam.

The R horizon is hard sandstone or shale bedrock.

Bonair Series

The Bonair series consists of deep, poorly drained, moderately permeable soils that have a dark surface layer (fig. 14). These nearly level soils are on flood plains. They formed in medium textured alluvium. Slopes range from 0 to 2 percent.

A typical pedon of Bonair loam, occasionally flooded; 0.9 mile southeast of the Interstate 40-Genesis Road interchange:

A—0 to 10 inches; very dark gray (10YR 3/1) loam; moderate medium granular structure; friable; many fine and common medium roots; few fine iron concentrations; strongly acid; clear smooth boundary.

Bg—10 to 36 inches; dark gray (10YR 4/1) loam; common coarse distinct very dark grayish brown (10YR 3/2) mottles; weak medium and coarse subangular blocky structure; friable; common fine and few medium roots; common fine brownish yellow (10YR 6/6) iron concentrations; strongly acid; gradual smooth boundary.

Cg—36 to 60 inches; dark gray (10YR 4/1) loam; massive; friable; many fine to coarse brownish yellow (10YR 6/6) iron concentrations; strongly acid.

Depth to bedrock is more than 40 inches. Reaction is strongly acid or very strongly acid throughout the profile, except for in the surface layer, which is not so acid in areas where lime has been applied.

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

The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It has few to many redoximorphic features in shades of brown. It is loam or silt loam.

The Cg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. In most pedons it has few to many redoximorphic features in shades of yellow and brown. It is loam or fine sandy loam.

Braxton Series

The Braxton series consists of very deep, well drained soils with slow and very slow permeability. These strongly sloping to steep soils are on hillsides in the Sequatchie Valley and on high mountains on the Cumberland Plateau. They formed in a thin layer of sandstone colluvium over limestone residuum. Slopes range from 5 to 40 percent.

A typical pedon of Braxton loam, in an area of Talbott-Rock outcrop-Braxton complex, 20 to 40 percent slopes; 0.3 mile west of Hicks Gap Road on Jewett Road, 100 feet north of the road:

A—0 to 4 inches; dark grayish brown (10YR 4/2) loam; moderate medium granular structure; friable; common fine and medium roots; 10 percent sandstone fragments up to 4 inches in diameter; moderately acid; abrupt smooth boundary.

BE—4 to 8 inches; strong brown (7.5YR 5/4) loam; common medium distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; common fine and medium roots; 10 percent sandstone fragments up to 4 inches in diameter; moderately acid; clear smooth boundary.

2Bt1—8 to 25 inches; yellowish red (5YR 5/8) clay; strong fine angular and subangular blocky structure; firm; few fine and medium roots; many distinct yellowish red (5YR 5/6) clay films on faces of peds; moderately acid; gradual smooth boundary.

2Bt2—25 to 48 inches; yellowish red (5YR 5/6) clay; common fine prominent brown (10YR 5/3) and few fine distinct strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; firm; few fine roots; few distinct reddish brown (5YR 5/4) clay films on faces of peds; common dark reddish brown (5YR 3/2) manganese concretions throughout; moderately acid; gradual smooth boundary.

2Bt3—48 to 61 inches; yellowish red (5YR 5/6) clay; common medium prominent brown (10YR 5/3) mottles; weak coarse subangular blocky structure; firm; few fine roots; few distinct reddish brown (5YR 5/4) clay films on faces of peds; slightly acid.

Depth to bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 10 percent in the A horizon and in the upper part of the B horizon. Reaction typically is strongly acid or moderately acid, except the horizon directly above bedrock may be slightly acid.

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

The Bt horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. In some pedons it is mottled in shades of brown and red. It is dominantly silty clay or clay, but in some pedons the upper few inches of the horizon is silty clay loam.

Craigsville Series

The Craigsville series consists of very deep, well drained soils with moderately rapid and rapid permeability. These nearly level and gently sloping soils are on flood plains and alluvial fans. They formed in cobbly and stony, coarse textured alluvium. Slopes range from 0 to 5 percent.

A typical pedon of Craigsville cobbly fine sandy loam, in an area of Ealy-Craigsville complex, 0 to 5 percent slopes, occasionally flooded; 0.5 mile east of Potters Ford Road, 300 feet west of the spot where Underwood Branch runs into the Obed River:

A—0 to 3 inches; dark brown (10YR 3/3) cobbly fine sandy loam; weak fine granular structure; very friable; many fine to coarse roots; 30 percent gravel and cobbles up to 8 inches in diameter; strongly acid; clear smooth boundary.

AB—3 to 9 inches; brown (10YR 4/3) cobbly sandy loam; weak fine granular structure; friable; many fine to coarse roots; 30 percent gravel and cobbles up to 8 inches in diameter; strongly acid; clear smooth boundary.

Bw—9 to 21 inches; dark yellowish brown (10YR 4/4) very cobbly sandy loam; weak medium subangular blocky structure; friable; common fine and few medium roots; 45 percent gravel and cobbles up to 20 inches in diameter; strongly acid; gradual smooth boundary.

C1—21 to 34 inches; dark yellowish brown (10YR 4/4) extremely cobbly loamy sand; single grain; loose; few fine roots; 70 percent cobbles up to 20 inches in diameter; strongly acid; gradual smooth boundary.

C2—34 to 60 inches; yellowish brown (10YR 5/4) extremely cobbly loamy sand; single grain; loose; 70 percent cobbles up to 20 inches in diameter; strongly acid.

Depth to bedrock is more than 60 inches. The content of rock fragments ranges from 15 to 35 percent in the A horizon and from 35 to 70 percent in the B and C horizons. Reaction is very strongly acid or strongly acid throughout the profile, except for in the surface layer, which is not so acid in areas where lime has been applied.

The A horizon has hue of 10YR, value of 3 or 4, and

chroma of 2 to 4. The texture of the fine-earth fraction is fine sandy loam.

The B horizon has hue of 10YR, value of 4 or 5, and chroma of 4 or 6. The texture of the fine-earth fraction is sandy loam or loam.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. The texture of the fine-earth fraction is loamy sand or sandy loam.

Ealy Series

The Ealy series consists of very deep, well drained, moderately rapidly permeable soils. These nearly level soils are on flood plains along streams and rivers. They formed in moderately coarse textured alluvium. Slopes range from 0 to 3 percent.

A typical pedon of Ealy fine sandy loam, in an area of Ealy-Craigsville complex, 0 to 5 percent slopes, occasionally flooded; in Catoosa Wildlife Management Area; 100 feet northwest of the junction of Elmore Creek and Obed River:

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

BA—3 to 10 inches; dark yellowish brown (10YR 4/4) fine sandy loam; common medium and coarse yellowish brown (10YR 5/4) mottles; weak coarse granular structure; very friable; many fine to coarse roots; strongly acid; clear smooth boundary.

Bw—10 to 39 inches; dark yellowish brown (10YR 4/6) fine sandy loam; weak coarse subangular blocky structure; very friable; common fine and medium roots; strongly acid; gradual smooth boundary.

C1—39 to 50 inches; dark yellowish brown (10YR 4/4) loam; common medium faint yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; friable; few fine and medium roots; strongly acid; gradual smooth boundary.

C2—50 to 60 inches; dark yellowish brown (10YR 4/4) fine sandy loam; massive; very friable; few fine and medium roots; strongly acid.

Depth to bedrock is more than 60 inches. The content of gravel ranges from 0 to 15 percent in each horizon. Reaction is strongly acid or very strongly acid throughout the profile, except for in the surface layer, which is not so acid in areas where lime has been applied.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. It is fine sandy loam.

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

The C horizon has hue of 10YR, value of 4 or 6, and chroma of 2 to 4. It is loam or fine sandy loam.

Etowah Series

The Etowah series consists of very deep, well drained, moderately permeable soils. These gently sloping to moderately steep soils are on footslopes and high stream terraces. They formed in moderately fine textured alluvium and colluvium. Slopes range from 2 to 20 percent.

A typical pedon of Etowah silt loam, 5 to 12 percent slopes; 1.7 miles south of Parham Chapel Road on a county road, 100 feet east in a field:

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

BA—7 to 16 inches; dark yellowish brown (10YR 4/6) silt loam; weak medium subangular blocky structure; friable; common fine roots; strongly acid; gradual smooth boundary.

Bt1—16 to 25 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; few fine dark brown (7.5YR 3/2) manganese concretions; strongly acid; gradual smooth boundary.

Bt2—25 to 37 inches; yellowish red (5YR 5/6) silty clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; common faint clay films on faces of peds; common fine dark brown (7.5YR 3/2) manganese concretions; strongly acid; gradual smooth boundary.

Bt3—37 to 48 inches; yellowish red (2.5YR 4/8) silty clay loam; moderate medium subangular blocky structure; friable; common faint clay films on faces of peds; common fine dark brown (7.5YR 3/2) manganese concretions; strongly acid; gradual smooth boundary.

2Bt4—48 to 61 inches; yellowish red (5YR 5/6) clay; moderate medium subangular blocky structure; friable; few distinct clay films on faces of peds; common fine dark brown (7.5YR 3/2) manganese concretions; strongly acid.

Depth to bedrock is more than 6 feet. Reaction is strongly acid or very strongly acid throughout the profile, except for in the surface layer, which is not so acid in areas where lime has been applied.

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

Some pedons have a transitional horizon between the A and Bt horizons.

The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 6 or 8. It is dominantly silty clay loam or clay loam, but the range in the lower part of the horizon includes clay. In most pedons the Bt horizon has few or common mottles in shades of brown or red.

Fullerton Series

The Fullerton series consists of very deep, well drained, moderately permeable soils. These moderately steep and steep soils are on hillsides in the Sequatchie Valley. They formed in residuum derived from cherty limestone. Slopes range from 20 to 35 percent.

A typical pedon of Fullerton gravelly silt loam, 20 to 35 percent slopes; in Bledsoe County; 0.2 mile northeast of Mill Dam Road on Bedwell Road, 25 feet east of the road:

Ap—0 to 5 inches; brown (10YR 4/3) gravelly silt loam; moderate medium granular structure; very friable; many fine and medium and few coarse roots; 15 percent angular fragments of chert less than 1 inch in diameter; strongly acid; clear wavy boundary.

BE—5 to 12 inches; strong brown (7.5YR 5/6) gravelly silt loam; weak fine subangular blocky structure; very friable; common medium and few coarse roots; 20 percent angular fragments of chert up to 2 inches in diameter; very strongly acid; clear wavy boundary.

Bt1—12 to 24 inches; red (2.5YR 5/8) gravelly clay; moderate medium subangular blocky structure; firm; few medium and coarse roots; many faint clay films on faces of peds; 25 percent angular fragments of chert up to 5 inches in diameter; very strongly acid; gradual smooth boundary.

Bt2—24 to 40 inches; red (2.5YR 4/8) cobbly clay; moderate medium angular and subangular blocky structure; firm; many faint clay films on faces of peds; about 30 percent angular fragments and cobbles of chert up to 6 inches in diameter; very strongly acid; gradual smooth boundary.

Bt3—40 to 65 inches; red (2.5YR 5/8) cobbly clay; few medium distinct strong brown (7.5YR 5/6) mottles; moderate medium angular blocky structure; firm; many faint clay films on faces of peds; 30 percent angular fragments and cobbles of chert up to 6 inches in diameter; very strongly acid.

Depth to bedrock is more than 60 inches. Reaction is strongly acid or very strongly acid. The content of fragments less than 2 inches in diameter in the A horizon is 15 to 20 percent. The content of fragments up to 6 inches in diameter in the B horizon is 15 to 35 percent.

The A horizon has hue of 10YR or 7.5YR, value of 4, and chroma of 2 or 3. The texture of the fine-earth fraction is silt loam.

The BE horizon has a hue of 7.5YR, value of 4 or 5, and chroma of 4 to 6. The texture of the fine-earth fraction is silt loam.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 4 to 8. The texture of the fine-earth fraction is silty clay or clay.

Gilpin Series

The Gilpin series consists of moderately deep, well drained, moderately permeable soils. These strongly sloping to very steep soils are on hillsides and ridgetops. They formed in residuum derived from shale and mudstone. Slopes range from 5 to 60 percent.

A typical pedon of Gilpin loam, 12 to 20 percent slopes; 0.5 mile northeast of the intersection of Millstone Mountain Road and Mount Vernon Road, 100 feet north of the road, in an area of woodland:

Oi—1 inch to 0; partially decomposed leaf litter.

A—0 to 1 inch; dark grayish brown (10YR 4/2) loam; weak medium granular structure; very friable; many very fine and fine roots; 10 percent sandstone gravel; strongly acid; abrupt smooth boundary.

BE—1 to 5 inches; yellowish brown (10YR 5/4) loam; weak medium subangular blocky structure; friable; common very fine and fine roots; 10 percent sandstone gravel; strongly acid; gradual smooth boundary.

Bt1—5 to 21 inches; yellowish brown (10YR 5/6) channery silty clay loam; moderate medium subangular blocky structure; friable; common fine and medium roots; few faint clay films on faces of peds; 15 percent shale channers; strongly acid; gradual smooth boundary.

Bt2—21 to 34 inches; yellowish brown (10YR 5/6) channery silty clay loam; few fine distinct strong brown (7.5YR 5/6) mottles; strong medium subangular blocky structure; friable; few fine and medium roots; common distinct clay films on faces of peds; 20 percent shale channers; strongly acid; gradual smooth boundary.

C—34 to 38 inches; yellowish brown (10YR 5/6) channery clay; common medium distinct strong

brown (7.5YR 5/6) mottles; massive; firm; 30 percent shale channers; strongly acid; gradual smooth boundary.
Cr—38 to 50 inches; soft shale bedrock.

The thickness of the solum ranges from 20 to 36 inches. The depth to bedrock ranges from 20 to 40 inches. The content of rock fragments is as much as 20 percent in the A and B horizons (fig. 15). Reaction is strongly acid or very strongly acid throughout the profile, except for in the surface layer, which is not so acid in areas where lime has been applied.

The A horizon is less than 3 inches thick. It has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. Texture is loam.

The BE horizon, if it occurs, has colors and textures similar to those of the horizons directly above and below it.

The Bt horizon has hue of 10YR or 7.5YR and value and chroma of 4 to 6. In most pedons it is mottled in shades of red or brown. In the upper part of the Bt horizon, the texture of the fine-earth fraction is clay loam or silty clay loam. In the lower part, it ranges to clay.

The C horizon has colors similar to those of the Bt horizon. It has mottles in shades of red and brown. The texture of the fine-earth fraction is dominantly clay or silty clay loam. In pedons where the soil formed in mudstone residuum, the texture is clay.

The Cr horizon is soft, multicolored shale or mudstone.

Hayter Series

The Hayter series consists of deep, well drained, moderately rapidly permeable soils. These strongly sloping to steep soils are on footslopes and benches. They formed in colluvium derived from sandstone and the underlying limestone residuum. Slopes range from 10 to 40 percent.

A typical pedon of Hayter loam, 10 to 20 percent slopes; in Swagerty Cove; 0.4 mile west of Reed Cemetery on Jewett Road:

A—0 to 1 inch; dark brown (10YR 3/3) loam; weak medium granular structure; very friable; many fine and few medium roots; 10 percent sandstone gravel; moderately acid; abrupt smooth boundary.
BA—1 to 7 inches; dark yellowish brown (10YR 4/4) loam; weak medium subangular blocky structure; friable; many fine and few medium roots; 10 percent sandstone gravel; moderately acid; clear smooth boundary.
Bt1—7 to 18 inches; strong brown (7.5YR 4/6) gravelly loam; moderate medium subangular blocky structure; friable; common fine and medium roots; few faint clay films on faces of peds; 15 percent sandstone gravel; strongly acid; gradual smooth boundary.
Bt2—18 to 30 inches; strong brown (7.5YR 4/6) gravelly loam; moderate medium subangular blocky structure; friable; common fine and medium roots; few faint clay films on faces of peds; 30 percent sandstone gravel; strongly acid; gradual wavy boundary.
2Bt3—30 to 40 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; few fine and medium roots; common distinct clay films on faces of peds; few pebbles; strongly acid; gradual smooth boundary.
2Bt4—40 to 60 inches; yellowish red (5YR 4/6) clay; strong fine and medium angular blocky structure; firm; few fine roots; many distinct clay films on faces of peds; common manganese concentrations; strongly acid.

The depth to bedrock ranges from 48 to more than 60 inches. The content of gravel ranges from 10 to 35 percent throughout the profile. The loamy material in the upper part of the B horizon is 2 to 3 feet thick. Reaction is moderately acid or strongly acid.

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

The BA horizon has hue 10YR, value of 4 or 5, and chroma of 4. It is loam or gravelly loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 or 6. The texture of the fine-earth fraction is loam or clay loam.

The 2Bt horizon, if it occurs, has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8. Texture is silty clay loam in the upper part of the horizon, but below a depth of about 40 inches, it ranges to clay.

Hendon Series

The Hendon series consists of very deep, well drained, moderately slowly permeable soils (fig. 16). These gently sloping to strongly sloping soils are on broad upland ridgetops on the Cumberland Plateau. They formed in a 1- to 3-foot-thick loamy mantle and the underlying residuum derived from shale and sandstone. Slopes range from 2 to 10 percent.

A typical pedon of Hendon silt loam, 2 to 5 percent slopes; 0.2 mile north of Genesis on Genesis Road, 300 feet west of a gravel road:

Oi—1 inch to 0; partially decomposed leaf litter.
A—0 to 1 inch; very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; very friable;

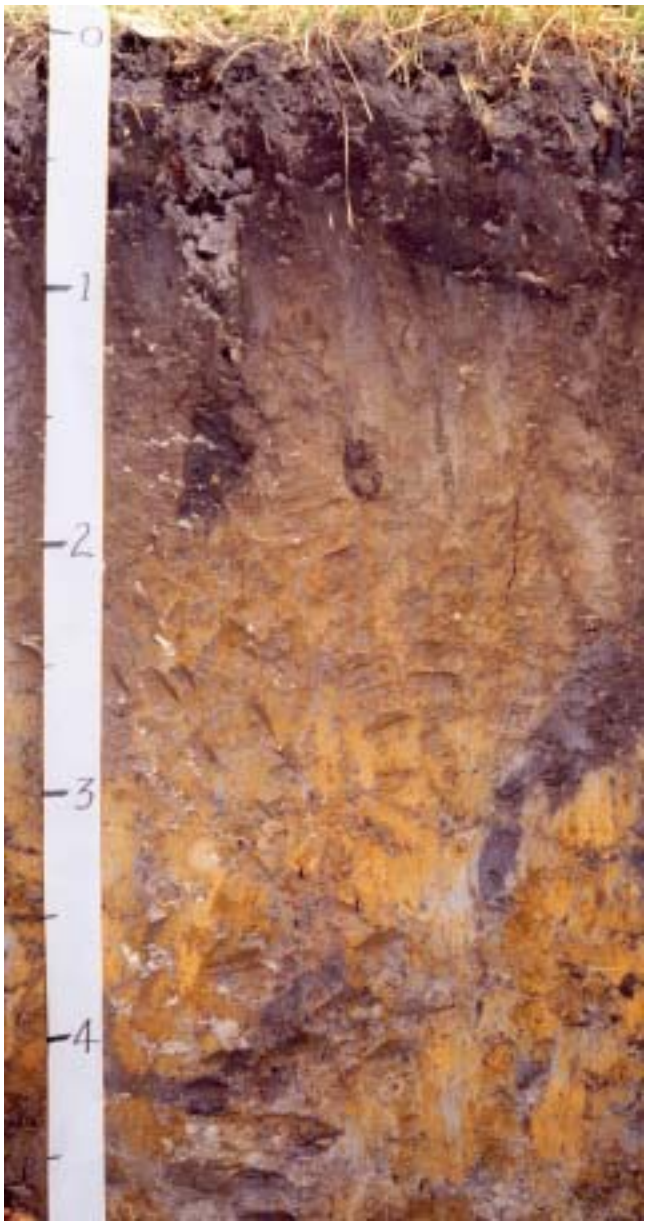


Figure 14.—A profile of Bonair loam, occasionally flooded. This poorly drained soil has an umbric epipedon. Depth is marked in feet.

Figure 15.—Profile of a Gilpin loam. Shale channers are common in the B horizon. The content of channers increases with increasing depth. Depth is marked in feet.

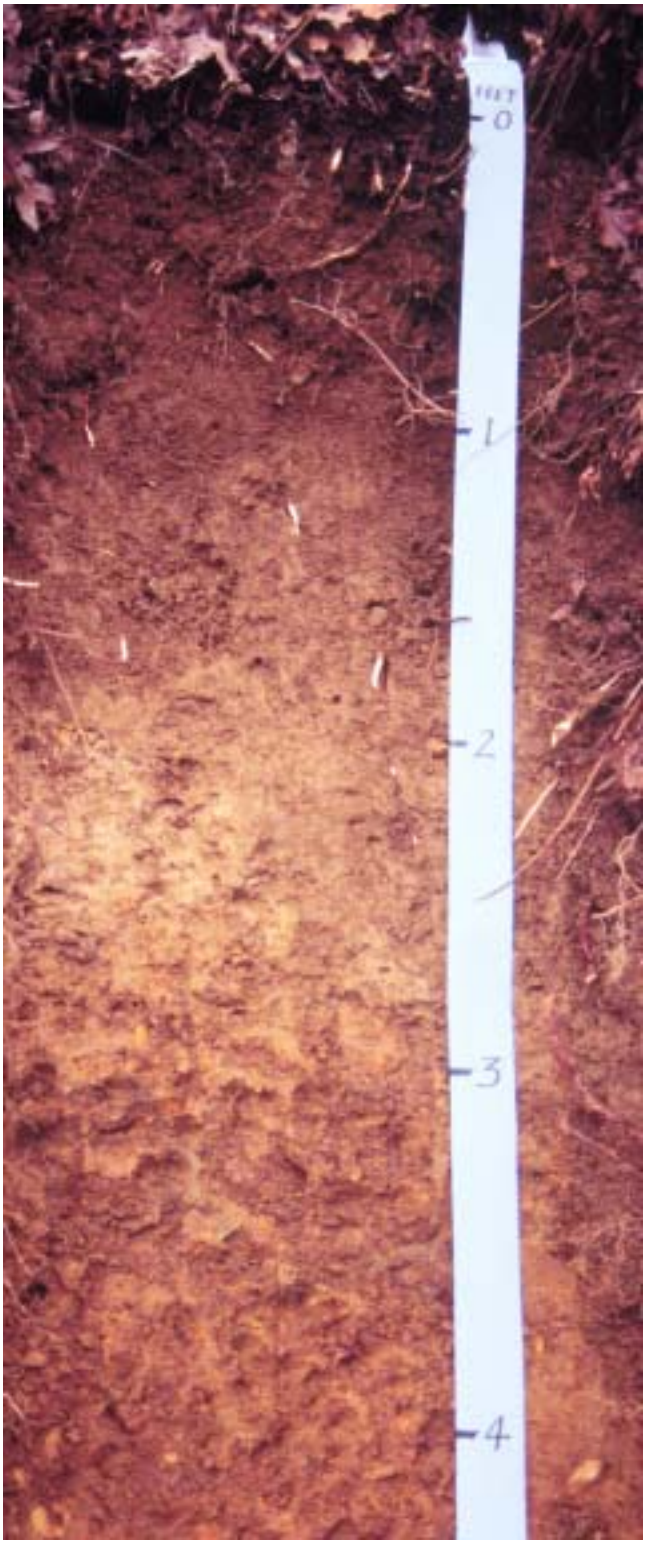


Figure 16.—Profile of a Hendon silt loam. This soil has a fragic layer at a depth of about 2 feet. Depth is marked in feet.

Figure 17.—Profile of a Jefferson cobbly loam. This very deep soil formed in colluvium. Depth is marked in feet.

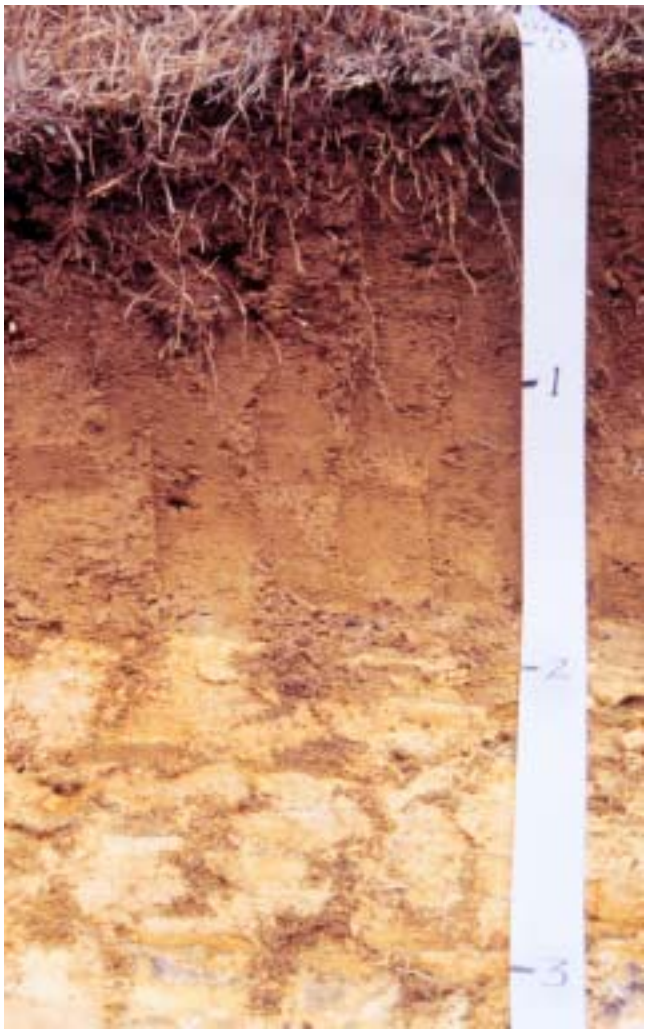


Figure 18.—Profile of a Ramsey loam. This soil is shallow over massive sandstone bedrock. Depth is marked in feet.

Figure 19.—Profile of a Talbott silt loam. This moderately deep soil has a clayey B horizon. Depth is marked in feet.

many fine and medium roots; strongly acid; abrupt smooth boundary.
BE—1 to 6 inches; yellowish brown (10YR 5/4) silt loam; weak fine granular structure; friable; many fine and medium roots; strongly acid; clear smooth boundary.
Bt1—6 to 16 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; common fine to coarse roots; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.
Bt2—16 to 23 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; few fine to coarse roots; few faint clay films on faces of peds; strongly acid; gradual wavy boundary.
Btx/E—23 to 29 inches; 70 percent yellowish brown (10YR 5/4) silt loam (Btx part); common medium distinct yellowish brown (10YR 5/8) mottles; weak medium prismatic structure parting to weak fine and medium subangular blocky; firm; few distinct yellowish brown (10YR 5/3) clay films in pores and on faces of peds; 30 percent common medium and coarse pale brown (10YR 6/3) silt loam pockets and coatings on faces of peds (E part); brittle in about 30 percent of the horizon; strongly acid; gradual wavy boundary.
B't—29 to 46 inches; strong brown (7.5YR 5/6) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium and coarse subangular and angular blocky structure; friable; common distinct brown (7.5YR 5/4) clay films on faces of peds; strongly acid; gradual smooth boundary.
2Bt—46 to 61 inches; strong brown (7.5YR 5/6) clay loam; common medium distinct yellowish brown (10YR 5/6) and common fine and medium prominent yellowish red (5YR 5/8) mottles; moderate fine subangular and angular blocky structure; friable; common distinct brown (7.5YR 5/4) clay films on faces of peds and in pores; strongly acid.

Depth to bedrock is more than 60 inches. The content of gravel ranges from 0 to 5 percent in the A horizon and in the upper part of the B horizon. It ranges from 0 to 10 percent in the lower part of the horizon. Reaction is very strongly acid or strongly acid.

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

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

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

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

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

Jefferson Series

The Jefferson series consists of very deep, well drained, moderately rapidly permeable soils (fig. 17). These strongly sloping to very steep soils are on concave hillsides and side slopes on the Cumberland Plateau. They formed in colluvium derived from interbedded sandstone and shale. Slopes range from 5 to 60 percent.

A typical pedon of Jefferson cobbly loam, in a area of Jefferson-Varilla-Shelocta complex, 20 to 60 percent slopes, very stony; 400 feet north of the Obed River on Genesis Road, 100 feet west of the road:

Oi—1 inch to 0; partially decomposed leaf litter.
A—0 to 1 inch; very dark grayish brown (10YR 3/2) cobbly loam; weak fine granular structure; very friable; common fine and medium roots; 20 percent gravel and cobbles up to 8 inches in diameter; strongly acid; abrupt smooth boundary.
E—1 to 7 inches; yellowish brown (10YR 5/4) cobbly loam; weak medium granular structure; friable; common fine and medium roots; 20 percent gravel and cobbles up to 8 inches in diameter; strongly acid; clear smooth boundary.
Bt1—7 to 17 inches; yellowish brown (10YR 5/6) cobbly loam; weak medium subangular blocky structure; friable; common fine and medium roots; few faint clay films on faces of peds; 30 percent gravel and cobbles up to 8 inches in diameter; strongly acid; gradual smooth boundary.
Bt2—17 to 40 inches; yellowish brown (10YR 5/6) cobbly loam; moderate medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; 30 percent gravel and cobbles up to 8 inches in diameter; strongly acid; gradual smooth boundary.
Bt3—40 to 56 inches; yellowish brown (10YR 5/6) very cobbly clay loam; moderate medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; 40 percent gravel and cobbles up to 8 inches in diameter; strongly acid; gradual smooth boundary.
C—56 to 60 inches; yellowish brown (10YR 5/6) very gravelly sandy loam; common medium distinct light yellowish brown (10YR 6/4) and common

medium distinct strong brown (7.5YR 5/6) mottles; massive; friable; 50 percent gravel and cobbles up to 5 inches in diameter; strongly acid.

Depth to bedrock is more than 60 inches. The content of rock fragments ranges from 5 to 35 percent in the A horizon and in the upper part of the B horizon and from 20 to 80 percent in the lower part of the B horizon and in the C horizon, if it occurs. Reaction is very strongly acid or strongly acid throughout the profile.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 3. The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The texture of the fine-earth fraction is loam.

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

Some pedons have a thin transitional horizon between the A or E horizon and the Bt horizon.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. The texture of the fine-earth fraction is loam, sandy clay loam, or clay loam.

Some pedons have a BC horizon. The BC and C horizons have colors in shades of brown, red, and gray. The texture of the fine-earth fraction is sandy loam, sandy clay loam, and clay loam.

Lily Series

The Lily series consists of moderately deep, well drained, moderately rapidly permeable soils. These gently sloping to moderately steep soils are on ridgetops and hillsides on the Cumberland Plateau. They formed in sandstone residuum. Slopes range from 2 to 35 percent.

A typical pedon of Lily loam, 2 to 5 percent slopes; 0.2 mile southeast of Old Neal Chapel Church on Potato Farm Road, 100 feet east of the road:

Oi—1 inch to 0; partially decomposed leaf litter.
A—0 to 2 inches; brown (10YR 4/3) loam; weak fine granular structure; friable; many fine and medium roots; very strongly acid; abrupt smooth boundary.
BE—2 to 6 inches; yellowish brown (10YR 5/4) loam; moderate medium granular structure; friable; many fine to coarse roots; very strongly acid; gradual smooth boundary.
Bt1—6 to 22 inches; yellowish brown (10YR 5/6) loam; weak medium subangular blocky structure; friable; common fine to coarse roots; few faint clay films on faces of peds; very strongly acid; gradual smooth boundary.
Bt2—22 to 31 inches; yellowish brown (10YR 5/6) loam; moderate medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; very strongly acid; gradual smooth boundary.
C—31 to 35 inches; brownish yellow (10YR 6/8) cobbly sandy loam; massive; 30 percent channers and cobbles up to 6 inches in length.
R—35 inches; hard sandstone bedrock.

The depth to sandstone bedrock ranges from 20 to 40 inches. The content of sandstone fragments ranges from 0 to 30 percent in the A and B horizons to as much as 35 percent in the C horizon. Reaction is very strongly acid or strongly acid throughout the profile, except for in the surface layer, which is not so acid in areas where lime has been applied.

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

The BE horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. The texture of the fine-earth fraction is loam or sandy loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. The texture of the fine-earth fraction is loam, clay loam, or sandy clay loam.

Some pedons have a BC horizon. The BC and C horizons have hue of 10YR to 5YR, value of 4 to 6, and chroma of 4 to 8. The texture of the fine-earth fraction is loamy sand, sandy loam, loam, or sandy clay loam.

The R horizon is hard sandstone bedrock.

Lonewood Series

The Lonewood series consists of deep and very deep, well drained, moderately permeable soils. These gently sloping and strongly sloping soils are on broad ridgetops and smooth side slopes on the Cumberland Plateau. They formed in a 1- to 3-foot-thick loamy mantle and the underlying residuum derived from shale and sandstone. Slopes range from 2 to 12 percent.

A typical pedon of Lonewood loam, 2 to 5 percent slopes; 3,000 feet northwest of the intersection of Carson Road and U.S. Highway 127 North:

Oi—1 inch to 0; partially decomposed leaf litter.
A—0 to 1 inch; dark brown (10YR 3/3) loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; abrupt smooth boundary.
BE—1 to 10 inches; yellowish brown (10YR 5/4) loam; weak medium granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

Bt1—10 to 17 inches; yellowish brown (10YR 5/6) clay loam; weak medium subangular blocky structure; friable; common fine roots; few faint clay films; strongly acid; gradual smooth boundary.
Bt2—17 to 31 inches; yellowish brown (10YR 5/6) clay loam; moderate medium subangular blocky structure; friable; common fine roots; few faint clay films; strongly acid; gradual wavy boundary.
Bt3—31 to 37 inches; yellowish brown (10YR 5/6) clay loam; common medium distinct light yellowish brown (10YR 6/4) and brownish yellow (10YR 6/6) mottles; moderate medium subangular and angular blocky structure; friable; few fine roots; common prominent brown (7.5YR 4/4) clay films on the faces of peds; strongly acid; gradual wavy boundary.
2Bt4—37 to 55 inches; strong brown (7.5YR 5/6) silty clay loam; few medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular and angular blocky structure; friable; common distinct brown (7.5YR 4/4) and dark brown (7.5YR 3/4) clay films on the faces of peds; 10 percent rock fragments up to 3 inches in diameter; very strongly acid; gradual smooth boundary.
2BC—55 to 72 inches; strong brown (7.5YR 5/8) clay loam; common medium prominent yellowish brown (10YR 5/6) and yellowish red (5YR 5/6) mottles; weak coarse subangular blocky structure; friable; 10 percent rock fragments up to 3 inches in diameter; very strongly acid; gradual smooth boundary.
Cr—72 to 80 inches; soft sandstone bedrock.

The depth to soft shale or sandstone bedrock ranges from 40 to 60 inches or more. Reaction is very strongly acid or strongly acid, except for in the surface layer, which is not so acid in areas where lime has been applied.

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

Some pedons have a transitional horizon between the A and Bt horizons.

The upper part of the Bt horizon has hue of 10YR to 5YR, value of 5, and chroma of 4 to 8. It is silt loam, loam, silty clay loam, or clay loam. The lower part of the horizon has hue of 7.5YR to 2.5YR, value of 4 or 5, and chroma of 6 or 8. In some pedons it is mottled in shades of brown, yellow, and red. It is loam, silty clay loam, clay loam, or clay.

The BC horizon and C horizon, if it occurs, have colors and textures similar to those in the lower part of the Bt horizon. Some pedons do not have a Cr horizon.

Muse Series

The Muse series consists of deep, well drained, slowly permeable soils. These strongly sloping and moderately steep soils are on upland side slopes on the Cumberland Plateau. They formed in shale residuum. Slopes range from 10 to 20 percent.

A typical pedon of Muse silt loam, 10 to 20 percent slopes; 0.5 mile east of Genesis Road on Potters Ford Road, 200 feet south:

A—0 to 1 inch; very dark grayish brown (10YR 3/2) silt loam; weak medium granular structure; very friable; many fine roots; 10 percent rock fragments up to 1 inch in diameter; strongly acid; abrupt smooth boundary.
BE—1 to 5 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; common fine and medium and few coarse roots; 10 percent rock fragments up to 1 inch in diameter; strongly acid; clear smooth boundary.
Bt1—5 to 13 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium and coarse subangular blocky structure; friable; few fine to coarse roots; few faint clay films on faces of peds; 10 percent rock fragments up to 1 inch in diameter; strongly acid; gradual smooth boundary.
Bt2—13 to 25 inches; yellowish brown (10YR 5/8) clay; few medium distinct strong brown (7.5YR 5/6) mottles; strong fine angular and subangular blocky structure; firm; few fine roots; common distinct yellowish brown (10YR 5/6) clay films on faces of peds; 10 percent shale channers up to 3 inches in length; strongly acid; gradual smooth boundary.
Bt3—25 to 36 inches; yellowish brown (10YR 5/6) clay; common medium distinct yellowish brown (10YR 5/8) and few fine distinct pale brown (10YR 6/3) mottles; strong fine angular blocky structure; firm; few fine roots; many distinct yellowish brown (10YR 5/4) clay films on faces of peds; 10 percent shale channers up to 3 inches in length; strongly acid; gradual smooth boundary.
Bt4—36 to 47 inches; clay, 25 percent yellowish brown (10YR 5/6), 25 percent strong brown (7.5YR 5/6), 25 percent pale brown (10YR 6/3), and 25 percent yellowish red (5YR 5/6); moderate thin platy structure; firm; many distinct yellowish brown (10YR 5/4) clay films on faces of peds; 10 percent shale channers up to 3 inches in length; strongly acid; gradual wavy boundary.
C—47 to 54 inches; channery clay, 34 percent brownish yellow (10YR 6/6), 33 percent light

yellowish brown (10YR 6/4), and 33 percent light gray (10YR 7/2); massive parting to weak platy structure; firm; 30 percent shale channers up to 3 inches in length; strongly acid; gradual wavy boundary.
Cr—54 to 60 inches; multicolored shale bedrock.

The depth to bedrock ranges from 40 to 80 inches. The content of rock fragments, mostly shale channers, ranges from 0 to 20 percent in the A and B horizons and from 30 to 50 percent in the C horizon. Reaction is very strongly acid or strongly acid throughout the profile.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 4. The texture of the fine-earth fraction is silt loam.

Some pedons have an E horizon. The E and BE horizons have hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 or 4. The texture of the fine-earth fraction is silt loam or loam.

The Bt horizon has hue of 10YR to 5YR, value of 4 or 5, and chroma of 4 to 8. The lower part of the horizon is mottled in shades of brown or red. The texture of the fine-earth fraction is silty clay loam, silty clay, or clay.

The C horizon has hue of 10YR to 5YR, value of 4 to 6, and chroma of 1 to 6. In some pedons it is mottled in shades of red, brown, yellow, or gray. The texture of the fine-earth fraction is clay or silty clay.

The Cr horizon is shale or siltstone.

Ramsey Series

The Ramsey series consists of shallow, somewhat excessively drained, rapid permeable soils (fig. 18). These strongly sloping to very steep soils are on hillsides and the upper side slopes on the Cumberland Plateau. They formed in sandstone residuum. Slopes range from 5 to 60 percent.

A typical pedon of Ramsey loam, in an area of Ramsey-Rock outcrop complex, 5 to 12 percent slopes; 0.7 mile east of Fairfield Glade headquarters, 0.3 mile south on a paved road, 100 feet west, in an area of woodland:

Oi—1 inch to 0; partially decomposed leaf litter.
A—0 to 2 inches; dark yellowish brown (10YR 4/4) loam; weak medium granular structure; very friable; many fine and medium roots; 10 percent rock fragments up to 4 inches in diameter; strongly acid; clear smooth boundary.
Bw1—2 to 15 inches; dark yellowish brown (10YR 4/6) loam; weak medium subangular blocky structure; friable; many fine and medium roots; 10 percent rock fragments up to 4 inches in diameter; strongly acid; clear smooth boundary.
Bw2—15 to 18 inches; yellowish brown (10YR 5/4) sandy loam; weak medium subangular blocky structure; very friable; common fine and medium roots; 10 percent rock fragments up to 4 inches in diameter; strongly acid.
R—18 inches; hard sandstone bedrock.

The depth to bedrock ranges from 7 to 20 inches. The content of rock fragments ranges from 5 to 35 percent in each horizon. Reaction is strongly acid or very strongly acid throughout the profile, except for in the surface layer, which is not so acid in areas where lime has been applied.

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

The E horizon, if it occurs, has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. The texture of the fine-earth fraction is loam or sandy loam.

The Bw horizon has hue of 10YR or 7.5YR and value and chroma of 4 to 6. The texture of the fine-earth fraction is loam or sandy loam.

The C horizon, if it occurs, has hue of 10YR and value and chroma of 4 to 6. The texture of the fine-earth fraction is loam, sandy loam, or loamy sand.

Sequatchie Series

The Sequatchie series consists of very deep, well drained, moderately permeable soils. These gently sloping soils are on low stream terraces in the Sequatchie Valley. They formed in moderately fine textured alluvium. Slopes range from 2 to 5 percent.

A typical pedon of Sequatchie loam, 2 to 5 percent slopes; in Bledsoe County; 1.8 miles southwest of Pikeville on U.S. Highway 127, about 1.5 miles southwest of the intersection of U.S. Highway 128 and old Highway 28, about 0.5 mile northwest on a farm road, in a field:

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 prominent 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 prominent yellowish brown (10YR 5/8) mottles; weak medium and fine subangular blocky structure; friable; many fine and medium tubular pores and few vesicular pores; few faint clay films on faces of peds; 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; loose; 50 percent rounded and subrounded pebbles 1/8 inch to 1 1/2 inches in diameter; very strongly acid.

Depth to bedrock is more than 60 inches. Reaction is strongly acid or very strongly acid, except for in the surface layer, which is not so acid in areas where lime has been applied. The content of sandstone pebbles ranges from 0 to 5 percent in the A and B horizons. It generally ranges from 0 to 30 percent in the C horizon, but in some subhorizons it is 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.

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. In some pedons it is mottled in shades of brown. It is loam or clay loam.

The BC horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. In some pedons it has few or common mottles in shades of brown and gray. It 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 texture of the fine-earth fraction is sandy loam, fine sandy loam, or loam.

Shelocta Series

The Shelocta series consists of deep and very deep, well drained, moderately permeable soils. These strongly sloping to very steep soils are on upland hillsides on the Cumberland Plateau. They formed in sandstone colluvium underlain by residuum derived from shale and siltstone. Slopes range from 10 to 60 percent.

A typical pedon of Shelocta loam, in an area of Jefferson-Varilla-Shelocta complex, 20 to 60 percent slopes, very stony; 6.6 miles northeast of the intersection of I-40 and Highway 298, about 0.3 mile east of Highway 298 and River Road, 300 feet south of River Road, by the Obed River, 300 feet south:

A—0 to 1 inch; dark brown (10YR 3/3) loam; weak medium granular structure; very friable; many fine to coarse roots; 10 percent hard sandstone fragments up to 3 inches in diameter; strongly acid; clear smooth boundary.
E—1 to 3 inches; yellowish brown (10YR 5/4) loam; moderate medium granular structure; very friable; many fine to coarse roots; 10 percent hard sandstone channers up to 3 inches in length; strongly acid; clear smooth boundary.
BE—3 to 11 inches; yellowish brown (10YR 5/6) loam; weak fine and medium subangular blocky structure; very friable; common fine to coarse roots; 10 percent hard sandstone channers up to 3 inches in length; strongly acid; clear smooth boundary.
Bt1—11 to 21 inches; yellowish brown (10YR 5/8) silty clay loam; moderate medium subangular blocky structure; friable; common fine and medium roots; few faint clay films on faces of peds; 10 percent hard sandstone channers up to 3 inches in length; strongly acid; clear smooth boundary.
2Bt2—21 to 32 inches; yellowish brown (10YR 5/8) silty clay loam; common medium distinct yellowish brown (10YR 5/4) and strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; friable; few fine roots; few distinct yellowish brown (10YR 5/6) clay films on faces of peds; 10 percent shale channers up to 3 inches in length; strongly acid; gradual smooth boundary.
2Bt3—32 to 40 inches; brownish yellow (10YR 6/8) silty clay loam; common fine and medium prominent strong brown (7.5YR 5/6) mottles; strong fine and medium subangular blocky structure; firm; few fine roots; common distinct brownish yellow (10YR 6/6) clay films on faces of peds; 10 percent shale channers up to 3 inches in length; strongly acid; gradual smooth boundary.
2BC—40 to 50 inches; channery silty clay loam, 34 percent brownish yellow (10YR 6/6), 33 percent pale brown (10YR 6/3), and 33 percent strong brown (7.5YR 5/6); weak medium platy structure; friable; 30 percent shale channers up to 3 inches in length; strongly acid; gradual smooth boundary.
2Cr—50 to 60 inches; multicolored shale bedrock.

Depth to bedrock is more than 48 inches. The content of rock fragments ranges from 5 to 35 percent in the A and B horizons and from 30 to 70 percent in the C horizon. Reaction is strongly acid or very strongly acid throughout the profile.

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

The E horizon, if it occurs, has hue of 10YR, value of 5 to 7, and chroma of 4. The texture of the fine-earth fraction is loam.

The BE horizon, if it occurs, has hue of 10YR, value of 4 to 6, and chroma of 4 or 6. The texture of the fine-earth fraction is loam or silty clay loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. The texture of the fine-earth fraction is silty clay loam or loam.

Some pedons have a C horizon. The BC horizon and C horizon, if it occurs, have hue of 10YR, value of 4 to 6, and chroma of 3 to 6. The texture of the fine-earth fraction is clay loam or silty clay loam.

The Cr horizon is multicolored shale or mudstone interlayered with some sandstone.

Sullivan Series

The Sullivan series consists of very deep, well drained, moderately permeable soils. These nearly level soils are on flood plains along streams and rivers. They formed in loamy alluvial sediments. Slopes range from 0 to 2 percent.

A typical pedon of Sullivan loam, occasionally flooded; 1.5 miles south from the beginning of the Sequatchie Valley on old Highway 28, about 1,200 feet northeast of Parham Cemetery:

Ap—0 to 8 inches; dark brown (10YR 4/3) loam; moderate fine granular structure; friable; many fine and very fine roots; slightly acid; clear smooth boundary.

Bw—8 to 20 inches; dark yellowish brown (10YR 4/3) loam; few medium dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; common fine roots; moderately acid; gradual smooth boundary.

Ab—20 to 29 inches; dark brown (10YR 3/3) silt loam; weak medium subangular blocky structure; friable; few fine roots; moderately acid; gradual smooth boundary.

Bwb—29 to 42 inches; brown (10YR 4/3) loam; moderate medium subangular blocky structure; friable; few fine roots; moderately acid; gradual smooth boundary.

C—42 to 60 inches; dark yellowish brown (10YR 4/4) loam; massive; friable; 10 percent rounded pebbles; moderately acid.

Depth to bedrock is more than 60 inches. The content of gravel ranges from 0 to 15 percent within a depth of 40 inches and from 0 to 30 percent below a depth of 40 inches. Reaction is moderately acid to neutral.

The A or Ap horizon has hue of 10YR, value of 4, and chroma of 2 to 4. Some pedons have an Ab horizon. The Ab horizon has hue of 10YR, value of 3, and chroma of 2 or 3. The A and Ab horizons are loam or silt loam.

The Bw and Bwb horizons have hue of 10YR, value of 4 or 5, and chroma of 3 or 4. They are loam or silt loam.

The C horizon, if it occurs, has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The texture of the fine-earth fraction is loam or sandy loam.

Talbott Series

The Talbott series consists of moderately deep, well drained soils (fig. 19). Permeability is slow or very slow. These strongly sloping to very steep soils are on ridgetops and hillsides. They formed in clayey limestone residuum. Slopes range from 5 to 70 percent.

A typical pedon of Talbott loam, in an area of Talbott-Rock outcrop-Braxton complex, 20 to 40 percent slopes; 0.3 mile west of Hicks Gap, 150 feet north of the road:

A—0 to 3 inches; very dark grayish brown (10YR 3/2) loam; moderate medium granular structure; friable; many fine to coarse roots; few rock fragments up to 4 inches in diameter; moderately acid; abrupt smooth boundary.

BA—3 to 7 inches; yellowish brown (10YR 5/4) loam; weak medium subangular blocky structure; friable; many fine to coarse roots; few rock fragments up to 4 inches in diameter; moderately acid; clear smooth boundary.

2Bt1—7 to 10 inches; strong brown (7.5YR 5/6) silty clay loam; common medium distinct yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; firm; common fine and few coarse and medium roots; common distinct clay films on faces of peds; slightly acid; clear smooth boundary.

2Bt2—10 to 22 inches; yellowish red (5YR 5/6) clay; moderate fine angular and subangular blocky structure; very firm; few fine and medium roots; many prominent clay films on faces of peds; slightly acid; gradual smooth boundary.

2Bt3—22 to 26 inches; yellowish red (5YR 5/6) clay; common fine distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; very firm; few very fine roots; common prominent clay films on faces of peds; slightly acid; gradual smooth boundary.

2BC—26 to 33 inches; dark yellowish brown (10YR 4/4) clay; common fine prominent yellowish red (5YR 5/6) and few fine distinct brown (10YR 5/3) mottles; weak fine angular blocky structure; very firm; neutral.
2R—33 inches; limestone bedrock.

The depth to bedrock ranges from 20 to 40 inches. The content of gravel ranges from 0 to 10 percent in the A horizon and from 0 to 5 percent in the B horizon. Reaction typically is slightly acid to strongly acid, except the horizon directly above bedrock may be neutral.

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

The BA horizon, if it occurs, has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is loam or silt loam.

Some pedons have a Bt horizon. The Bt and 2Bt horizons have hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 or 6. The number of mottles in shades of brown and yellow ranges from none to common. The Bt and 2Bt horizons are dominantly silty clay or clay, but in some pedons the upper part of these horizons is silty clay loam.

Some pedons have a 2C horizon. The 2BC and 2C horizons have hue of 10YR to 5YR and value and chroma of 4 to 6. They are silty clay or clay.

Varilla Series

The Varilla series consists of deep and very deep, somewhat excessively drained, moderately rapidly permeable soils. These strongly sloping to very steep soils are on convex hillsides and footslopes below sandstone escarpments on the Cumberland Plateau. They formed mostly in sandstone colluvium and in some material weathered from shale and siltstone. Slopes range from 10 to 60 percent.

A typical pedon of Varilla very cobbly sandy loam, in an area of Jefferson-Varilla-Shelocta complex, 20 to 60 percent slopes, very stony; 2 miles northeast of U.S. Highway 127 on Tabor Loop, east to end of McCampbell Road, 600 feet north:

Oi—1 inch to 0; partially decomposed leaf litter.
A—0 to 1 inch; very dark grayish brown (10YR 3/2) very cobbly sandy loam; weak medium granular structure; very friable; many fine to coarse roots; 40 percent cobbles and stones up to 16 inches in diameter; strongly acid; abrupt smooth boundary.
BE—1 to 7 inches; brown (10YR 4/3) very cobbly sandy loam; weak medium granular structure; very friable; many fine to coarse roots; 40 percent cobbles and stones up to 16 inches in diameter; strongly acid; clear smooth boundary.
Bw1—7 to 28 inches; dark yellowish brown (10YR 4/6) very cobbly sandy loam; weak coarse subangular blocky structure; very friable; common fine and few medium and coarse roots; 40 percent cobbles up to 8 inches in diameter; very strongly acid; gradual smooth boundary.
Bw2—28 to 44 inches; dark yellowish brown (10YR 4/6) very cobbly sandy loam; weak coarse subangular blocky structure; very friable; common fine and few medium and coarse roots; 50 percent cobbles up to 8 inches in diameter; very strongly acid; gradual smooth boundary.
C—44 to 60 inches; yellowish brown (10YR 5/6) very cobbly sandy loam; massive; very friable; 60 percent cobbles up to 8 inches in diameter; very strongly acid.

The depth to bedrock ranges from 48 to more than 60 inches. The content of rock fragments, which are mostly cobbles and stones, ranges from 15 to 75 percent in the A and B horizons and from 35 to 90 percent in the C horizon. Reaction is strongly acid or very strongly acid throughout the profile.

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

The BE horizon, if it occurs, has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The texture of the fine-earth fraction is loam or sandy loam.

The Bw horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. The texture of the fine-earth fraction is loam or sandy loam.

Some pedons have a BC horizon. The BC and C horizons have hue of 10YR, value of 5 or 6, and chroma of 3 to 6. In some pedons they are mottled in shades of brown, red, or gray. The texture of the fine-earth fraction is sandy loam or loamy sand.

Waynesboro Series

The Waynesboro series consists of very deep, well drained, moderately permeable soils. These strongly sloping and moderately steep soils are on footslopes and high stream terraces. Slopes range from 5 to 20 percent.

A typical pedon of Waynesboro loam, 5 to 12 percent slopes; 0.6 mile west of Highway 68 on Grassy Cove Road, 200 feet south:

Ap—0 to 9 inches; dark yellowish brown (10YR 4/4) loam; few medium and coarse prominent strong brown (7.5YR 5/6) mottles; moderate medium granular structure; friable; common fine and very fine roots; slightly acid; abrupt wavy boundary.

Bt1—9 to 20 inches; yellowish red (5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; common fine roots; common faint clay films on faces of peds; strongly acid; gradual smooth boundary.
Bt2—20 to 32 inches; yellowish red (5YR 4/6) clay; common medium distinct red (2.5YR 5/6) and few medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; common faint clay films on faces of peds; strongly acid; gradual smooth boundary.
Bt3—32 to 42 inches; red (2.5YR 5/6) clay; common medium distinct yellowish red (5YR 5/6) and common medium and coarse prominent strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; common faint clay films on faces of peds; strongly acid; gradual smooth boundary.
Bt4—42 to 61 inches; red (2.5YR 4/8) sandy clay; moderate medium subangular blocky structure; friable; common faint clay films on faces of peds; strongly acid.

Depth to bedrock is more than 60 inches. Reaction is strongly acid or very strongly acid, except for in the surface layer, which is not so acid in areas where lime has been applied.

The A or Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. In severely eroded areas, it has hue of 5YR, value of 4 or 5, and chroma of 4 to 6. It is loam.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8. In most pedons it has few or common mottles in shades of brown or red. It is clay loam in the upper part and clay, clay loam, or sandy clay in the lower part.

Some pedons have a BC horizon. This horizon, if it occurs, has hue of 5YR, value of 4 or 5, and chroma of 6. It is sandy clay loam.

Whitwell Series

The Whitwell series consists of very deep, moderately well drained, moderately permeable soils. These nearly level and gently sloping soils are on low stream terraces. Slopes range from 0 to 5 percent.

A typical pedon of Whitwell loam, 2 to 5 percent slopes; 1.8 miles west of Highway 68 on Grassy Cove Road, 200 feet north:

Ap—0 to 7 inches; brown (10YR 4/3) loam; moderate medium granular structure; friable; common very fine roots; slightly acid; abrupt smooth boundary.
Bt1—7 to 16 inches; yellowish brown (10YR 5/6) loam; weak medium subangular blocky structure; friable; few very fine roots; few faint clay films on faces of peds; few manganese concretions; strongly acid; gradual smooth boundary.
Bt2—16 to 38 inches; yellowish brown (10YR 5/4) clay loam; moderate medium subangular blocky structure; friable; few distinct clay films on faces of peds; common iron and manganese concretions; common medium distinct pale brown (10YR 6/3) and few fine distinct light brownish gray (10YR 6/2) iron depletions; strongly acid; gradual smooth boundary.
Bt3—38 to 45 inches; yellowish brown (10YR 5/6) clay loam; common medium distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; few distinct clay films on faces of peds; common iron and manganese concretions; common fine prominent light brownish gray (10YR 6/2) iron depletions; strongly acid; gradual smooth boundary.
BC—45 to 50 inches; yellowish brown (10YR 5/6) clay loam; common medium distinct light yellowish brown (10YR 6/4) mottles; weak coarse subangular blocky structure; friable; few iron and manganese concretions; few fine prominent light brownish gray (10YR 6/2) iron depletions; strongly acid; gradual smooth boundary.
C—50 to 60 inches; yellowish brown (10YR 5/6) sandy loam; common medium distinct light yellowish brown (10YR 6/4) mottles; few fine prominent light brownish gray (10YR 6/2) iron depletions; massive; very friable; strongly acid.

Depth to bedrock is more than 60 inches. The content of gravel ranges from 0 to 10 percent throughout the profile. Reaction is strongly acid or very strongly acid, except for in the surface layer, which is not so acid in areas where lime has been applied.

The A or Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is loam.

The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. It has few or common mottles in shades of brown and yellow. The lower part of the horizon has iron depletions with chroma of 2 or less. Texture is loam or clay loam.

Some pedons have a BC horizon. This horizon has the same colors and textures as those in the lower part of the Bt horizon.

The C horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 6. It is loam or sandy loam.

Formation of the Soils

This section relates the factors of soil formation to the soils in Cumberland County. It also describes the geologic relationships and landforms in the survey area.

Factors of Soil Formation

Soils are a collection of natural bodies that occupy portions of the Earth's surface. They are formed by the interaction of topography, climate, and living organisms with parent material over a period of time. Because of these processes, the soils formed are unique in properties and features. When any of the soil-forming factors change, a different soil may form.

The process of soil formation is a sequence of events, including both complicated reactions and comparatively simple rearrangements of matter, that can directly or indirectly affect the soil that is formed. Numerous events may take place simultaneously or in sequence to mutually reinforce or contradict each other (Buol, Hole, and McCracken 1973). The five soil-forming factors and how they interact are described in the following paragraphs.

Parent Material

Parent material is the unconsolidated mass in which a soil forms. It is a product of the weathering or decomposition of underlying bedrock or transported material. Weathering refers to the chemical and physical disintegration and decomposition of rock and minerals. Of the five soil-forming factors, parent material has the greatest effect on soil formation in the county. It influences the physical characteristics, as well as the chemical and mineralogical composition, of the soil. Generally, the younger the soil the more the soil has been influenced by and can be related to the parent material. As weathering continues, the influence of the initial material is lessened. For example, the Ramsey soils, which are relatively young in soil formation, are shallow to sandstone bedrock and consist of mostly sand-sized particles weathered from the original bedrock.

Most of the soils in the county formed in residuum, or material that weathered in place from a parent rock or an initial material. Examples are the Ramsey and Lily soils, which formed in residuum derived from high-silica sandstone that underlies much of the Cumberland Plateau; Gilpin and Muse soils, which formed in residuum derived from shale and mudstone; and Talbott, Barfield, Ashwood, and Braxton soils, which formed in residuum derived from limestone.

Many of the soils in the county formed in colluvium, or material that weathered from bedrock and then was moved or transported from its site of initial weathering. Colluvium has been moved by several processes that are mainly related to gravity. It has been moved from the ridges and higher slopes and deposited on the lower slopes. Some colluvium is a mixture of material weathered from more than one source of parent rock. In this survey area most of the soils on the side slopes in the more mountainous areas and gorges formed in colluvial material. Jefferson, Shelocta, and Hayter soils formed in these areas. Varilla soils, which also formed in colluvium, are in the more stony areas near the escarpment.

Some soils in the county formed in alluvium, which is weathered material that has moved and been deposited by water. Alluvial material can be recent in age in drainageways and on flood plains where little weathering and soil development have occurred, or it can be of an older age on high terraces where soils are well developed. Soils formed in alluvium tend to be deep and less sloping than soils on the surrounding hills. Ealy, Bonair, Atkins, and Sullivan soils formed on flood plains in recent alluvium. Waynesboro, Etowah, and Whitwell soils formed in older alluvium on the higher terraces.

Topography

Topography relates to variations in the surface of the land. Changes in landscape occur over periods of time. It is not possible to express the stages of landscape development in terms of years. The rate of development depends on several factors, but mainly on the resistance of the existing features to the type of environmental forces attempting to make the changes and on the intensity of the environmental forces involved. Therefore, the age of a soil or the amount of pedogenic processes it has been subjected to is

determined to a large extent by the stability of the surface (Buol, Hole, and McCracken 1973).

The steepness of the slope is the most visual part of the topography. Processes on hillslopes are controlled directly by gravity (Ruhe 1975). Water infiltrating the soils flows downward and laterally. This water moves to the lowest part of the landscape where it accumulates unless the soils are adequately drained, both internally and externally. An example is the poorly drained Atkins series. The Atkins soils receive the runoff and lateral seepage from the Ramsey and Lily soils, which are on the adjacent hillslopes. Both of these soils have substantial lateral water movement on slopes because they have loamy textures and are shallow or moderately deep over sandstone. Water on a hillslope not only erodes the soil, transports debris, and deposits sediment, but it infiltrates the mass and may alter its physical properties. In a plastic state the mass may move downslope under the force of gravity (Ruhe 1975). This movement may occur as very slow creep or catastrophic landslides.

Other factors, such as freezing and thawing, the hazard of windthrow, and the activity of animals, contribute to creep and downslope movement of the soil. Under conditions that favor instability, the upper layer of soil may move as much as 6 inches per year on slopes of about 30 percent (Ruhe 1975).

On steeper side slopes, especially in mountainous areas, the slope and aspect help to determine the kinds of soil and vegetation that occur. Orientation of the slope modifies or intensifies the effect of climate. South- and west-facing slopes receive more direct sunlight than north- and east-facing slopes. Because of the higher temperatures on the south- and west-facing slopes, the rates of moisture evaporation and of decomposition of organic matter are increased. The dominant trees on the warmer, drier slopes are Virginia pine and chestnut oak. North- and east-facing slopes, which are cooler and more moist than the south- and west-facing slopes, have a thicker layer of humus on the surface than the other slopes. The dominant tree species on these slopes are yellow poplar, white pine, and black oak. Differences in the understory and herbaceous layer on opposite slopes are significant (Braun 1942). Elevation also has a similar effect, with cooler temperatures at the higher elevations and warmer temperatures at the lower elevations.

Topography also influences soil formation in relation to the nature of the initial parent material. In thick, resistant sandstone lenses, the soils on rolling uplands formed in the very upper part of the bedrock. Soils on mountainsides below the thick sandstone layer formed in thick, stony regolith that accumulated as the escarpment eroded (fig. 20). In the steeper topography where the valleys along the mountain range are characterized by broad alluvial-colluvial fans, the initial material near the mountain range contains more coarse and angular material than the material in areas farther away from the mountain range (Birot 1960).

Climate

The two most commonly measured features of climate that have been correlated to soil properties are rainfall and temperature. Climate not only exhibits its influence on soil formation by control of some of the chemical and physical reactions taking place in the soil but also by its control of the organic factor. As important as average climatic conditions are to soil formation, the extremes of weather occurring in a given climatic region may be more influential in the development of certain properties of soils.

The climate of the survey area is temperate and humid. The average temperature is 35 degrees F in winter and 71 degrees F in summer. Temperatures vary between the low and high elevations. Most of Cumberland County is in the mesic temperature class. The lower, warmer coves, such as Grassy Cove and the Sequatchie Valley, are in the thermic temperature class. The thermic temperature class has an annual soil temperature of 59 to 72 degrees F, while the mesic class has an annual soil temperature of 47 to 59 degrees F.

Because temperatures are warmer at the lower elevations, trees and shrubs in those areas leaf out at an earlier date than those at the higher elevations. They reach full leaf canopy about 3 weeks earlier in the Grassy Cove and Sequatchie Valley areas than they do on the plateau. The trees and shrubs in the high mountains reach full leaf canopy even later.

Several soil properties are temperature dependent. The color of soil tends to become redder as temperature increases. Bases are more leached in warm areas, and the nitrogen content and the organic matter content decrease as temperature increases. The content of clay increases with an increase in temperature (Buol, Hole, and McCracken 1973).

The average annual precipitation in the county is about 58 inches, with an average seasonal snowfall of about 16 inches. It supports a productive forest ecosystem that returns substantial amounts of organic matter to the soils. The abundance of precipitation also results in the leaching of many of the soluble bases from the soils. This leaching results in the formation of acidic soils that have low natural fertility.

Figure 20.—Large sandstone rock escarpments border the edge of many deep hollows. Stony soils, such as Varilla and Jefferson soils, formed in the colluvial soil material directly below the escarpments.

The content of clay in the subsoil increases with an increase in the amount of rainfall.

Living Organisms

Before the land in the survey area was settled and cleared, the soils on the Cumberland Plateau supported oak and a mixture of hardwoods and pine with a few openings of native grasses, or meadows. Virginia pine and scarlet oak are the most dominant species in areas of shallow, droughty soils underlain by sandstone. Scarlet oak, white oak, hickory, Virginia pine, and white pine are the dominant species in areas of moderately deep and deep soils underlain by sandstone and shale. Soils in protected coves and gorges and on mountainsides at the higher elevations support yellow poplar, red oak, sugar maple, white pine, hemlock, and black cherry. Redcedar and hickory are the dominant species in areas of soils underlain by limestone.

Trees and other plants in the forest ecosystem have significantly affected soil formation. The trees have a large root system for support and for the intake of water and nutrients. As trees grow, their roots create great pressure that helps to break up rock and other parent material. As the roots decay, they leave channels that increase the rate of water infiltration. These channels become filled with more porous soil from the upper horizons. Trees that are blown over by

strong winds uproot areas of soil and thus help to mix the soil.

The most important soil-forming processes in a forest ecosystem are the capture of energy and substance through photosynthesis, decomposition of plant residue, cation exchange, and formation of organic-mineral complexes. The material that the plants of an ecosystem mobilize and circulate tends to be deposited within the system and recycled many times before eventual escape (Buol, Hole, and McCracken 1973). The deposition and decomposition of leaf litter on the forest floor is an example of this process. Most of the organic matter in a forested area is deposited on the soil surface as leaf litter. The layer of leaf litter helps to prevent nutrient loss, conserve soil moisture, and reduce the depth to which frost penetrates. Soils formed in acidic leaf litter, such as pine, mountain laurel, and rhododendron litter, are more acid and have a lower base saturation than soils formed mainly under hardwoods.

Channels are excavated in the soil by insects, crustacea, reptiles, amphibia, and burrowing mammals. Soils that have a high water table, such as Atkins and Bonair soils, have many crawfish tunnels. Crawfish bring substantial amounts of soil to the surface over a long period of time. As a result, they may impede the development of soil horizons or destroy horizons already formed.

Human activities, such as clearing forests and plowing the land, have affected soil formation. In areas of cultivated soils, the rate of erosion has increased, the original surface layer has been removed by erosion, and the eroded soil material has been deposited on the lower footslopes, in drainageways, and on flood plains. Excavating, grading, and land shaping during urban development and mining have resulted in areas of disturbed soils. In places these activities have so altered the soil that a different soil is formed. Bethesda soils formed in strip mine spoil.

Time

Time is needed for the climate and living organisms to act upon the parent material with associated topographic influences. Soil formation cannot be expressed in chronologic time only. The age of a soil is determined by the extent of the development of pedogenic horizons and other features. Entisols and some Inceptisols, such as Atkins, Bonair, and Ealy soils, may be considered to be young, or youthful soils. Ultisols and Alfisols, such as Lily, Gilpin, Waynesboro, and Talbott soils, are considered to be mature, or old, soils. They have developed an argillic horizon, which is characterized by an accumulation of silicate clays moved downward by water. Because there is little or no evidence of clay movement in soils on the youngest landscapes, it is concluded that the formation of an argillic horizon ordinarily requires a few thousand years (Soil Survey Staff 1975). Other soil properties may take much less time to develop. In 100 years, soils under prairie vegetation have developed an A horizon that is 25 to 30 centimeters thick (Hallberg, Wollenhaupt, and Miller 1978).

Other soil-forming factors impede or accelerate development over time. Soils formed in material derived from resistant bedrock, such as high-silica sandstone, may be old in chronologic years but young in soil development. An example is the Ramsey series. The stability of the soil surface also affects the degree of soil development. A highly weathered or developed soil must be on a stable surface. Soils formed in old high terrace deposits, such as Waynesboro soils, show this development. Most soils can be viewed as time independent, extending themselves into the initial material at the same rate as geologic erosion lowers the hills. After a time of disequilibrium, a steady state of both soil formation and downwasting of the landscape is reached (Buol, Hole, and McCracken 1973).

Geologic Relationships and Landforms

Cumberland County is underlain by the youngest geologic formations in Tennessee. Pennsylvanian sandstone, shale, and siltstone underlie the major part of the county. A second major region in the county is in the Sequatchie Valley and its associated coves. These areas are underlain by older, Mississippian limestone bedrock.

The distinctive broad flats after which the Cumberland Plateau is named are directly related to the resistant sandstones that are composed of quartz. Quartz is a mineral that is not susceptible to chemical weathering by water (Buckman and Brady 1960). For this reason, there are no sinkholes or caves in areas of sandstones or shales on the plateau. Most soils are only shallow or moderately deep because physical weathering becomes more difficult with increasing depth. Elevation ranges from about 1,600 to 2,000 feet. Relief generally is less than 150 feet.

A large part of the plateau is dissected, although the bedrock in the region is not susceptible to chemical weathering. About 635 feet of sandstones, shales, and siltstones of the Crab Orchard Mountain Group, along with younger formations, such as the Crossville sandstone, make up the geology of the plateau in Cumberland County (Wilson, Jewell, and Luther 1956). Coal can often be found in different seams in the shale bedrock. The Lantana, Morgan Springs,

Sewanee, and Wilder coalbeds can be found in Cumberland County (Wilson 1956). All of these geologic beds rise slightly to the northwest at a rate of 15 to 20 feet per mile.

Differential weathering occurs when more resistant rocks undergoing weathering processes are not affected at the same rate as nearby, less resistant rocks. The Rockcastle, Sewanee, and Crossville Formations are massive, crossbedded sandstones that form broad flats in areas around Crossville, Homestead, Mayland, and Woody and along Potato Farm Road (USGS 1981). Other areas with Pennsylvanian geology, similar to the areas between Pleasant Hill and Vandever, have a topographic sequence of many short flats between steeper areas. They are more prevalent where interbedded geology is exposed. Elevation ranges from 1,500 to 2,500 feet, and relief is 100 to 350 feet. The Vandever Formation consists mainly of siltstone and shale with interbedded lenses of sandstone. Soils formed in material derived from shale or siltstone have slopes ranging from 12 to 30 percent because geologic weathering occurs faster on parent material that has more weatherable minerals and little cohesiveness between the individual grains. A deep layer of partially weathered shale or siltstone, which is referred to as either saprolite or mudstone, can commonly be found. Conversely, soils that formed in material derived from sandstone bedrock have slopes ranging from 2 to 12 percent.

The second main geologic region of Cumberland County is that area associated with the Sequatchie Valley. What once was an anticlinal mountain associated with the Cumberland Mountain Overthrust has been breached into a deep valley that extends from the southeastern part of Cumberland County into northern Alabama (Wilson, Jewell, and Luther 1956). The arch-shaped geologic bedding that once extended above what is now the valley can still be seen along either side of the high escarpment. The evolution of the valley began when water invaded beneath the Pennsylvanian caprock and formed many solutional features in the Mississippian limestone (Crafford 1989). Differential weathering of the underlying limestones, along with the exaggerated dip of the beds, caused this deep valley to form. The processes of subterranean stream invasion and headward eating and slope retreat of the Sequatchie Valley can be seen in the transitional zone between the main valley and the remnant anticlinal mountains (Crafford 1989). The rugged Crab Orchard Mountains are the remains of these mountains. Along the crests of these mountains, elevation ranges from about 2,500 to 3,000 feet with relief of as much as 1,000 feet or more. Several coves, including Crab Orchard Cove and Grassy Cove, typify this transition. Cove Creek in Grassy Cove has no channeled outlet above ground from the cove; however, it flows into Mill Cave and surfaces in the Sequatchie Valley (Crafford 1989).

In this unique structure, limestone geology that can be found at lower elevations of the State has been thrust upward in Cumberland County and is now exposed in the lower parts of Sequatchie Valley. For example, the Fort Payne Formation that is associated with the Highland Rim is exposed through most of Putnam, Dekalb, Warren, and Coffee Counties at elevations of about 900 feet. This same geology is exposed on the floor of Grassy Cove at an elevation of about 1,600 feet. The lowest elevations of Sequatchie Valley as it leaves Cumberland County include geologic formations found in the Nashville Basin.

References

American Association of State Highway and Transportation Officials. 1986. Standard specifications for highway materials and methods of sampling and testing. 14th edition, 2 volumes.

American Society for Testing and Materials. 1993. Standard classification of soils for engineering purposes. ASTM Standard D 2487.

Birot, P. 1960. The cycle of erosion in different climates.

Braun, Lucy E. 1942. Forests of the Cumberland Mountains. Ecological Monograph 12.

Buckman, Harry, and Nyle Brady. 1960. The nature and property of soils. 6th edition.

Buol, S.W., F.D. Hole, and R.J. McCracken. 1973. Soil genesis and classification.

Capel, Stephen. 1991. Warm-season grasses for Virginia and North Carolina: Benefits for livestock and wildlife. Virginia Department of Game and Inland Fisheries.

Crafford, Nichelous C. 1989. Karst hydrogeology of the Cumberland Plateau Escarpment of Tennessee. Tennessee Division of Geology, Report of Investigation, number 44, part 2.

Hallberg, George R., Nyle C. Wollenhaupt, and George A. Miller. March-April 1978. A century of soil development in spoil derived from loess in Iowa. Soil Science of American Journal, volume 42, number 2.

Hubbard, E.H., B.L. Matzek, M.E. Austin, S.R. Bacon, and K.V. Goodman. 1950. Soil survey of Cumberland County, Tennessee. U.S. Department of Agriculture, series 1938, number 25.

Ruhe, Robert V. 1975. Geomorphology, geomorphic processes, and surficial geology.

Soil Survey Division Staff. 1993. Soil survey manual. United States Department of Agriculture Handbook 18.

Soil Survey Staff. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. United States Department of Agriculture Handbook 436. (Revised in 1999)

Soil Survey Staff. 1994. Keys to soil taxonomy. 6th edition. United States Department of Agriculture, Natural Resources Conservation Service. (Revised in 1998)

Tennessee Department of Agriculture, Tennessee Agricultural Statistics Service. 1995. Tennessee agricultural statistics, 1995.

United States Department of the Interior, Geological Survey (USGS). 1981. Geologic map of the Crossville quadrangle, Tennessee. Map GM-109-NE.

Wilson, Charles W., Jr. 1956. Geologic quadrangle maps of Tennessee, Pennsylvanian geology of the Clarkrange, Obey City, Campbell Junction, and Isoline quadrangles. Tennessee Department of Conservation, Division of Geology.

Wilson, Charles W., Jr., John W. Jewell, and Edward T. Luther. 1956. Pennsylvanian geology of the Cumberland Plateau. Tennessee Department of Conservation, Division of Geology.

Glossary

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

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

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.

Aspect. The direction in which a slope faces.

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, and 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.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

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 material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

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.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

Colluvium. Soil material or 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 or miscellaneous areas 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 or miscellaneous areas are somewhat similar in all areas.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation

cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

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. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

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.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

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.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

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 wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the "Soil Survey Manual."

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

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic).—Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated).—Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

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

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

Flood plain. A nearly level alluvial plain that borders a

stream and is subject to flooding unless protected artificially.

Footslope. The position that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

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. Frost action 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.

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 as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

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.

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 A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

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 overlying soil material. 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, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

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

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

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:
Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.
Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.
Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.
Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.
Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.
Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.
Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.
Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.
Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Large stones (in tables). Rock fragments 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.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

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

Mottling, soil. Irregular spots of different colors that vary in number and size. 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).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

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 of 6.6 to 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. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Parent material. The unconsolidated organic and mineral material in which soil forms.

Pebble. A rounded or angular fragment of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. A collection of pebbles is referred to as gravel.

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 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 or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow	0.0 to 0.01 inch
Very slow	0.01 to 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, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities 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.

Plateau. An extensive upland mass with relatively flat summit area that is considerably elevated (more than 100 meters) above adjacent lowlands and separated from them on one or more sides by escarpments.

Poor filter (in tables). Because of rapid or very rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly 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

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

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

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

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.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

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. Seepage 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. 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.

Shrink-swell (in tables). 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.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

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.

Slippage (in tables). Soil mass 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. In this survey, classes for simple slopes are as follows:

Level	0 to 1 percent
Nearly level	0 to 3 percent
Gently sloping	1 to 8 percent
Strongly sloping	4 to 16 percent
Moderately steep	10 to 30 percent
Steep	20 to 60 percent
Very steep	45 percent and higher

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

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.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

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

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

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

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the 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."

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt 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). 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.

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). Risk of caving or sloughing on banks of fill material.

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

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Windthrow. The uprooting and tipping over of trees by the wind.

Tables

Table 1.--Temperature and Precipitation

(Recorded in the period 1951-90 at Crossville, 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
	o F	o F	o F	o F	o F	Units	In	In	In		In
January--	42.1	22.1	32.1	66	-11	14	5.44	3.12	7.50	10	5.1
February-	46.4	24.9	35.7	70	-4	17	5.01	2.95	6.84	9	5.0
March----	54.9	33.4	44.2	77	11	58	6.13	3.62	8.36	10	2.4
April----	65.5	42.9	54.2	83	22	167	4.92	3.09	6.57	9	.3
May------	73.6	50.7	62.2	86	31	385	5.18	3.13	7.00	9	.0
June-----	80.6	57.9	69.3	92	41	579	4.33	2.42	6.01	8	.0
July-----	83.8	61.7	72.8	94	50	707	5.22	3.10	7.10	9	.0
August---	83.4	60.6	72.0	93	48	682	3.61	2.06	4.97	7	.0
September	77.8	54.6	66.2	91	36	486	4.07	2.10	5.78	6	.0
October--	67.4	42.6	55.0	83	23	202	3.51	1.68	5.11	6	.0
November-	56.1	34.3	45.2	75	11	42	4.99	3.10	6.68	8	.8
December-	46.1	25.9	36.0	68	-3	21	5.85	3.15	8.23	8	2.2
Yearly:											
Average	64.8	42.6	53.7	---	---	---	---	---	---	---	---
Extreme	---	---	---	95	-13	---	---	---	---	---	---
Total--	---	---	---	---	---	3,360	58.26	50.05	66.14	99	15.8

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

Table 2.--Freeze Dates in Spring and Fall

(Recorded in the period 1951-90 at Crossville, 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. 16	Apr. 25	May 15
2 years in 10 later than	Apr. 11	Apr. 20	May 7
5 years in 10 later than	Apr. 1	Apr. 10	Apr. 24
First freezing temperature in fall:			
1 year in 10 earlier than	Oct. 21	Oct. 15	Sept. 29
2 years in 10 earlier than	Oct. 26	Oct. 19	Oct. 5
5 years in 10 earlier than	Nov. 6	Oct. 27	Oct. 16

Table 3.--Growing Season

(Recorded in the period 1951-90 at Crossville, 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	198	182	147
8 years in 10	205	188	157
5 years in 10	218	199	175
2 years in 10	231	210	193
1 year in 10	237	216	202

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
At	Atkins loam, frequently flooded	1,474	0.3
BaE	Barfield-Ashwood-Rock outcrop complex, 20 to 40 percent slopes	1,426	0.3
Be	Beason silt loam, occasionally flooded	284	*
BM	Bethesda-Mine pits complex, 10 to 80 percent slopes	927	0.2
Bo	Bonair loam, occasionally flooded	606	0.1
Ea	Ealy loam, occasionally flooded	1,399	0.3
EcB	Ealy-Craigsville complex, 0 to 5 percent slopes, occasionally flooded	627	0.1
EtB	Etowah silt loam, 2 to 5 percent slopes	392	*
EtC	Etowah silt loam, 5 to 12 percent slopes	453	0.1
EtD2	Etowah silt loam, 12 to 20 percent slopes, eroded	53	*
FuE	Fullerton gravelly silt loam, 20 to 35 percent slopes	408	*
GpC	Gilpin loam, 5 to 12 percent slopes	10,295	2.4
GpD	Gilpin loam, 12 to 20 percent slopes	18,237	4.2
GpF	Gilpin loam, 20 to 60 percent slopes	18,946	4.3
HaD	Hayter loam, 10 to 20 percent slopes	389	*
HaE	Hayter loam, 20 to 40 percent slopes	396	*
HeB	Hendon silt loam, 2 to 5 percent slopes	5,636	1.3
HeC	Hendon silt loam, 5 to 12 percent slopes	1,310	0.3
JeC	Jefferson cobbly loam, 5 to 12 percent slopes	1,265	0.3
JeD	Jefferson cobbly loam, 12 to 20 percent slopes	1,254	0.3
JnD	Jefferson cobbly loam, 12 to 20 percent slopes, stony	1,611	0.4
JnF	Jefferson cobbly loam, 20 to 50 percent slopes, stony	21,727	5.0
JsD	Jefferson-Shelocta complex, 10 to 20 percent slopes	3,867	0.9
JsF	Jefferson-Shelocta complex, 20 to 45 percent slopes	21,630	4.9
JvD	Jefferson-Varilla-Shelocta complex, 10 to 20 percent slopes, very stony	246	*
JvF	Jefferson-Varilla-Shelocta complex, 20 to 60 percent slopes, very stony	21,975	5.0
LlB	Lily loam, 2 to 5 percent slopes	38,008	8.7
LlC	Lily loam, 5 to 12 percent slopes	109,224	24.9
LlD	Lily loam, 12 to 20 percent slopes	39,964	9.1
LlE	Lily loam, 20 to 35 percent slopes	457	0.1
LnC	Lily-Lonewood complex, 5 to 12 percent slopes, rocky	1,056	0.2
LwB	Lonewood loam, 2 to 5 percent slopes	3,101	0.7
LwC	Lonewood loam, 5 to 12 percent slopes	16,326	3.7
MuD	Muse silt loam, 10 to 20 percent slopes	913	0.2
Pl	Pits, limestone quarry	128	*
Ps	Pits, sandstone quarry	655	0.1
RaC	Ramsey loam, 5 to 12 percent slopes	15,474	3.5
RaD	Ramsey loam, 12 to 20 percent slopes	14,763	3.4
RaF	Ramsey loam, 20 to 50 percent slopes	1,219	0.3
RrC	Ramsey-Rock outcrop complex, 5 to 12 percent slopes	6,222	1.4
RrD	Ramsey-Rock outcrop complex, 12 to 20 percent slopes	26,993	6.2
RrF	Ramsey-Rock outcrop complex, 20 to 50 percent slopes	9,500	2.2
SeB	Sequatchie loam, 2 to 5 percent slopes	226	*
Su	Sullivan loam, occasionally flooded	151	*
TaC	Talbott silt loam, 5 to 12 percent slopes	116	*
TbD	Talbott-Braxton-Rock outcrop complex, 5 to 20 percent slopes	1,027	0.2
ToE	Talbott-Rock outcrop-Braxton complex, 20 to 40 percent slopes	5,263	1.2
TrF	Talbott-Rock outcrop complex, 40 to 70 percent slopes	1,139	0.3
VsE	Varilla-Shelocta complex, 15 to 30 percent slopes, very rocky	4,310	1.0
W	Water	1,900	0.4
WaC	Waynesboro loam, 5 to 12 percent slopes	946	0.2
WaD2	Waynesboro loam, 12 to 20 percent slopes, eroded	391	*
WaD3	Waynesboro clay loam, 12 to 20 percent slopes, severely eroded	10	*
WhA	Whitwell loam, 0 to 2 percent slopes, occasionally flooded	260	*
WhB	Whitwell loam, 2 to 5 percent slopes	1,425	0.3
	Total	438,000	100.0

* Less than 0.05 percent. The combined extent of the soils assigned an asterisk in the "Percent" column is about 0.1 percent of the survey area.

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. They are for nonirrigated areas. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil.)

Map symbol and soil name	Land capability	Corn	Soybeans	Tall fescue-ladino	Tobacco	Wheat
		Bu	Bu	AUM	Lbs	Bu
At Atkins	4w	---	30	7.70	---	---
BaE		---	---	---	---	---
Barfield	7s					
Ashwood	7s					
Rock outcrop	8					
Be Beason	3w	60	35	7.50	---	---
BM		---	---	---	---	---
Bethesda	7e					
Mine pits.		---				
Bo Bonair	4w		30	7.50	---	---
Ea Ealy	2w	120	40	8.50	---	40
EcB Ealy-Craigsville	2w	90	---	7.00	---	35
EtB Etowah	2e	120	40	8.00	2,850	50
EtC Etowah	3e	110	35	7.50	2,800	45
EtD2 Etowah	4e	90	30	7.00	2,600	40
FuE Fullerton	6e	---	---	5.50	---	---
GpC Gilpin	3e	85	30	6.00	2,300	35
GpD Gilpin	4e	80	25	5.50	2,000	30
GpF Gilpin	7e	---	---	---	---	---
HaD Hayter	4e	90	30	7.00	2,500	35
HaE Hayter	6e	---	---	6.00	---	---
HeB Hendon	2e	100	38	7.50	2,600	50
HeC Hendon	3e	95	35	7.00	2,500	45
JeC Jefferson	4s	75	25	6.00	2,100	40

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Soybeans	Tall fescue-ladino	Tobacco	Wheat
		Bu	Bu	AUM	Lbs	Bu
JeD--Jefferson	6s	---	---	4.50	---	---
JnD--Jefferson	6s	---	---	3.50	---	---
JnF--Jefferson	7s	---	---	---	---	---
JsD--Jefferson-Shelocta	6s	---	---	3.50	---	---
JsF--Jefferson-Shelocta	7s	---	---	---	---	---
JvD--Jefferson-Varilla-Shelocta	6s	---	---	3.50	---	---
JvF--Jefferson-Varilla-Shelocta	7s	---	---	---	---	---
LlB--Lily	2e	95	35	7.50	2,500	40
LlC--Lily	3e	85	30	7.00	2,400	35
LlD--Lily	4e	70	25	6.50	1,900	30
LlE--Lily	6e	---	---	5.50	---	---
LnC--Lily-Lonewood	4s	86	30	---	2,400	45
LwB--Lonewood	2e	100	38	7.50	2,600	50
LwC--Lonewood	3e	90	35	7.00	2,400	48
MuD--Muse	4e	80	25	---	2,000	35
Pl: Pits, limestone quarry.						
Ps: Pits, sandstone quarry.						
RaC--Ramsey	6e	---	---	3.50	---	---
RaD--Ramsey	6e	---	---	3.50	---	---
RaF--Ramsey	7e	---	---	---	---	---

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Soybeans	Tall fescue-ladino	Tobacco	Wheat
		Bu	Bu	AUM	Lbs	Bu
RrC		---	---	3.50	---	---
Ramsey	6s					
Rock outcrop	8					
RrD		---	---	---	---	---
Ramsey	7s					
Rock outcrop	8					
RrF		---	---	---	---	---
Ramsey	7s					
Rock outcrop	8					
SeB	2e	120	45	8.50	2,900	55
Sequatchie						
Su	2w	120	40	8.50	---	52
Sullivan						
TaC	4e	---	---	4.50	1,600	40
Talbott						
TbD		---	---	4.50	---	---
Talbott	6e					
Braxton	6e					
Rock outcrop	8					
ToE		---	---	---	---	---
Talbott	7s					
Rock outcrop	8					
Braxton	7s					
TrF		---	---	---	---	---
Talbott	7e					
Rock outcrop	8					
VsE	7s	---	---	4.00	---	---
Varilla-Shelocta						
W:						
Water.						
WaC	3e	95	35	7.00	2,300	55
Waynesboro						
WaD2	4e	80	28	6.00	---	45
Waynesboro						
WaD3	6e	---	---	---	---	---
Waynesboro						
WhA	2w	85	35	7.50	---	35
Whitwell						
WhB	2e	85	35	7.00	1,800	45
Whitwell						

Table 6.--Prime Farmland

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name.)

Map symbol	Soil name
Be	Beason silt loam, occasionally flooded (if drained)
Ea	Ealy loam, occasionally flooded
EtB	Etowah silt loam, 2 to 5 percent slopes
HeB	Hendon silt loam, 2 to 5 percent slopes
LlB	Lily loam, 2 to 5 percent slopes
LwB	Lonewood loam, 2 to 5 percent slopes
SeB	Sequatchie loam, 2 to 5 percent slopes
Su	Sullivan loam, occasionally flooded
WhA	Whitwell loam, 0 to 2 percent slopes, occasionally flooded
WhB	Whitwell loam, 2 to 5 percent slopes

Table 7.--Woodland Management and Productivity

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber	
								cu ft/ac	
At:									
Atkins	Slight	Severe	Severe	Moderate	Severe	loblolly pine	83	114	eastern cottonwood, loblolly pine, shortleaf pine, sweetgum
						sweetgum	95	114	
BaE:									
Barfield	Moderate	Moderate	Moderate	Severe	Moderate	eastern redcedar	40	43	eastern redcedar
Ashwood	Moderate	Moderate	Slight	Slight	Moderate	eastern redcedar	45	57	eastern redcedar, loblolly pine, shortleaf pine
						loblolly pine	80	114	
						southern red oak	65	43	
Rock outcrop.									
Be:									
Beason	Slight	Moderate	Moderate	Slight	Moderate	loblolly pine	80	114	American sycamore, cherrybark oak, green ash, loblolly pine, pin oak, swamp white oak, sweetgum, yellow poplar
						southern red oak	70	57	
						sweetgum	80	86	
						white oak	70	57	
						yellow poplar	90	86	
BM:									
Bethesda	Severe	Severe	Severe	Slight	Moderate	Virginia pine	60	---	Virginia pine, black locust, eastern redcedar
						black locust	75	---	
						southern red oak	65	57	
Mine pits.									
Bo:									
Bonair	Slight	Moderate	Moderate	Slight	Severe	loblolly pine	90	129	loblolly pine, sweetgum, willow oak
						sweetgum	90	100	
						willow oak	90	86	
Ea:									
Ealy	Slight	Slight	Moderate	Slight	Severe	American sycamore	90	100	black walnut, eastern white pine, loblolly pine, yellow poplar
						Virginia pine	75	114	
						eastern white pine	90	172	
						northern red oak	80	57	
						shortleaf pine	80	129	
						yellow poplar	105	114	

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber	
								cu ft/ac	
EcB:									
Ealy	Slight	Slight	Moderate	Slight	Severe	American sycamore	90	100	black walnut, eastern white pine, loblolly pine, yellow poplar
						Virginia pine	75	114	
						eastern white pine	90	172	
						northern red oak	80	57	
						shortleaf pine	80	129	
						yellow poplar	105	114	
Craigsville	Slight	Slight	Slight	Slight	Severe	Virginia pine	80	114	eastern white pine, loblolly pine, yellow poplar
						eastern white pine	90	172	
						northern red oak	80	57	
						yellow poplar	95	100	
EtB:									
Etowah	Slight	Slight	Slight	Slight	Moderate	loblolly pine	90	129	black cherry, black walnut, loblolly pine, yellow poplar
						shortleaf pine	80	114	
						southern red oak	80	57	
						yellow poplar	100	100	
EtC:									
Etowah	Slight	Slight	Slight	Slight	Moderate	loblolly pine	90	129	black cherry, black walnut, loblolly pine, yellow poplar
						shortleaf pine	80	114	
						southern red oak	80	57	
						yellow poplar	95	86	
EtD2:									
Etowah	Moderate	Moderate	Slight	Slight	Moderate	loblolly pine	90	129	black cherry, black walnut, loblolly pine, yellow poplar
						shortleaf pine	80	114	
						southern red oak	80	57	
						yellow poplar	90	86	
FuE:									
Fullerton	Moderate	Moderate	Slight	Slight	Moderate	shortleaf pine	67	100	loblolly pine, northern red oak, yellow poplar
						southern red oak	70	57	
						yellow poplar	90	100	
GpC:									
Gilpin	Slight	Slight	Slight	Slight	Moderate	northern red oak	80	57	Virginia pine, black cherry, eastern white pine, yellow poplar
						yellow poplar	90	100	

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber	
								cu ft/ac	
GpD:									
Gilpin	Moderate	Moderate	Slight	Slight	Moderate	northern red oak	80	57	Virginia pine, black cherry, eastern white pine, yellow poplar
						yellow poplar	90	100	
GpF:									
Gilpin	Severe	Severe	Slight	Slight	Moderate	northern red oak	80	71	Virginia pine, black cherry, eastern white pine, yellow poplar
						yellow poplar	90	100	
HaD:									
Hayter	Slight	Moderate	Slight	Slight	Severe	northern red oak	86	71	black walnut, eastern white pine, yellow poplar
						yellow poplar	100	114	
HaE:									
Hayter	Slight	Moderate	Slight	Slight	Severe	northern red oak	86	71	black walnut, eastern white pine, yellow poplar
						yellow poplar	100	114	
HeB:									
Hendon	Slight	Slight	Slight	Slight	Severe	Virginia pine	70	114	eastern white pine, loblolly pine, shortleaf pine, white oak
						loblolly pine	80	114	
						shortleaf pine	70	114	
						southern red oak	70	57	
						white oak	70	57	
HeC:									
Hendon	Slight	Slight	Slight	Slight	Severe	Virginia pine	70	114	eastern white pine, loblolly pine, shortleaf pine, white oak
						loblolly pine	80	114	
						shortleaf pine	70	114	
						southern red oak	70	57	
						white oak	70	57	
JeC:									
Jefferson	Slight	Slight	Slight	Slight	Moderate	Virginia pine	70	114	eastern white pine, shortleaf pine, white oak, yellow poplar
						shortleaf pine	70	114	
						white oak	70	57	
						yellow poplar	90	100	

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber	
								cu ft/ac	
JeD:									
Jefferson	Moderate	Moderate	Moderate	Slight	Moderate	Virginia pine	70	114	eastern white pine,
						shortleaf pine	70	114	shortleaf pine,
						white oak	70	57	white oak, yellow
						yellow poplar	90	100	poplar
JnD:									
Jefferson	Moderate	Moderate	Slight	Slight	Moderate	northern red oak	80	57	eastern white pine,
						shortleaf pine	70	114	shortleaf pine,
						white oak	70	57	white oak, yellow
						yellow poplar	90	100	poplar
JnF:									
Jefferson	Severe	Severe	Slight	Slight	Moderate	northern red oak	80	57	eastern white pine,
						shortleaf pine	70	114	shortleaf pine,
						white oak	70	57	white oak, yellow
						yellow poplar	90	100	poplar
JsD:									
Jefferson	Moderate	Moderate	Moderate	Slight	Moderate	Virginia pine	70	114	eastern white pine,
						scarlet oak	70	57	northern red oak,
						shortleaf pine	65	100	shortleaf pine,
						yellow poplar	90	100	white oak
Shelocta	Moderate	Moderate	Moderate	Slight	Severe	black oak	80	107	eastern white pine,
						scarlet oak	80	43	northern red oak,
						white oak	70	57	shortleaf pine,
						yellow poplar	100	57	white oak
JsF:									
Jefferson	Moderate	Moderate	Moderate	Slight	Moderate	Virginia pine	70	114	eastern white pine,
						scarlet oak	70	57	northern red oak,
						shortleaf pine	65	100	shortleaf pine,
						yellow poplar	90	100	white oak
Shelocta	Moderate	Moderate	Moderate	Slight	Severe	black oak	80	107	eastern white pine,
						scarlet oak	80	43	northern red oak,
						white oak	70	57	shortleaf pine,
						yellow poplar	100	57	white oak

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber	
								cu ft/ac	
JvD:									
Jefferson	Moderate	Moderate	Slight	Slight	Moderate	northern red oak yellow poplar	80 95	57 100	eastern white pine, shortleaf pine, white oak, yellow poplar
Varilla	Slight	Moderate	Moderate	Slight	Moderate	white oak yellow poplar	75 95	57 100	eastern white pine, shortleaf pine, white oak, yellow poplar
Shelocta	Moderate	Moderate	Slight	Slight	Severe	scarlet oak shortleaf pine white oak yellow poplar	80 129 77 100	57 129 57 100	black walnut, eastern white pine, northern red oak, shortleaf pine, white ash, white oak, yellow poplar
JvF:									
Jefferson	Severe	Severe	Slight	Slight	Moderate	northern red oak yellow poplar	80 95	57 100	eastern white pine, shortleaf pine, white oak, yellow poplar
Varilla	Moderate	Severe	Moderate	Slight	Moderate	white oak yellow poplar	75 95	57 100	eastern white pine, shortleaf pine, white oak, yellow poplar
Shelocta	Severe	Severe	Slight	Slight	Severe	scarlet oak shortleaf pine white oak yellow poplar	80 129 77 100	57 129 57 100	black walnut, eastern white pine, northern red oak, shortleaf pine, white ash, white oak, yellow poplar

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber	
								cu ft/ac	
LlB:									
Lily	Slight	Moderate	Slight	Slight	Moderate	Virginia pine	80	114	eastern white pine,
						black oak	78	57	northern red oak,
						chestnut oak	73	57	shortleaf pine,
						northern red oak	78	57	white oak
						scarlet oak	77	43	
						shortleaf pine	63	100	
						white oak	73	57	
LlC:									
Lily	Slight	Moderate	Slight	Slight	Moderate	Virginia pine	80	114	eastern white pine,
						black oak	78	57	northern red oak,
						chestnut oak	73	57	shortleaf pine,
						northern red oak	78	57	white oak
						scarlet oak	77	43	
						shortleaf pine	63	100	
						white oak	73	57	
LlD:									
Lily	Moderate	Moderate	Moderate	Slight	Moderate	Virginia pine	71	100	shortleaf pine,
						scarlet oak	66	57	white oak
						shortleaf pine	57	57	
						white oak	67	57	
						yellow poplar	88	86	
LlE:									
Lily	Moderate	Moderate	Moderate	Slight	Moderate	Virginia pine	71	100	shortleaf pine,
						scarlet oak	66	57	white oak
						shortleaf pine	57	57	
						white oak	67	57	
						yellow poplar	88	86	
LnC:									
Lily	Slight	Moderate	Slight	Slight	Moderate	Virginia pine	80	114	eastern white pine,
						black oak	78	57	northern red oak,
						chestnut oak	73	57	shortleaf pine,
						northern red oak	78	57	white oak
						scarlet oak	77	43	
						shortleaf pine	63	100	
						white oak	73	57	

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber	
								cu ft/ac	
LnC:									
Lonewood	Slight	Slight	Slight	Slight	Moderate	Virginia pine	70	114	Virginia pine, eastern white pine, loblolly pine, shortleaf pine
						eastern white pine	80	143	
						loblolly pine	80	114	
						shortleaf pine	70	114	
						white oak	70	57	
LwB:									
Lonewood	Slight	Slight	Slight	Slight	Moderate	Virginia pine	70	114	eastern white pine, loblolly pine, northern red oak, shortleaf pine
						eastern white pine	80	143	
						loblolly pine	80	114	
						shortleaf pine	70	114	
						white oak	70	57	
LwC:									
Lonewood	Slight	Slight	Slight	Slight	Moderate	Virginia pine	70	114	eastern white pine, loblolly pine, northern red oak, shortleaf pine
						eastern white pine	80	143	
						loblolly pine	80	114	
						shortleaf pine	70	114	
						white oak	70	57	
MuD:									
Muse	Moderate	Moderate	Slight	Slight	Severe	Virginia pine	67	100	eastern white pine, northern red oak, shortleaf pine, white oak
						black oak	56	43	
						chestnut oak	62	43	
						shortleaf pine	79	114	
						white oak	59	43	
Pl:									
Pits, limestone quarry.									
Ps:									
Pits, sandstone quarry.									
RaC:									
Ramsey	Slight	Slight	Moderate	Severe	Slight	eastern white pine	70	114	Virginia pine, eastern white pine, loblolly pine, shortleaf pine, white oak
						northern red oak	60	43	
						shortleaf pine	59	86	
						white oak	61	43	

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber	
								cu ft/ac	
RaD:									
Ramsey	Moderate	Moderate	Moderate	Severe	Slight	Virginia pine northern red oak shortleaf pine	50 50 50	77 29 72	Virginia pine, eastern white pine, loblolly pine, shortleaf pine, white oak
RaF:									
Ramsey	Moderate	Severe	Severe	Severe	Slight	Virginia pine northern red oak shortleaf pine	50 50 50	77 29 72	Virginia pine, eastern white pine, loblolly pine, shortleaf pine, white oak
RrC:									
Ramsey	Slight	Slight	Moderate	Severe	Slight	eastern white pine northern red oak shortleaf pine white oak	70 60 59 61	114 43 86 43	Virginia pine, eastern white pine, loblolly pine, shortleaf pine, white oak
Rock outcrop.									
RrD:									
Ramsey	Moderate	Moderate	Moderate	Severe	Slight	Virginia pine northern red oak shortleaf pine	50 50 50	77 29 72	Virginia pine, eastern white pine, loblolly pine, shortleaf pine, white oak
Rock outcrop.									
RrF:									
Ramsey	Moderate	Severe	Severe	Severe	Slight	Virginia pine northern red oak shortleaf pine	50 50 50	77 29 72	Virginia pine, eastern white pine, loblolly pine, shortleaf pine, white oak
Rock outcrop.									

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber	
								cu ft/ac	
SeB:									
Sequatchie	Slight	Slight	Slight	Slight	Moderate	loblolly pine	90	129	black cherry, black walnut, loblolly pine, yellow poplar
						white oak	80	57	
						yellow poplar	110	114	
Su:									
Sullivan	Slight	Slight	Moderate	Slight	Severe	Virginia pine	70	114	black cherry, black walnut, loblolly pine, yellow poplar
						northern red oak	85	71	
						shortleaf pine	70	114	
						yellow poplar	110	114	
TaC:									
Talbott	Slight	Slight	Slight	Slight	Moderate	eastern redcedar	46	57	Virginia pine, eastern redcedar, loblolly pine, shortleaf pine
						loblolly pine	80	114	
						northern red oak	65	43	
						shortleaf pine	64	100	
TbD:									
Talbott	Slight	Slight	Slight	Slight	Moderate	eastern redcedar	46	57	Virginia pine, eastern redcedar, loblolly pine, shortleaf pine
						loblolly pine	80	114	
						northern red oak	65	43	
						shortleaf pine	64	100	
Braxton	Slight	Slight	Slight	Slight	Moderate	eastern redcedar	50	57	eastern redcedar, loblolly pine, shortleaf pine
						loblolly pine	80	114	
						northern red oak	70	57	
Rock outcrop.									
ToE:									
Talbott	Moderate	Moderate	Slight	Slight	Moderate	eastern redcedar	46	57	Virginia pine, eastern redcedar, loblolly pine, shortleaf pine
						loblolly pine	80	114	
						northern red oak	65	43	
						shortleaf pine	64	100	
Rock outcrop.									
Braxton	Moderate	Moderate	Slight	Slight	Moderate	eastern redcedar	50	57	eastern redcedar, loblolly pine, shortleaf pine
						loblolly pine	80	114	
						northern red oak	70	57	

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber	
								cu ft/ac	
TrF:									
Talbott	Severe	Severe	Slight	Slight	Moderate	eastern redcedar	46	57	Virginia pine, eastern redcedar, loblolly pine, shortleaf pine
						loblolly pine	80	114	
						northern red oak	65	43	
						shortleaf pine	64	100	
Rock outcrop.									
VsE:									
Varilla	Slight	Moderate	Moderate	Slight	Moderate	scarlet oak	70	57	shortleaf pine, white oak
						white oak	65	43	
Shelocta	Moderate	Moderate	Moderate	Slight	Severe	black oak	73	57	eastern white pine, shortleaf pine, white oak
						scarlet oak	70	57	
						white oak	65	43	
						yellow poplar	100	107	
W:									
Water.									
WaC:									
Waynesboro	Slight	Slight	Slight	Slight	Moderate	loblolly pine	80	114	black walnut, loblolly pine, shortleaf pine, yellow poplar
						southern red oak	70	57	
						white oak	70	57	
						yellow poplar	95	100	
WaD2:									
Waynesboro	Moderate	Moderate	Slight	Slight	Moderate	loblolly pine	80	114	black walnut, loblolly pine, shortleaf pine, yellow poplar
						southern red oak	70	57	
						white oak	70	57	
						yellow poplar	95	100	
WaD3:									
Waynesboro	Moderate	Moderate	Slight	Slight	Moderate	loblolly pine	80	114	black walnut, loblolly pine, shortleaf pine, yellow poplar
						southern red oak	70	57	
						white oak	70	57	
						yellow poplar	95	100	
WhA:									
Whitwell	Slight	Slight	Moderate	Slight	Slight	eastern white pine	90	172	eastern white pine, loblolly pine, sweetgum
						loblolly pine	90	129	
						northern red oak	75	57	
						sweetgum	90	100	
						yellow poplar	95	100	

Table 7.--Woodland Management and Productivity--Continued

Map symbol and soil name	Management concerns					Potential productivity			Suggested trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber	
								cu ft/ac	
WhB:									
Whitwell	Slight	Slight	Slight	Slight	Severe	eastern white pine	90	172	eastern white pine, loblolly pine, sweetgum
						loblolly pine	90	129	
						northern red oak	75	57	
						sweetgum	90	100	
						yellow poplar	95	100	

Table 8.--Recreational Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
At:					
Atkins	Severe: flooding wetness	Severe: wetness	Severe: flooding wetness	Severe: wetness	Severe: flooding wetness
BaE:					
Barfield	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope	Severe: slope depth to rock
Ashwood	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Rock outcrop	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope	Severe: slope depth to rock
Be:					
Beason	Severe: flooding wetness	Moderate: percs slowly wetness	Severe: wetness	Moderate: wetness	Moderate: flooding wetness
BM:					
Bethesda	Severe: slope	Severe: slope	Severe: slope small stones	Severe: slope	Severe: slope droughty
Mine pits.					
Bo:					
Bonair	Severe: flooding wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
Ea:					
Ealy	Severe: flooding	Slight	Moderate: flooding small stones	Slight	Moderate: flooding
EcB:					
Ealy	Severe: flooding	Slight	Moderate: flooding small stones	Slight	Moderate: flooding
Craigsville	Severe: flooding	Moderate: large stones	Severe: small stones	Moderate: large stones	Severe: large stones
EtB:					
Etowah	Slight	Slight	Moderate: slope small stones	Slight	Slight
EtC:					
Etowah	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope
EtD2:					
Etowah	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope

Table 8.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
FuE:					
Fullerton	Severe: slope small stones	Severe: slope small stones	Severe: slope small stones	Severe: slope	Severe: slope small stones
GpC:					
Gilpin	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope thin layer
GpD:					
Gilpin	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
GpF:					
Gilpin	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
HaD:					
Hayter	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
HaE:					
Hayter	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
HeB:					
Hendon	Moderate: percs slowly	Moderate: percs slowly	Moderate: percs slowly slope	Slight	Slight
HeC:					
Hendon	Moderate: percs slowly	Moderate: percs slowly	Severe: slope	Slight	Slight
JeC:					
Jefferson	Moderate: large stones slope	Moderate: large stones slope	Severe: large stones slope small stones	Moderate: large stones	Severe: large stones
JeD:					
Jefferson	Severe: slope	Severe: slope	Severe: large stones slope small stones	Moderate: large stones slope	Severe: large stones slope
JnD:					
Jefferson	Severe: slope	Severe: slope	Severe: large stones slope small stones	Moderate: slope	Severe: slope
JnF:					
Jefferson	Severe: slope	Severe: slope	Severe: large stones slope small stones	Severe: slope	Severe: slope
JsD:					
Jefferson	Severe: slope	Severe: slope	Severe: large stones slope small stones	Moderate: large stones slope	Severe: large stones slope

Table 8.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
JsD:					
Shelocta	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
JsF:					
Jefferson	Severe: slope	Severe: slope	Severe: large stones slope small stones	Severe: slope	Severe: large stones slope
Shelocta	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
JvD:					
Jefferson	Severe: slope	Severe: slope	Severe: large stones slope small stones	Moderate: large stones slope	Severe: large stones slope
Varilla	Severe: slope	Severe: slope	Severe: large stones slope small stones	Moderate: large stones slope	Severe: large stones slope
Shelocta	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
JvF:					
Jefferson	Severe: slope	Severe: slope	Severe: large stones slope small stones	Severe: slope	Severe: large stones slope
Varilla	Severe: slope	Severe: slope	Severe: large stones slope small stones	Severe: slope	Severe: large stones slope
Shelocta	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
LlB:					
Lily	Slight	Slight	Moderate: slope depth to rock	Slight	Moderate: depth to rock
LlC:					
Lily	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope depth to rock
LlD:					
Lily	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
LlE:					
Lily	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
LnC:					
Lily	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope depth to rock

Table 8.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
LnC:					
Lonewood	Moderate: slope	Moderate: slope	Severe: slope	Severe: erodes easily	Moderate: slope
LwB:					
Lonewood	Slight	Slight	Moderate: slope	Severe: erodes easily	Slight
LwC:					
Lonewood	Moderate: slope	Moderate: slope	Severe: slope	Severe: erodes easily	Moderate: slope
MuD:					
Muse	Severe: slope	Severe: slope	Severe: slope small stones	Severe: erodes easily	Severe: slope
Pl:					
Pits, limestone quarry-	Severe: depth to rock	Severe: depth to rock	Severe: slope depth to rock	Slight	Severe: depth to rock
Ps:					
Pits, sandstone quarry-	Severe: depth to rock	Severe: depth to rock	Severe: slope depth to rock	Slight	Severe: depth to rock
RaC:					
Ramsey	Severe: depth to rock	Severe: depth to rock	Severe: slope depth to rock	Slight	Severe: depth to rock
RaD:					
Ramsey	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Moderate: slope	Severe: slope depth to rock
RaF:					
Ramsey	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope	Severe: slope depth to rock
RrC:					
Ramsey	Severe: depth to rock	Severe: depth to rock	Severe: slope depth to rock	Slight	Severe: depth to rock
Rock outcrop	Severe: depth to rock	Severe: depth to rock	Severe: slope depth to rock	Slight	Severe: depth to rock
RrD:					
Ramsey	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Moderate: slope	Severe: slope depth to rock
Rock outcrop	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Moderate: slope	Severe: slope depth to rock
RrF:					
Ramsey	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope	Severe: slope depth to rock

Table 8.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
RrF:					
Rock outcrop	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope	Severe: slope, depth to rock
SeB:					
Sequatchie	Slight	Slight	Moderate: slope, small stones	Slight	Moderate: large stones
Su:					
Sullivan	Severe: flooding	Slight	Moderate: flooding, small stones	Slight	Moderate: flooding
TaC:					
Talbott	Moderate: percs slowly, slope	Moderate: percs slowly, slope	Severe: slope	Slight	Moderate: slope, depth to rock
TbD:					
Talbott	Moderate: percs slowly, slope	Moderate: percs slowly, slope	Severe: slope	Slight	Moderate: slope, depth to rock
Braxton	Moderate: percs slowly, slope	Moderate: percs slowly, slope	Severe: slope	Slight	Moderate: slope
Rock outcrop	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Slight	Severe: depth to rock
ToE:					
Talbott	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Rock outcrop	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope	Severe: slope, depth to rock
Braxton	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
TrF:					
Talbott	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Rock outcrop	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope	Severe: slope, depth to rock
VsE:					
Varilla	Severe: slope	Severe: slope	Severe: large stones, slope, small stones	Moderate: large stones, slope	Severe: large stones, slope
Shelocta	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
W:					
Water.					

Table 8.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
WaC:					
Waynesboro	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope
WaD2:					
Waynesboro	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
WaD3:					
Waynesboro	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
WhA:					
Whitwell	Severe: flooding	Moderate: wetness	Moderate: small stones wetness	Slight	Moderate: flooding
WhB:					
Whitwell	Moderate: wetness	Moderate: wetness	Moderate: slope small stones wetness	Slight	Slight

Table 9.--Wildlife Habitat

(See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	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
At:										
Atkins	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair
BaE:										
Barfield	Poor	Poor	Fair	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor
Ashwood	Very poor	Fair	Poor	Good	Good	Very poor	Very poor	Poor	Good	Very poor
Rock outcrop	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor
Be:										
Beason	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair
BM:										
Bethesda	Very poor	Very poor	Poor	Poor	Poor	Very poor	Very poor	Very poor	Poor	Very poor
Mine pits.										
Bo:										
Bonair	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair
Ea:										
Ealy	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
EcB:										
Ealy	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
Craigsville	Poor	Fair	Fair	Fair	Fair	Poor	Very poor	Fair	Fair	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
EtD2:										
Etowah	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
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

Table 9.--Wildlife Habitat--Continued

Map symbol and soil name	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
GpF:										
Gilpin	Very poor	Poor	Good	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
HaD:										
Hayter	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
HaE:										
Hayter	Very poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very 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
JeC:										
Jefferson	Fair	Good	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
JeD:										
Jefferson	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
JnD:										
Jefferson	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor
JnF:										
Jefferson	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor
JsD:										
Jefferson	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
Shelocta	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
JsF:										
Jefferson	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
Shelocta	Very poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
JvD:										
Jefferson	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
Varilla	Poor	Poor	Fair	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
Shelocta	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor

Table 9.--Wildlife Habitat--Continued

Map symbol and soil name	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
JvF:										
Jefferson	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor
Varilla	Very poor	Poor	Fair	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
Shelocta	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor
LlB:										
Lily	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
LlC:										
Lily	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
LlD:										
Lily	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
LlE:										
Lily	Very poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
LnC:										
Lily	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Lonewood	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
LwB:										
Lonewood	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
LwC:										
Lonewood	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
MuD:										
Muse	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
Pl:										
Pits, limestone quarry	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor
Ps:										
Pits, sandstone quarry	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor
RaC:										
Ramsey	Very poor	Poor	Poor	Very poor	Very poor	Very poor	Very poor	Very poor	Poor	Very poor
RaD:										
Ramsey	Very poor	Poor	Poor	Very poor	Very poor	Very poor	Very poor	Very poor	Poor	Very poor

Table 9.--Wildlife Habitat--Continued

Map symbol and soil name	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
RaF:										
Ramsey	Very poor	Poor	Poor	Very poor	Very poor	Very poor	Very poor	Very poor	Poor	Very poor
RrC:										
Ramsey	Very poor	Poor	Poor	Very poor	Very poor	Very poor	Very poor	Very poor	Poor	Very poor
Rock outcrop	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor
RrD:										
Ramsey	Very poor	Poor	Poor	Very poor	Very poor	Very poor	Very poor	Very poor	Poor	Very poor
Rock outcrop	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor
RrF:										
Ramsey	Very poor	Poor	Poor	Very poor	Very poor	Very poor	Very poor	Very poor	Poor	Very poor
Rock outcrop	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor
SeB:										
Sequatchie	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Su:										
Sullivan	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
TaC:										
Talbott	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
TbD:										
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	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor
ToE:										
Talbott	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
Rock outcrop	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor
Braxton	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
TrF:										
Talbott	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor

Table 9.--Wildlife Habitat--Continued

Map symbol and soil name	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
TrF:										
Rock outcrop	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor
VsE:										
Varilla	Poor	Poor	Fair	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
Shelocta	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
W:										
Water.										
WaC:										
Waynesboro	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
WaD2:										
Waynesboro	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
WaD3:										
Waynesboro	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
WhA:										
Whitwell	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
WhB:										
Whitwell	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor

Table 10.--Building Site Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
At:						
Atkins	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding frost action wetness	Severe: flooding wetness
BaE:						
Barfield	Severe: slope depth to rock	Severe: shrink-swell slope depth to rock	Severe: shrink-swell slope depth to rock	Severe: shrink-swell slope depth to rock	Severe: low strength shrink-swell depth to rock	Severe: slope depth to rock
Ashwood	Severe: slope depth to rock	Severe: shrink-swell slope	Severe: shrink-swell slope depth to rock	Severe: shrink-swell slope	Severe: low strength shrink-swell slope	Severe: slope
Rock outcrop	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock
Be:						
Beason	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding low strength	Moderate: flooding wetness
BM:						
Bethesda	Severe: slope	Severe: slope unstable fill	Severe: slope unstable fill	Severe: slope unstable fill	Severe: slope unstable fill	Severe: slope droughty
Mine pits.						
Bo:						
Bonair	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: wetness
Ea:						
Ealy	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding

Table 10.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
EcB:						
Ealy	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding
Craigsville	Severe: large stones cutbanks cave	Severe: flooding large stones	Severe: flooding large stones	Severe: flooding large stones	Severe: large stones	Severe: large stones
EtB:						
Etowah	Moderate: too clayey	Slight	Slight	Slight	Moderate: low strength	Slight
EtC:						
Etowah	Moderate: slope too clayey	Moderate: slope	Moderate: slope	Severe: slope	Moderate: low strength slope	Moderate: slope
EtD2:						
Etowah	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
FuE:						
Fullerton	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope small stones
GpC:						
Gilpin	Moderate: slope depth to rock	Moderate: slope	Moderate: slope depth to rock	Severe: slope	Moderate: frost action slope	Moderate: slope thin layer
GpD:						
Gilpin	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
GpF:						
Gilpin	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
HaD:						
Hayter	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
HaE:						
Hayter	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope

Table 10.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
HeB:						
Hendon	Slight	Slight	Slight	Slight	Slight	Slight
HeC:						
Hendon	Slight	Slight	Slight	Moderate: slope	Slight	Slight
JeC:						
Jefferson	Moderate: large stones slope	Moderate: large stones slope	Moderate: large stones slope	Severe: slope	Moderate: large stones slope	Severe: large stones
JeD:						
Jefferson	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: large stones slope
JnD:						
Jefferson	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
JnF:						
Jefferson	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
JsD:						
Jefferson	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: large stones slope
Shelocta	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
JsF:						
Jefferson	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: large stones slope
Shelocta	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
JvD:						
Jefferson	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: large stones slope

Table 10.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
JvD:						
Varilla	Severe: slope cutbanks cave	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: large stones slope
Shelocta	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
JvF:						
Jefferson	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: large stones slope
Varilla	Severe: slope cutbanks cave	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: large stones slope
Shelocta	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
LlB:						
Lily	Severe: depth to rock	Moderate: depth to rock	Severe: depth to rock	Moderate: depth to rock	Moderate: depth to rock	Moderate: depth to rock
LlC:						
Lily	Severe: depth to rock	Moderate: slope depth to rock	Severe: depth to rock	Severe: slope	Moderate: slope depth to rock	Moderate: slope depth to rock
LlD:						
Lily	Severe: slope depth to rock	Severe: slope	Severe: slope depth to rock	Severe: slope	Severe: slope	Severe: slope
LlE:						
Lily	Severe: slope depth to rock	Severe: slope	Severe: slope depth to rock	Severe: slope	Severe: slope	Severe: slope
LnC:						
Lily	Severe: depth to rock	Moderate: slope depth to rock	Severe: depth to rock	Severe: slope	Moderate: slope depth to rock	Moderate: slope depth to rock
Lonewood	Moderate: slope depth to rock	Moderate: slope	Moderate: slope depth to rock	Severe: slope	Severe: low strength	Moderate: slope

Table 10.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
LwB:						
Lonewood	Moderate: depth to rock	Slight	Moderate: depth to rock	Slight	Severe: low strength	Slight
LwC:						
Lonewood	Moderate: slope depth to rock	Moderate: slope	Moderate: slope depth to rock	Severe: slope	Severe: low strength	Moderate: slope
MuD:						
Muse	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength slope	Severe: slope
Pl:						
Pits, limestone quarry	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
Ps:						
Pits, sandstone quarry	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
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
RaD:						
Ramsey	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock
RaF:						
Ramsey	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock
RrC:						
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
Rock outcrop	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

Table 10.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
RrD:						
Ramsey	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock
Rock outcrop	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock
RrF:						
Ramsey	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock
Rock outcrop	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock
SeB:						
Sequatchie	Slight	Slight	Slight	Slight	Slight	Moderate: large stones
Su:						
Sullivan	Moderate: flooding, wetness	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding
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
TbD:						
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: slope, too clayey	Moderate: shrink-swell, slope	Moderate: shrink-swell, slope	Severe: slope	Severe: low strength	Moderate: slope
Rock outcrop	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

Table 10.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
ToE:						
Talbott	Severe: slope, depth to rock	Severe: slope	Severe: slope, depth to rock	Severe: slope	Severe: low strength, slope	Severe: slope
Rock outcrop	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock
Braxton	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope
TrF:						
Talbott	Severe: slope, depth to rock	Severe: slope	Severe: slope, depth to rock	Severe: slope	Severe: low strength, slope	Severe: slope
Rock outcrop	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock
VsE:						
Varilla	Severe: slope, cutbanks cave	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: large stones, slope
Shelocta	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
W:						
Water.						
WaC:						
Waynesboro	Moderate: slope, too clayey	Moderate: slope	Moderate: slope	Severe: slope	Moderate: low strength, slope	Moderate: slope
WaD2:						
Waynesboro	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
WaD3:						
Waynesboro	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope

Table 10.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
WhA: Whitwell	Severe: wetness	Severe: flooding	Severe: flooding wetness	Severe: flooding	Severe: flooding	Moderate: flooding
WhB: Whitwell	Severe: wetness	Moderate: wetness	Severe: wetness	Moderate: wetness	Moderate: wetness	Slight

Table 11.--Sanitary Facilities

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
At:					
Atkins	Severe: flooding, percs slowly, wetness	Severe: flooding, seepage, wetness	Severe: flooding, seepage, wetness	Severe: flooding, seepage, wetness	Poor: wetness
BaE:					
Barfield	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, too clayey, depth to rock	Severe: slope, depth to rock	Poor: hard to pack, too clayey, depth to rock
Ashwood	Severe: percs slowly, slope, depth to rock	Severe: slope, depth to rock	Severe: slope, too clayey, depth to rock	Severe: slope, depth to rock	Poor: hard to pack, too clayey, depth to rock
Rock outcrop	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Poor: slope, depth to rock
Be:					
Beason	Severe: flooding, percs slowly, wetness	Severe: flooding, wetness	Severe: flooding, too clayey, wetness	Severe: flooding, wetness	Poor: too clayey, wetness
BM:					
Bethesda	Severe: percs slowly, slope, unstable fill	Severe: slope, unstable fill	Severe: slope, unstable fill	Severe: slope, unstable fill	Poor: slope, small stones
Mine pits.					
Bo:					
Bonair	Severe: flooding, wetness	Severe: flooding, wetness	Severe: flooding, wetness, depth to rock	Severe: flooding, wetness	Poor: wetness
Ea:					
Ealy	Severe: flooding	Severe: flooding, seepage	Severe: flooding, seepage, wetness	Severe: flooding, seepage	Fair: too sandy
EcB:					
Ealy	Severe: flooding	Severe: flooding, seepage	Severe: flooding, seepage, wetness	Severe: flooding, seepage	Fair: too sandy
Craigsville	Severe: large stones, poor filter	Severe: large stones, seepage	Severe: large stones, seepage	Severe: seepage	Poor: large stones, seepage

Table 11.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
EtB:					
Etowah	Moderate: percs slowly	Moderate: seepage slope	Moderate: too clayey	Slight	Fair: too clayey
EtC:					
Etowah	Moderate: percs slowly slope	Severe: slope	Moderate: slope too clayey	Moderate: slope	Fair: too clayey
EtD2:					
Etowah	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
FuE:					
Fullerton	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope small stones
GpC:					
Gilpin	Severe: depth to rock	Severe: slope depth to rock	Severe: depth to rock	Severe: depth to rock	Poor: area reclaim thin layer
GpD:					
Gilpin	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Poor: area reclaim slope thin layer
GpF:					
Gilpin	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Poor: area reclaim slope thin layer
HaD:					
Hayter	Severe: slope	Severe: seepage slope	Severe: seepage slope	Severe: seepage slope	Poor: slope
HaE:					
Hayter	Severe: slope	Severe: seepage slope	Severe: seepage slope	Severe: seepage slope	Poor: slope
HeB:					
Hendon	Severe: percs slowly	Moderate: seepage slope	Moderate: too clayey	Slight	Fair: too clayey
HeC:					
Hendon	Severe: percs slowly	Severe: slope	Moderate: too clayey	Slight	Fair: too clayey
JeC:					
Jefferson	Moderate: large stones slope	Severe: seepage slope	Severe: seepage	Severe: seepage	Poor: large stones

Table 11.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
JeD:					
Jefferson	Severe: slope	Severe: seepage slope	Severe: seepage slope	Severe: seepage slope	Poor: large stones slope
JnD:					
Jefferson	Severe: slope	Severe: seepage slope	Severe: seepage slope	Severe: seepage slope	Poor: slope
JnF:					
Jefferson	Severe: slope	Severe: seepage slope	Severe: seepage slope	Severe: seepage slope	Poor: slope
JsD:					
Jefferson	Severe: slope	Severe: seepage slope	Severe: seepage slope	Severe: seepage slope	Poor: large stones slope
Shelocta	Severe: slope	Severe: seepage slope	Severe: seepage slope	Severe: slope	Poor: slope small stones
JsF:					
Jefferson	Severe: slope	Severe: seepage slope	Severe: seepage slope	Severe: seepage slope	Poor: large stones slope
Shelocta	Severe: slope	Severe: seepage slope	Severe: seepage slope	Severe: slope	Poor: slope small stones
JvD:					
Jefferson	Severe: slope	Severe: seepage slope	Severe: seepage slope	Severe: seepage slope	Poor: large stones slope
Varilla	Severe: slope poor filter	Severe: seepage slope	Severe: seepage slope depth to rock	Severe: seepage slope	Poor: large stones slope
Shelocta	Severe: slope	Severe: seepage slope	Severe: seepage slope	Severe: slope	Poor: slope small stones
JvF:					
Jefferson	Severe: slope	Severe: seepage slope	Severe: seepage slope	Severe: seepage slope	Poor: large stones slope
Varilla	Severe: slope poor filter	Severe: seepage slope	Severe: seepage slope depth to rock	Severe: seepage slope	Poor: large stones slope
Shelocta	Severe: slope	Severe: seepage slope	Severe: seepage slope	Severe: slope	Poor: slope small stones

Table 11.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
LlB:					
Lily	Severe: depth to rock	Severe: seepage depth to rock	Severe: seepage depth to rock	Severe: seepage depth to rock	Poor: depth to rock
LlC:					
Lily	Severe: depth to rock	Severe: seepage slope depth to rock	Severe: seepage depth to rock	Severe: seepage depth to rock	Poor: depth to rock
LlD:					
Lily	Severe: slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Poor: slope depth to rock
LlE:					
Lily	Severe: slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Poor: slope depth to rock
LnC:					
Lily	Severe: depth to rock	Severe: seepage slope depth to rock	Severe: seepage depth to rock	Severe: seepage depth to rock	Poor: depth to rock
Lonewood	Moderate: percs slowly slope depth to rock	Severe: slope	Severe: depth to rock	Moderate: slope depth to rock	Fair: slope too clayey depth to rock
LwB:					
Lonewood	Moderate: percs slowly depth to rock	Moderate: seepage slope depth to rock	Severe: depth to rock	Moderate: depth to rock	Fair: too clayey depth to rock
LwC:					
Lonewood	Moderate: percs slowly slope depth to rock	Severe: slope	Severe: depth to rock	Moderate: slope depth to rock	Fair: slope too clayey depth to rock
MuD:					
Muse	Severe: percs slowly slope	Severe: slope	Severe: slope wetness depth to rock	Severe: slope	Poor: hard to pack slope too clayey
Pl:					
Pits, limestone quarry	Severe: depth to rock	Severe: slope depth to rock	Severe: depth to rock	Severe: depth to rock	Poor: depth to rock
Ps:					
Pits, sandstone quarry	Severe: depth to rock	Severe: slope depth to rock	Severe: depth to rock	Severe: depth to rock	Poor: depth to rock

Table 11.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
RaC:					
Ramsey	Severe: depth to rock	Severe: seepage slope depth to rock	Severe: seepage depth to rock	Severe: seepage depth to rock	Poor: depth to rock
RaD:					
Ramsey	Severe: slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Poor: slope depth to rock
RaF:					
Ramsey	Severe: slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Poor: slope depth to rock
RrC:					
Ramsey	Severe: depth to rock	Severe: seepage slope depth to rock	Severe: seepage depth to rock	Severe: seepage depth to rock	Poor: depth to rock
Rock outcrop	Severe: depth to rock	Severe: slope depth to rock	Severe: depth to rock	Severe: depth to rock	Poor: depth to rock
RrD:					
Ramsey	Severe: slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Poor: slope depth to rock
Rock outcrop	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Poor: slope depth to rock
RrF:					
Ramsey	Severe: slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Poor: slope depth to rock
Rock outcrop	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Poor: slope depth to rock
SeB:					
Sequatchie	Slight	Severe: seepage	Severe: seepage	Slight	Fair: small stones too clayey
Su:					
Sullivan	Severe: flooding	Severe: flooding	Severe: flooding wetness	Severe: flooding	Good
TaC:					
Talbott	Severe: percs slowly depth to rock	Severe: slope depth to rock	Severe: too clayey depth to rock	Severe: depth to rock	Poor: hard to pack too clayey depth to rock

Table 11.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
TbD:					
Talbott	Severe: percs slowly, depth to rock	Severe: slope, depth to rock	Severe: too clayey, depth to rock	Severe: depth to rock	Poor: hard to pack, too clayey, depth to rock
Braxton	Severe: percs slowly	Severe: slope	Severe: too clayey	Moderate: slope	Poor: hard to pack, too clayey
Rock outcrop	Severe: depth to rock	Severe: slope, depth to rock	Severe: depth to rock	Severe: depth to rock	Poor: depth to rock
ToE:					
Talbott	Severe: percs slowly, slope, depth to rock	Severe: slope, depth to rock	Severe: slope, too clayey, depth to rock	Severe: slope, depth to rock	Poor: hard to pack, too clayey, depth to rock
Rock outcrop	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Poor: slope, depth to rock
Braxton	Severe: percs slowly, slope	Severe: slope	Severe: slope, too clayey	Severe: slope	Poor: hard to pack, slope, too clayey
TrF:					
Talbott	Severe: percs slowly, slope, depth to rock	Severe: slope, depth to rock	Severe: slope, too clayey, depth to rock	Severe: slope, depth to rock	Poor: hard to pack, too clayey, depth to rock
Rock outcrop	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Poor: slope, depth to rock
VsE:					
Varilla	Severe: slope, poor filter	Severe: seepage, slope	Severe: seepage, slope, depth to rock	Severe: seepage, slope	Poor: large stones, slope
Shelocta	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: slope	Poor: slope, small stones
W:					
Water.					
WaC:					
Waynesboro	Moderate: percs slowly, slope	Severe: slope	Moderate: slope, too clayey	Moderate: slope	Fair: hard to pack, slope, too clayey
WaD2:					
Waynesboro	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope

Table 11.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
WaD3:					
Waynesboro	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
WhA:					
Whitwell	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Fair: too clayey wetness
WhB:					
Whitwell	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Fair: too clayey wetness

Table 12.--Construction Materials

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
At:				
Atkins	Poor: wetness	Improbable: excess fines	Improbable: excess fines	Poor: wetness
BaE:				
Barfield	Poor: low strength, shrink-swell, depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: small stones, too clayey, depth to rock
Ashwood	Poor: low strength, shrink-swell, depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope, too clayey
Rock outcrop	Poor: slope, depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope, depth to rock
Be:				
Beason	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
BM:				
Bethesda	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim, slope, small stones
Mine pits.				
Bo:				
Bonair	Poor: wetness	Improbable: excess fines	Improbable: excess fines	Poor: wetness
Ea:				
Ealy	Good	Improbable: excess fines	Improbable: excess fines	Fair: small stones
EcB:				
Ealy	Good	Improbable: excess fines	Improbable: excess fines	Fair: small stones
Craigsville	Poor: large stones	Improbable: large stones	Improbable: large stones	Poor: area reclaim, small stones
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: slope, small stones, too clayey

Table 12.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
EtD2:				
Etowah	Fair: low strength, slope, thin layer	Improbable: excess fines	Improbable: excess fines	Poor: slope
FuE:				
Fullerton	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim, small stones, too clayey
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
GpF:				
Gilpin	Poor: slope, thin layer	Improbable: excess fines	Improbable: excess fines	Poor: slope, small stones
HaD:				
Hayter	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim, large stones, slope
HaE:				
Hayter	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim, large stones, slope
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
JeC:				
Jefferson	Fair: large stones	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim, large stones
JeD:				
Jefferson	Fair: large stones, slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim, large stones, slope
JnD:				
Jefferson	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: slope, small stones

Table 12.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
JnF:				
Jefferson	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: slope, small stones
JsD:				
Jefferson	Fair: large stones, slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim, large stones, slope
Shelocta	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim, slope, small stones
JsF:				
Jefferson	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim, large stones, slope
Shelocta	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim, slope, small stones
JvD:				
Jefferson	Fair: large stones, slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim, large stones, slope
Varilla	Fair: large stones, slope, depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim, large stones, slope
Shelocta	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim, slope, small stones
JvF:				
Jefferson	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim, large stones, slope
Varilla	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim, large stones, slope
Shelocta	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim, slope, small stones
LlB:				
Lily	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: area reclaim, small stones

Table 12.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
LlC:				
Lily	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: area reclaim, small stones
LlD:				
Lily	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope
LlE:				
Lily	Poor: slope, depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope
LnC:				
Lily	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: area reclaim, small stones
Lonewood	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: slope, small stones, too clayey
LwB:				
Lonewood	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: small stones, too clayey
LwC:				
Lonewood	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: slope, small stones, too clayey
MuD:				
Muse	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: slope, too clayey
Pl:				
Pits, limestone quarry	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
Ps:				
Pits, sandstone quarry	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
RaC:				
Ramsey	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: small stones, depth to rock
RaD:				
Ramsey	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope, small stones, depth to rock

Table 12.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
RaF:				
Ramsey	Poor: slope, depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope, small stones, depth to rock
RrC:				
Ramsey	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: small stones, depth to rock
Rock outcrop	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
RrD:				
Ramsey	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope, small stones, depth to rock
Rock outcrop	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope, depth to rock
RrF:				
Ramsey	Poor: slope, depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope, small stones, depth to rock
Rock outcrop	Poor: slope, depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope, depth to rock
SeB:				
Sequatchie	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones
Su:				
Sullivan	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: small stones
TaC:				
Talbott	Poor: low strength, depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
TbD:				
Talbott	Poor: low strength, depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Braxton	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Rock outcrop	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
ToE:				
Talbott	Poor: low strength, slope, depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope, too clayey

Table 12.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
ToE:				
Rock outcrop	Poor: slope, depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope, depth to rock
Braxton	Poor: low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: slope, too clayey
TrF:				
Talbott	Poor: low strength, slope, depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope, too clayey
Rock outcrop	Poor: slope, depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope, depth to rock
VsE:				
Varilla	Fair: large stones, slope, depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim, large stones, slope
Shelocta	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim, slope, small stones
W:				
Water.				
WaC:				
Waynesboro	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
WaD2:				
Waynesboro	Fair: low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: slope, too clayey
WaD3:				
Waynesboro	Fair: low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: slope, too clayey
WhA:				
Whitwell	Fair: wetness	Improbable: excess fines	Improbable: excess fines	Fair: small stones, too clayey
WhB:				
Whitwell	Fair: wetness	Improbable: excess fines	Improbable: excess fines	Fair: small stones, too clayey

Table 13.--Water Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
At:						
Atkins	Severe: seepage	Severe: piping wetness	Limitation: flooding frost action percs slowly	Limitation: flooding percs slowly wetness	Limitation: percs slowly wetness	Limitation: percs slowly wetness
BaE:						
Barfield	Severe: slope depth to rock	Severe: hard to pack	Limitation: deep to water	Limitation: slope droughty	Limitation: slope depth to rock	Limitation: slope depth to rock droughty
Ashwood	Severe: slope	Severe: hard to pack	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock
Rock outcrop	Severe: slope depth to rock	Slight	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock
Be:						
Beason	Slight	Severe: wetness	Limitation: flooding	Limitation: erodes easily flooding wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
BM:						
Bethesda	Severe: slope	Severe: seepage piping	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope slippage	Limitation: large stones slope droughty
Mine pits.						
Bo:						
Bonair	Moderate: seepage depth to rock	Severe: piping wetness	Limitation: flooding	Limitation: erodes easily flooding wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
Ea:						
Ealy	Severe: seepage	Severe: piping	Limitation: deep to water	Limitation: flooding	Favorable	Favorable

Table 13.--Water Management--Continued

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
EcB:						
Ealy	Severe: seepage	Severe: piping	Limitation: deep to water	Limitation: flooding	Favorable	Favorable
Craigsville	Severe: seepage	Severe: large stones seepage	Limitation: deep to water	Limitation: large stones droughty	Limitation: large stones too sandy soil blowing	Limitation: large stones droughty
EtB:						
Etowah	Moderate: seepage slope	Moderate: piping thin layer	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily	Limitation: erodes easily
EtC:						
Etowah	Severe: slope	Moderate: piping thin layer	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily slope	Limitation: erodes easily slope
EtD2:						
Etowah	Severe: slope	Moderate: piping thin layer	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily slope	Limitation: erodes easily slope
FuE:						
Fullerton	Severe: slope	Severe: hard to pack piping	Limitation: deep to water	Limitation: slope	Limitation: large stones slope	Limitation: large stones slope
GpC:						
Gilpin	Severe: slope	Severe: thin layer	Limitation: deep to water	Limitation: slope depth to rock	Limitation: large stones slope depth to rock	Limitation: large stones slope depth to rock
GpD:						
Gilpin	Severe: slope	Severe: thin layer	Limitation: deep to water	Limitation: slope depth to rock	Limitation: large stones slope depth to rock	Limitation: large stones slope depth to rock
GpF:						
Gilpin	Severe: slope	Severe: thin layer	Limitation: deep to water	Limitation: slope depth to rock	Limitation: large stones slope depth to rock	Limitation: large stones slope depth to rock

Table 13.--Water Management--Continued

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
HaD:						
Hayter	Severe: seepage slope	Moderate: large stones piping thin layer	Limitation: deep to water	Limitation: slope soil blowing	Limitation: large stones slope soil blowing	Limitation: large stones slope
HaE:						
Hayter	Severe: seepage slope	Moderate: large stones piping thin layer	Limitation: deep to water	Limitation: slope soil blowing	Limitation: large stones slope soil blowing	Limitation: large stones slope
HeB:						
Hendon	Moderate: seepage slope	Severe: piping	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily	Limitation: erodes easily
HeC:						
Hendon	Moderate: seepage slope	Severe: piping	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily	Limitation: erodes easily
JeC:						
Jefferson	Severe: seepage slope	Severe: piping	Limitation: deep to water	Limitation: large stones slope	Limitation: large stones slope	Limitation: large stones slope
JeD:						
Jefferson	Severe: seepage slope	Severe: piping	Limitation: deep to water	Limitation: large stones slope	Limitation: large stones slope	Limitation: large stones slope
JnD:						
Jefferson	Severe: seepage	Severe: piping	Limitation: deep to water	Limitation: slope	Limitation: large stones slope	Limitation: large stones slope
JnF:						
Jefferson	Severe: seepage slope	Severe: piping	Limitation: deep to water	Limitation: slope	Limitation: large stones slope	Limitation: large stones slope
JsD:						
Jefferson	Severe: seepage slope	Severe: piping	Limitation: deep to water	Limitation: large stones slope	Limitation: large stones slope	Limitation: large stones slope

Table 13.--Water Management--Continued

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
JsD:						
Shelocta	Severe: seepage slope	Severe: piping	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
JsF:						
Jefferson	Severe: seepage slope	Severe: piping	Limitation: deep to water	Limitation: large stones slope	Limitation: large stones slope	Limitation: large stones slope
Shelocta	Severe: seepage slope	Severe: piping	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
JvD:						
Jefferson	Severe: seepage slope	Severe: piping	Limitation: deep to water	Limitation: large stones slope	Limitation: large stones slope	Limitation: large stones slope
Varilla	Severe: seepage slope	Severe: large stones seepage	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope too sandy	Limitation: large stones slope droughty
Shelocta	Severe: seepage slope	Severe: piping	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
JvF:						
Jefferson	Severe: seepage slope	Severe: piping	Limitation: deep to water	Limitation: large stones slope	Limitation: large stones slope	Limitation: large stones slope
Varilla	Severe: seepage slope	Severe: large stones seepage	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope too sandy	Limitation: large stones slope droughty
Shelocta	Severe: seepage slope	Severe: piping	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
LlB:						
Lily	Severe: seepage	Severe: piping	Limitation: deep to water	Limitation: slope depth to rock	Limitation: depth to rock	Limitation: depth to rock

Table 13.--Water Management--Continued

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
LlC:						
Lily	Severe: seepage	Severe: piping	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock
LlD:						
Lily	Severe: seepage	Severe: piping	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock
LlE:						
Lily	Severe: seepage slope	Severe: piping	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock
LnC:						
Lily	Severe: seepage	Severe: piping	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock
Lonewood	Severe: slope	Moderate: piping thin layer	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily slope	Limitation: erodes easily slope
LwB:						
Lonewood	Moderate: seepage slope depth to rock	Moderate: piping thin layer	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily	Limitation: erodes easily
LwC:						
Lonewood	Severe: slope	Moderate: piping thin layer	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily slope	Limitation: erodes easily slope
MuD:						
Muse	Moderate: depth to rock	Moderate: hard to pack thin layer	Limitation: deep to water	Limitation: erodes easily percs slowly slope	Limitation: erodes easily percs slowly slope	Limitation: erodes easily percs slowly slope
Pl:						
Pits, limestone quarry	Severe: slope depth to rock	Slight	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock

Table 13.--Water Management--Continued

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Ps:						
Pits, sandstone quarry-	Severe: slope, depth to rock	Slight	Limitation: deep to water	Limitation: slope, depth to rock	Limitation: slope, depth to rock	Limitation: slope, depth to rock
RaC:						
Ramsey	Severe: slope, depth to rock	Severe: piping	Limitation: deep to water	Limitation: slope, depth to rock, droughty	Limitation: slope, depth to rock	Limitation: slope, depth to rock, droughty
RaD:						
Ramsey	Severe: slope, depth to rock	Severe: piping	Limitation: deep to water	Limitation: slope, depth to rock, droughty	Limitation: slope, depth to rock	Limitation: slope, depth to rock, droughty
RaF:						
Ramsey	Severe: slope, depth to rock	Severe: piping	Limitation: deep to water	Limitation: slope, depth to rock, droughty	Limitation: slope, depth to rock	Limitation: slope, depth to rock, droughty
RrC:						
Ramsey	Severe: slope, depth to rock	Severe: piping	Limitation: deep to water	Limitation: slope, depth to rock, droughty	Limitation: slope, depth to rock	Limitation: slope, depth to rock, droughty
Rock outcrop	Severe: slope, depth to rock	Slight	Limitation: deep to water	Limitation: slope, depth to rock	Limitation: slope, depth to rock	Limitation: slope, depth to rock
RrD:						
Ramsey	Severe: slope, depth to rock	Severe: piping	Limitation: deep to water	Limitation: slope, depth to rock, droughty	Limitation: slope, depth to rock	Limitation: slope, depth to rock, droughty
Rock outcrop	Severe: slope, depth to rock	Slight	Limitation: deep to water	Limitation: slope, depth to rock	Limitation: slope, depth to rock	Limitation: slope, depth to rock

Table 13.--Water Management--Continued

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
RrF:						
Ramsey	Severe: slope, depth to rock	Severe: piping	Limitation: deep to water	Limitation: slope, depth to rock, droughty	Limitation: slope, depth to rock	Limitation: slope, depth to rock, droughty
Rock outcrop	Severe: slope, depth to rock	Slight	Limitation: deep to water	Limitation: slope, depth to rock	Limitation: slope, depth to rock	Limitation: slope, depth to rock
SeB:						
Sequatchie	Severe: seepage	Severe: piping	Limitation: deep to water	Limitation: slope	Favorable	Favorable
Su:						
Sullivan	Moderate: seepage	Severe: piping	Limitation: deep to water	Limitation: flooding	Favorable	Favorable
TaC:						
Talbott	Severe: slope	Severe: hard to pack	Limitation: deep to water	Limitation: slope, depth to rock	Limitation: erodes easily, slope, depth to rock	Limitation: erodes easily, slope, depth to rock
TbD:						
Talbott	Severe: slope	Severe: hard to pack	Limitation: deep to water	Limitation: slope, depth to rock	Limitation: slope, depth to rock	Limitation: slope, depth to rock
Braxton	Severe: slope	Moderate: hard to pack	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
Rock outcrop	Severe: slope, depth to rock	Slight	Limitation: deep to water	Limitation: slope, depth to rock	Limitation: slope, depth to rock	Limitation: slope, depth to rock
ToE:						
Talbott	Severe: slope	Severe: hard to pack	Limitation: deep to water	Limitation: slope, depth to rock	Limitation: slope, depth to rock	Limitation: slope, depth to rock
Rock outcrop	Severe: slope, depth to rock	Slight	Limitation: deep to water	Limitation: slope, depth to rock	Limitation: slope, depth to rock	Limitation: slope, depth to rock

Table 13.--Water Management--Continued

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
ToE:						
Braxton	Severe: slope	Moderate: hard to pack	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
TrF:						
Talbott	Severe: slope	Severe: hard to pack	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock
Rock outcrop	Severe: slope depth to rock	Slight	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock
VsE:						
Varilla	Severe: seepage slope	Severe: large stones seepage	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope too sandy	Limitation: large stones slope droughty
Shelocta	Severe: seepage slope	Severe: piping	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
W:						
Water.						
WaC:						
Waynesboro	Severe: slope	Severe: hard to pack piping	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
WaD2:						
Waynesboro	Severe: slope	Severe: hard to pack piping	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
WaD3:						
Waynesboro	Severe: slope	Severe: hard to pack piping	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
WhA:						
Whitwell	Moderate: seepage	Severe: piping	Limitation: flooding	Limitation: flooding wetness	Limitation: wetness	Favorable

Table 13.--Water Management--Continued

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
WhB: Whitwell	Moderate: seepage slope	Severe: piping	Limitation: slope	Limitation: slope wetness	Limitation: wetness	Favorable

Table 14.--Engineering Index Properties

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
At:												
Atkins----------	0-10	Loam	ML, CL, SC, SM	A-4, A-6	---	0-5	90-100	80-100	60-95	45-75	20-35	1-15
	10-52	Silty clay loam, silt loam, sandy loam	ML, SC, CL, SM	A-4, A-6	---	0-5	90-100	85-100	65-100	45-85	20-40	3-20
	52-60	Stratified silty clay loam to gravelly sandy loam	GM, ML, CL, SM	A-2, A-4, A-6	---	0-15	60-100	60-100	50-95	30-85	20-40	1-15
BaE:												
Barfield--------	0-4	Silty clay loam	CH, CL, MH	A-6, A-7	0-5	0-10	90-100	85-95	80-90	75-85	35-65	12-35
	4-14	Clay, silty clay loam, flaggy clay	CH, MH, CL	A-6, A-7	0-5	0-15	70-100	65-90	60-85	55-80	35-70	14-40
	14-20	Unweathered bedrock			---	---	---	---	---	---	---	---
Ashwood---------	0-6	Silt loam	CL, CL-ML	A-4, A-7, A-6	0	0-15	95-100	90-100	85-100	70-95	25-49	6-22
	6-37	Clay, silty clay	MH	A-7	0	0-15	95-100	90-100	85-100	75-95	51-75	20-40
	37-40	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock			---	---	---	---	---	---	---	---
Be:												
Beason----------	0-4	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	95-100	90-100	75-90	25-40	5-15
	4-13	Silty clay loam, silt loam	CL	A-6	0	0	100	95-100	90-100	80-95	25-40	11-20
	13-38	Silty clay loam, silty clay, clay	CL	A-6, A-7	0	0	100	95-100	90-95	80-95	30-49	11-25
	38-60	Variable			---	---	---	---	---	---	---	---

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
BM:												
Bethesda--------	0-23	Channery loam	CL-ML, GC-GM, ML, GM	A-4, A-6	---	0-15	65-90	55-80	50-80	35-75	25-40	4-14
	23-60	Very channery clay loam, very channery silty clay loam, channery clay loam	GC-GM, GM, CL, ML	A-2, A-4, A-7, A-6	---	10-30	45-80	25-65	25-65	20-60	24-50	3-23
Mine pits.					---	---	---	---	---	---	---	---
Bo:												
Bonair----------	0-10	Loam	CL-ML, CL, ML	A-4	0	0	95-100	90-100	70-95	55-85	16-25	2-8
	10-36	Silt loam, loam, fine sandy loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	70-95	55-80	20-32	5-12
	36-60	Fine sandy loam, loam, silt loam	CL, CL-ML, SC-SM, SC	A-4, A-6	---	0-5	90-100	85-100	70-90	40-80	17-32	4-12
Ea:												
Ealy----------	0-10	Loam	ML, CL-ML, SC-SM, SM	A-2, A-4	0	0-3	85-100	75-100	55-95	30-70	0-30	NP-8
	10-60	Loam, fine sandy loam, loamy fine sand	ML, SC-SM, CL-ML, SM	A-2, A-4	0	0	85-100	75-100	50-95	25-70	0-30	NP-8
EcB:												
Ealy----------	0-10	Fine sandy loam	ML, CL-ML, SC-SM, SM	A-2, A-4	0	0-3	85-100	75-100	55-95	30-70	0-30	NP-8
	10-60	Loam, fine sandy loam, loamy fine sand	CL-ML, SM, ML, SC-SM	A-2, A-4	0	0	85-100	75-100	50-95	25-70	0-30	NP-8

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
EcB:												
Craigsville-----	0-3	Cobbly fine sandy loam	CL-ML, SM, ML, SC	A-2, A-4	---	25-50	80-95	75-95	50-80	25-60	0-25	NP-10
	3-21	Gravelly sandy loam, cobbly loam, very gravelly sandy loam	GM, GC, SC, SM	A-1, A-2, A-4	---	25-60	50-80	30-65	25-60	15-40	0-25	NP-10
	21-60	Very gravelly loamy sand, very gravelly sandy loam, very cobbly sandy loam	GC-GM, GC, GM, GP-GM	A-1, A-2	---	35-75	35-55	30-50	20-45	10-25	0-25	NP-8
EtB:												
Etowah----------	0-7	Silt loam	CL-ML, CL, ML, SC-SM	A-4	0	0	80-100	75-100	70-95	45-70	20-30	3-10
	7-48	Silty clay loam, clay loam, silt loam	CL	A-6	0	0	80-100	75-100	70-95	65-85	25-35	10-15
	48-61	Silty clay loam, clay loam, clay	CL, MH, ML	A-6, A-7	0	0	80-100	75-100	70-95	65-85	39-60	15-25
EtC:												
Etowah----------	0-7	Silt loam	CL, SC-SM, CL-ML, ML	A-4	0	0	80-100	75-100	70-95	45-70	20-30	3-10
	7-48	Silty clay loam, clay loam, silt loam	CL	A-6	0	0	80-100	75-100	70-95	65-85	25-35	10-15
	48-61	Silty clay loam, clay loam, clay	CL, MH, ML	A-6, A-7	0	0	80-100	75-100	70-95	65-85	39-60	15-25
EtD2:												
Etowah----------	0-7	Silt loam	CL, SC-SM, CL-ML, ML	A-4	0	0	80-100	75-100	70-95	45-70	20-30	3-10
	7-48	Silty clay loam, clay loam, silt loam	CL	A-6	0	0	80-100	75-100	70-95	65-85	25-35	10-15
	48-61	Silty clay loam, clay loam, clay	CL, MH, ML	A-6, A-7	0	0	80-100	75-100	70-95	65-85	39-60	15-25

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
FuE:												
Fullerton-------	0-12	Gravelly silt loam	CL-ML, CL, GC, GC-GM	A-2, A-4	---	2-15	60-94	45-80	40-75	30-70	18-30	3-10
	12-65	Gravelly clay, gravelly silty clay	MH, GM, ML, SM	A-2, A-7	---	2-18	60-90	45-80	40-75	30-75	48-78	20-42
GpC:												
Gilpin----------	0-5	Loam	CL, CL-ML	A-4, A-6	---	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	5-34	Channery silty clay loam, channery loam, channery silt loam	CL-ML, GC, CL, SC	A-2, A-4, A-6	---	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	34-38	Channery silty clay loam, channery clay, clay	GC, GC-GM	A-2, A-1, A-4, A-6	---	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	38-50	Unweathered bedrock			---	---	---	---	---	---	---	---
GpD:												
Gilpin----------	0-5	Loam	CL, CL-ML	A-4, A-6	---	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	5-34	Channery silty clay loam, channery loam, channery silt loam	CL, CL-ML, SC, GC	A-4, A-2, A-6	---	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	34-38	Channery silty clay loam, channery clay, clay	GC, GC-GM	A-2, A-1, A-4, A-6	---	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	38-50	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
GpF:												
Gilpin----------	0-5	Loam	CL, CL-ML	A-4, A-6	---	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	5-34	Channery silty clay loam, channery loam, channery silt loam	CL, CL-ML, SC, GC	A-2, A-4, A-6	---	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	34-38	Channery silty clay loam, channery clay, clay	GC, GC-GM	A-2, A-1, A-4, A-6	---	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	38-50	Unweathered bedrock			---	---	---	---	---	---	---	---
HaD:												
Hayter----------	0-7	Loam	ML, CL, SC, SM	A-4, A-6	---	0-15	90-100	80-100	55-85	36-70	0-40	NP-15
	7-40	Clay loam, sandy clay loam, cobbly clay loam	CL, SC	A-2, A-6, A-7	---	0-25	85-100	80-100	60-95	30-70	30-45	11-20
	40-60	Cobbly loam, very cobbly loam, very cobbly fine sandy loam	CL, ML, SM, SC	A-4, A-2, A-6	---	25-80	75-100	55-95	45-90	30-60	0-40	NP-15
HaE:												
Hayter----------	0-7	Loam	CL, SM, ML, SC	A-4, A-6	---	0-15	90-100	80-100	55-85	36-70	0-40	NP-15
	7-40	Clay loam, sandy clay loam, cobbly clay loam	CL, SC	A-2, A-7, A-6	---	0-25	85-100	80-100	60-95	30-70	30-45	11-20
	40-60	Cobbly loam, very cobbly loam, very cobbly fine sandy loam	CL, ML, SM, SC	A-2, A-6, A-4	---	25-80	75-100	55-95	45-90	30-60	0-40	NP-15
HeB:												
Hendon----------	0-16	Silt loam	CL, ML, CL-ML	A-4	0	0	100	90-100	85-100	75-90	18-30	1-9
	16-23	Silt loam, loam, clay loam	CL-ML, CL, ML	A-4, A-6	0	0	100	90-100	80-100	65-85	20-35	3-12
	23-29	Loam, clay loam	CL	A-4, A-6	0	0	95-100	85-100	75-100	60-85	25-38	7-15
	29-61	Loam, clay loam	CL	A-4, A-6	0	0	95-100	85-100	75-100	60-85	25-40	7-16

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
HeC:												
Hendon----------	0-16	Silt loam	CL, CL-ML, ML	A-4	0	0	100	90-100	85-100	75-90	18-30	1-9
	16-23	Silt loam, loam, clay loam	CL, CL-ML, ML	A-4, A-6	0	0	100	90-100	80-100	65-85	20-35	3-12
	23-29	Loam, clay loam	CL	A-4, A-6	0	0	95-100	85-100	75-100	60-85	25-38	7-15
	29-61	Loam, clay loam	CL	A-4, A-6	0	0	95-100	85-100	75-100	60-85	25-40	7-16
JeC:												
Jefferson-------	0-7	Cobbly loam	CL, SM, GM, ML	A-2, A-4	---	10-35	65-90	60-90	50-80	30-60	20-35	2-10
	7-56	Cobbly loam, cobbly clay loam, gravelly sandy clay loam	ML, CL, SC, SM	A-2, A-4, A-6	---	10-35	75-90	70-90	50-80	30-70	20-40	2-15
	56-60	Cobbly loam, cobbly clay loam, gravelly sandy clay loam	GC-GM, SM, GM, ML	A-2, A-1, A-4	---	10-35	55-75	50-75	35-70	20-60	20-35	2-10
JeD:												
Jefferson-------	0-7	Cobbly loam	GM, CL, ML, SM	A-2, A-4	---	10-35	65-90	60-90	50-80	30-60	20-35	2-10
	7-56	Cobbly loam, cobbly clay loam, gravelly sandy clay loam	ML, CL, SC, SM	A-2, A-6, A-4	---	10-35	75-90	70-90	50-80	30-70	20-40	2-15
	56-60	Cobbly loam, cobbly clay loam, gravelly sandy clay loam	GM, GC-GM, ML, SM	A-1, A-4, A-2	---	10-35	55-75	50-75	35-70	20-60	20-35	2-10

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
JnD:												
Jefferson-------	0-7	Very cobbly fine sandy loam	ML, GM, SM	A-2, A-4	---	20-50	60-85	60-70	50-60	25-55	20-35	2-10
	7-56	Channery loam, gravelly clay loam, gravelly sandy clay loam	ML, CL, SC, SM	A-2, A-4, A-6	---	5-20	75-90	70-90	50-80	30-70	15-35	2-15
	56-60	Very channery loam, gravelly clay loam, gravelly sandy clay loam	GM, ML, GC-GM, SM	A-2, A-1, A-4	---	5-25	55-75	50-75	35-70	20-60	20-35	2-10
JnF:												
Jefferson-------	0-7	Very cobbly fine sandy loam	GM, ML, SM	A-2, A-4	---	20-50	60-85	60-70	50-60	25-55	20-35	2-10
	7-56	Channery loam, gravelly clay loam, gravelly sandy clay loam	CL, SM, ML, SC	A-2, A-6, A-4	---	5-20	75-90	70-90	50-80	30-70	15-35	2-15
	56-60	Very channery loam, gravelly clay loam, gravelly sandy clay loam	GC-GM, GM, SM, ML	A-1, A-2, A-4	---	5-25	55-75	50-75	35-70	20-60	20-35	2-10
JsD:												
Jefferson-------	0-7	Cobbly loam	GM, CL, ML, SM	A-2, A-4	---	10-35	65-90	60-90	50-80	30-60	20-35	2-10
	7-56	Cobbly loam, cobbly clay loam, gravelly sandy clay loam	ML, SC, CL, SM	A-2, A-4, A-6	---	10-35	75-90	70-90	50-80	30-70	20-40	2-15
	56-60	Cobbly loam, cobbly clay loam, gravelly sandy clay loam	GM, ML, GC-GM, SM	A-1, A-2, A-4	---	10-35	55-75	50-75	35-70	20-60	20-35	2-10

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
JsD:												
Shelocta--------	0-3	Loam	CL-ML, ML	A-4	0-2	0-5	80-95	75-95	60-95	55-90	0-35	NP-10
	3-50	Silty clay loam, silt loam, channery silty clay loam	CL, CL-ML, SC, GC	A-4, A-6	0-5	0-10	55-95	50-95	45-95	40-90	25-40	4-15
	50-60	Channery silt loam, channery silty clay loam, very channery clay loam	GC, CL, GM, ML	A-1-b, A-2, A-6, A-4	0-10	0-15	40-85	35-70	25-70	20-65	20-40	3-20
JsF:												
Jefferson-------	0-7	Cobbly loam	GM, CL, ML, SM	A-2, A-4	---	10-35	65-90	60-90	50-80	30-60	20-35	2-10
	7-56	Cobbly loam, cobbly clay loam, gravelly sandy clay loam	ML, CL, SC, SM	A-4, A-2, A-6	---	10-35	75-90	70-90	50-80	30-70	20-40	2-15
	56-60	Cobbly loam, cobbly clay loam, gravelly sandy clay loam	GM, ML, GC-GM, SM	A-2, A-1, A-4	---	10-35	55-75	50-75	35-70	20-60	20-35	2-10
Shelocta--------	0-3	Loam	CL-ML, ML	A-4	0-2	0-5	80-95	75-95	60-95	55-90	0-35	NP-10
	3-50	Silty clay loam, silt loam, channery silty clay loam	CL, CL-ML, SC, GC	A-4, A-6	0-5	0-10	55-95	50-95	45-95	40-90	25-40	4-15
	50-60	Channery silt loam, channery silty clay loam, very channery clay loam	CL, GC, ML, GM	A-2, A-1-b, A-4, A-6	0-10	0-15	40-85	35-70	25-70	20-65	20-40	3-20

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
JvD:												
Jefferson-------	0-7	Cobbly loam	GM, CL, ML, SM	A-2, A-4	---	10-35	65-90	60-90	50-80	30-60	20-35	2-10
	7-56	Cobbly loam, cobbly clay loam, gravelly sandy clay loam	ML, SC, CL, SM	A-2, A-4, A-6	---	10-35	75-90	70-90	50-80	30-70	20-40	2-15
	56-60	Cobbly loam, cobbly clay loam, gravelly sandy clay loam	GM, ML, GC-GM, SM	A-2, A-1, A-4	---	10-35	55-75	50-75	35-70	20-60	20-35	2-10
Varilla---------	0-7	Very stony sandy loam	SC, SC-SM, SM	A-2, A-4, A-6	---	20-40	70-90	70-90	50-80	25-50	0-30	NP-15
	7-44	Very cobbly fine sandy loam, very gravelly fine sandy loam, very gravelly loam	SC, SC-SM, SM	A-4, A-2, A-6	---	20-40	70-90	70-90	50-80	25-50	0-30	NP-15
	44-60	Extremely cobbly fine sandy loam, extremely cobbly loamy sand, extremely gravelly loamy sand	GM, SC-SM, GC-GM, SM	A-2	---	30-50	60-80	55-80	50-70	10-35	0-25	NP-10
Shelocta--------	0-3	Loam	CL-ML, ML	A-4	0-2	0-5	80-95	75-95	60-95	55-90	0-35	NP-10
	3-50	Silty clay loam, silt loam, channery silty clay loam	CL, SC, CL-ML, GC	A-4, A-6	0-5	0-10	55-95	50-95	45-95	40-90	25-40	4-15
	50-60	Channery silt loam, channery silty clay loam, very channery clay loam	GC, CL, GM, ML	A-1-b, A-2, A-6, A-4	0-10	0-15	40-85	35-70	25-70	20-65	20-40	3-20

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
JvF:												
Jefferson-------	0-7	Cobbly loam	GM, CL, ML, SM	A-2, A-4	---	10-35	65-90	60-90	50-80	30-60	20-35	2-10
	7-56	Cobbly loam, cobbly clay loam, gravelly sandy clay loam	ML, CL, SC, SM	A-4, A-2, A-6	---	10-35	75-90	70-90	50-80	30-70	20-40	2-15
	56-60	Cobbly loam, cobbly clay loam, gravelly sandy clay loam	GC-GM, GM, SM, ML	A-1, A-2, A-4	---	10-35	55-75	50-75	35-70	20-60	20-35	2-10
Varilla---------	0-7	Very stony sandy loam	SC, SC-SM, SM	A-2, A-6, A-4	---	20-40	70-90	70-90	50-80	25-50	0-30	NP-15
	7-44	Very cobbly fine sandy loam, very gravelly fine sandy loam, very gravelly loam	SC, SM, SC-SM	A-2, A-4, A-6	---	20-40	70-90	70-90	50-80	25-50	0-30	NP-15
	44-60	Extremely cobbly fine sandy loam, extremely cobbly loamy sand, extremely gravelly loamy sand	GM, GC-GM, SC-SM, SM	A-2	---	30-50	60-80	55-80	50-70	10-35	0-25	NP-10
Shelocta--------	0-3	Loam	CL-ML, ML	A-4	0-2	0-5	80-95	75-95	60-95	55-90	0-35	NP-10
	3-50	Silty clay loam, silt loam, channery silty clay loam	CL, CL-ML, SC, GC	A-4, A-6	0-5	0-10	55-95	50-95	45-95	40-90	25-40	4-15
	50-60	Channery silt loam, channery silty clay loam, very channery clay loam	CL, ML, GC, GM	A-2, A-4, A-1-b, A-6	0-10	0-15	40-85	35-70	25-70	20-65	20-40	3-20

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
LlB:												
Lily	0-2	Loam	CL-ML, ML	A-4	---	0-5	90-100	85-100	70-95	55-80	0-35	NP-10
	2-31	Clay loam, sandy clay loam, loam	CL, ML, SM, SC	A-4, A-6	---	0-5	90-100	85-100	75-100	40-80	0-35	3-15
	31-35	Sandy clay loam, clay loam, gravelly sandy clay loam	CL, SM, ML, SC	A-2, A-1-b, A-4, A-6	---	0-10	65-100	50-100	40-95	20-75	0-35	3-15
	35-40	Unweathered bedrock			---	---	---	---	---	---	---	---
LlC:												
Lily	0-2	Loam	CL-ML, ML	A-4	---	0-5	90-100	85-100	70-95	55-80	0-35	NP-10
	2-31	Clay loam, sandy clay loam, loam	CL, ML, SM, SC	A-4, A-6	---	0-5	90-100	85-100	75-100	40-80	0-35	3-15
	31-35	Sandy clay loam, clay loam, gravelly sandy clay loam	ML, SC, CL, SM	A-2, A-1-b, A-4, A-6	---	0-10	65-100	50-100	40-95	20-75	0-35	3-15
	35-40	Unweathered bedrock			---	---	---	---	---	---	---	---
LlD:												
Lily	0-2	Loam	CL-ML, ML	A-4	---	0-5	90-100	85-100	70-95	55-80	0-35	NP-10
	2-31	Clay loam, sandy clay loam, loam	CL, ML, SM, SC	A-4, A-6	---	0-5	90-100	85-100	75-100	40-80	0-35	3-15
	31-35	Sandy clay loam, clay loam, gravelly sandy clay loam	ML, CL, SC, SM	A-2, A-1-b, A-4, A-6	---	0-10	65-100	50-100	40-95	20-75	0-35	3-15
	35-40	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
LlE:												
Lily----------	0-2	Loam	CL-ML, ML	A-4	---	0-5	90-100	85-100	70-95	55-80	0-35	NP-10
	2-31	Clay loam, sandy clay loam, loam	ML, CL, SC, SM	A-4, A-6	---	0-5	90-100	85-100	75-100	40-80	0-35	3-15
	31-35	Sandy clay loam, clay loam, gravelly sandy clay loam	ML, SC, CL, SM	A-1-b, A-2, A-6, A-4	---	0-10	65-100	50-100	40-95	20-75	0-35	3-15
	35-40	Unweathered bedrock			---	---	---	---	---	---	---	---
LnC:												
Lily----------	0-2	Loam	CL-ML, ML	A-4	---	0-5	90-100	85-100	70-95	55-80	0-35	NP-10
	2-31	Clay loam, sandy clay loam, loam	CL, ML, SM, SC	A-4, A-6	---	0-5	90-100	85-100	75-100	40-80	0-35	3-15
	31-35	Sandy clay loam, clay loam, gravelly sandy clay loam	CL, ML, SM, SC	A-1-b, A-2, A-6, A-4	---	0-10	65-100	50-100	40-95	20-75	0-35	3-15
	35-40	Unweathered bedrock			---	---	---	---	---	---	---	---
Lonewood--------	0-10	Loam	CL-ML, CL, ML	A-4	0	0	100	90-100	85-100	75-90	18-26	3-9
	10-37	Silt loam, silty clay loam, loam	CL	A-4, A-6	0	0	100	90-100	85-95	70-90	25-39	9-18
	37-55	Silty clay loam, clay loam, loam	CL	A-6, A-7	0	0	95-100	85-100	75-90	65-85	29-48	10-23
	55-72	Loam	CL, GC, SC	A-4, A-2, A-6, A-7	0-5	5-25	45-90	25-85	25-80	25-75	25-48	9-23
	72-80	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
LwB:												
Lonewood--------	0-10	Loam	CL-ML, CL, ML	A-4	0	0	100	90-100	85-100	75-90	18-26	3-9
	10-37	Silt loam, silty clay loam, loam	CL	A-4, A-6	0	0	100	90-100	85-95	70-90	25-39	9-18
	37-55	Silty clay loam, clay loam, loam	CL	A-6, A-7	0	0	95-100	85-100	75-90	65-85	29-48	10-23
	55-72	Loam	CL, GC, SC	A-4, A-2, A-6, A-7	0-5	5-25	45-90	25-85	25-80	25-75	25-48	9-23
	72-80	Unweathered bedrock			---	---	---	---	---	---	---	---
LwC:												
Lonewood--------	0-10	Loam	CL-ML, CL, ML	A-4	0	0	100	90-100	85-100	75-90	18-26	3-9
	10-37	Silt loam, silty clay loam, loam	CL	A-4, A-6	0	0	100	90-100	85-95	70-90	25-39	9-18
	37-55	Silty clay loam, clay loam, loam	CL	A-6, A-7	0	0	95-100	85-100	75-90	65-85	29-48	10-23
	55-72	Loam	CL, GC, SC	A-4, A-6, A-2, A-7	0-5	5-25	45-90	25-85	25-80	25-75	25-48	9-23
	72-80	Unweathered bedrock			---	---	---	---	---	---	---	---
MuD:												
Muse------------	0-5	Silt loam	CL-ML, CL, ML	A-4, A-6	0	0	80-100	70-100	60-100	55-95	20-40	2-20
	5-47	Silty clay loam, clay,	CH, CL	A-6, A-7	0	0	70-100	65-100	60-100	55-100	35-65	15-35
	47-54	Clay	CL, GC, CH, MH	A-2, A-7	0	0	50-100	40-95	35-95	30-95	40-75	20-40
	54-60	Weathered bedrock			---	---	---	---	---	---	---	---
Pl:												
Pits, limestone quarry---------	0-60	Unweathered bedrock			---	---	---	---	---	---	0-14	---
Ps:												
Pits, sandstone quarry---------	0-60	Unweathered bedrock			---	---	---	---	---	---	0-14	---

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
RaC:												
Ramsey----------	0-2	Loam	ML, CL-ML, SC-SM, SM	A-2, A-4	---	0-10	85-100	75-95	60-75	30-70	0-25	NP-7
	2-18	Loam, sandy loam, fine sandy loam	CL-ML, SM, ML, SC-SM	A-2, A-4	---	0-10	85-100	75-95	60-77	30-70	0-25	NP-7
	18-25	Unweathered bedrock			---	---	---	---	---	---	---	---
RaD:												
Ramsey----------	0-2	Loam	CL-ML, SM, ML, SC-SM	A-2, A-4	---	0-10	85-100	75-95	60-75	30-70	0-25	NP-7
	2-18	Loam, sandy loam, fine sandy loam	ML, CL-ML, SC-SM, SM	A-2, A-4	---	0-10	85-100	75-95	60-77	30-70	0-25	NP-7
	18-25	Unweathered bedrock			---	---	---	---	---	---	---	---
RaF:												
Ramsey----------	0-2	Loam	CL-ML, SM, ML, SC-SM	A-2, A-4	---	0-10	85-100	75-95	60-75	30-70	0-25	NP-7
	2-18	Loam, sandy loam, fine sandy loam	ML, CL-ML, SC-SM, SM	A-2, A-4	---	0-10	85-100	75-95	60-77	30-70	0-25	NP-7
	18-25	Unweathered bedrock			---	---	---	---	---	---	---	---
RrC:												
Ramsey----------	0-2	Loam	ML, CL-ML, SC-SM, SM	A-2, A-4	---	0-10	85-100	75-95	60-75	30-70	0-25	NP-7
	2-18	Loam, sandy loam, fine sandy loam	ML, CL-ML, SC-SM, SM	A-2, A-4	---	0-10	85-100	75-95	60-77	30-70	0-25	NP-7
	18-25	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock			---	---	---	---	---	---	---	---
RrD:												
Ramsey----------	0-2	Loam	ML, SC-SM, CL-ML, SM	A-2, A-4	---	0-10	85-100	75-95	60-75	30-70	0-25	NP-7
	2-18	Loam, sandy loam, fine sandy loam	ML, CL-ML, SC-SM, SM	A-2, A-4	---	0-10	85-100	75-95	60-77	30-70	0-25	NP-7
	18-25	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
RrD:												
Rock outcrop----	0-60	Unweathered bedrock			---	---	---	---	---	---	---	---
RrF:												
Ramsey----------	0-2	Loam	CL-ML, SM, ML, SC-SM	A-2, A-4	---	0-10	85-100	75-95	60-75	30-70	0-25	NP-7
	2-18	Loam, sandy loam, fine sandy loam	CL-ML, SM, ML, SC-SM	A-2, A-4	---	0-10	85-100	75-95	60-77	30-70	0-25	NP-7
	18-25	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock			---	---	---	---	---	---	---	---
SeB:												
Sequatchie------	0-7	Loam	CL-ML, CL, ML, SM	A-2, A-4	---	0-10	85-100	75-100	65-95	30-70	15-27	2-10
	7-51	Clay loam, loam, silt loam	CL, CL-ML	A-4, A-6	---	0-10	85-100	75-100	65-95	55-85	20-32	5-15
	51-68	Very gravelly sandy loam, loam, fine sandy loam	CL-ML, CL, ML, SM	A-2, A-4	---	0-15	75-100	65-100	45-85	25-65	15-25	2-10
Su:												
Sullivan--------	0-42	Loam	CL-ML, ML, CL, SM	A-4	0	0	80-100	75-100	60-100	36-90	20-31	3-10
	42-60	Gravelly fine sandy loam, gravelly loam, silt loam	SC, SC-SM, GM, SM	A-2, A-4	0	0-5	65-100	55-100	45-85	25-55	20-30	3-10
TaC:												
Talbott---------	0-7	Silt loam	CL	A-4, A-6	0	0-5	95-100	90-100	85-95	75-95	25-40	8-16
	7-26	Clay, silty clay	CH, CL	A-7	0	0-10	95-100	90-100	85-95	80-95	41-80	20-45
	26-33	Clay, silty clay	CH, CL	A-7	0	0-10	95-100	90-100	85-95	80-95	41-80	20-45
	33-40	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
TbD:												
Talbott---------	0-7	Loam	ML	A-4	0	0-5	95-100	90-100	80-95	55-75	0-30	1-7
	7-26	Clay, silty clay	CH, CL	A-7	0	0-10	95-100	90-100	85-95	80-95	41-80	20-45
	26-33	Clay, silty clay	CH, CL	A-7	0	0-10	95-100	90-100	85-95	80-95	41-80	20-45
	33-40	Unweathered bedrock			---	---	---	---	---	---	---	---
Braxton---------	0-4	Loam	ML	A-4	0	0-5	95-100	90-100	80-95	55-75	0-30	1-7
	4-8	Clay, silty clay	CH, CL	A-7	0	0	80-100	75-100	65-95	60-90	45-62	20-32
	8-61	Clay	CH, CL	A-7	0	0	80-100	75-100	65-95	60-90	45-65	22-34
Rock outcrop----	0-60	Unweathered bedrock			---	---	---	---	---	---	---	---
ToE:												
Talbott---------	0-7	Loam	ML	A-4	0	0-5	95-100	90-100	80-95	55-75	0-30	1-7
	7-26	Clay, silty clay	CH, CL	A-7	0	0-10	95-100	90-100	85-95	80-95	41-80	20-45
	26-33	Clay, silty clay	CH, CL	A-7	0	0-10	95-100	90-100	85-95	80-95	41-80	20-45
	33-40	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock			---	---	---	---	---	---	---	---
Braxton---------	0-4	Loam	ML	A-4	0	0-5	95-100	90-100	80-95	55-75	0-30	1-7
	4-8	Clay, silty clay	CH, CL	A-7	0	0	80-100	75-100	65-95	60-90	45-62	20-32
	8-61	Clay	CH, CL	A-7	0	0	80-100	75-100	65-95	60-90	45-65	22-34
TrF:												
Talbott---------	0-7	Loam	ML	A-4	0	0-5	95-100	90-100	80-95	55-75	0-30	1-7
	7-26	Clay, silty clay	CH, CL	A-7	0	0-10	95-100	90-100	85-95	80-95	41-80	20-45
	26-33	Clay, silty clay	CH, CL	A-7	0	0-10	95-100	90-100	85-95	80-95	41-80	20-45
	33-40	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock			---	---	---	---	---	---	---	---

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
VsE:												
Varilla---------	0-7	Very stony sandy loam	SC, SC-SM, SM	A-2, A-4, A-6	---	20-40	70-90	70-90	50-80	25-50	0-30	NP-15
	7-44	Very cobbly fine sandy loam, very gravelly fine sandy loam, very gravelly loam	SC, SM, SC-SM	A-4, A-2, A-6	---	20-40	70-90	70-90	50-80	25-50	0-30	NP-15
	44-60	Extremely cobbly fine sandy loam, extremely cobbly loamy sand, extremely gravelly loamy sand	GM, GC-GM, SC-SM, SM	A-2	---	30-50	60-80	55-80	50-70	10-35	0-25	NP-10
Shelocta--------	0-3	Loam	CL-ML, ML	A-4	0-2	0-5	80-95	75-95	60-95	55-90	0-35	NP-10
	3-50	Silty clay loam, silt loam, channery silty clay loam	CL, CL-ML, SC, GC	A-4, A-6	0-5	0-10	55-95	50-95	45-95	40-90	25-40	4-15
	50-60	Channery silt loam, channery silty clay loam, very channery clay loam	GC, CL, GM, ML	A-2, A-1-b, A-4, A-6	0-10	0-15	40-85	35-70	25-70	20-65	20-40	3-20
W:												
Water.												
WaC:												
Waynesboro------	0-9	Loam	CL-ML, ML, CL, SM	A-4	0	0-5	85-100	80-100	70-95	43-70	18-30	2-9
	9-42	Clay loam, loam, sandy clay loam	CL, SC	A-4, A-6, A-7	0	0-5	90-100	85-100	75-95	45-75	30-41	9-17
	42-61	Clay loam, sandy clay, clay	CL, ML, MH	A-4, A-6, A-7	0	0-5	90-100	80-100	70-98	55-75	35-68	9-32

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
WaD2:												
Waynesboro------	0-9	Loam	CL-ML, ML, CL, SM	A-4	0	0-5	85-100	80-100	70-95	43-70	18-30	2-9
	9-42	Clay loam, loam, sandy clay loam	CL, SC	A-4, A-6, A-7	0	0-5	90-100	85-100	75-95	45-75	30-41	9-17
	42-61	Clay loam, sandy clay, clay	CL, ML, MH	A-4, A-7, A-6	0	0-5	90-100	80-100	70-98	55-75	35-68	9-32
WaD3:												
Waynesboro------	0-6	Clay loam	CL-ML, CL, ML, SM	A-4	0	0-5	85-100	80-100	70-95	43-70	18-30	2-9
	6-42	Clay loam, loam, sandy clay loam	CL, SC	A-4, A-6, A-7	0	0-5	90-100	85-100	75-95	45-75	30-41	9-17
	42-61	Clay loam, sandy clay, clay	CL, MH, ML	A-4, A-7, A-6	0	0-5	90-100	80-100	70-98	55-75	35-68	9-32
WhA:												
Whitwell--------	0-7	Loam	CL, CL-ML, ML	A-4	---	0-3	80-100	75-100	70-100	55-95	18-28	3-10
	7-60	Clay loam, loam, silt loam	CL, SC, CL-ML, ML	A-4, A-6	---	0-3	80-100	75-100	60-90	40-80	18-35	3-15
WhB:												
Whitwell--------	0-7	Loam	CL, ML, CL-ML	A-4	---	0-3	80-100	75-100	70-100	55-95	18-28	3-10
	7-60	Clay loam, loam, silt loam	CL-ML, CL, ML, SC	A-4, A-6	---	0-3	80-100	75-100	60-90	40-80	18-35	3-15

Table 15.--Physical Properties of the Soils

(Entries under "Erosion factors--T" apply to the entire profile. Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability (K_{sat})	Available water capacity	Linear extensibility	Organic matter	Erosion factors		
								Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	Pct			
At:										
Atkins	0-10	15-25	1.20-1.40	0.60-2.00	0.14-0.22	0.0-2.9	2.0-4.0	.28	.28	5
	10-52	18-35	1.20-1.50	0.06-2.00	0.14-0.18	0.0-2.9	---	.32	.32	
	52-60	10-35	1.20-1.50	0.20-6.00	0.08-0.18	0.0-2.9	---	.28	.32	
BaE:										
Barfield	0-4	35-55	1.30-1.50	0.20-0.60	0.10-0.15	3.0-5.9	2.0-4.0	.24	.24	1
	4-14	35-55	1.30-1.50	0.20-0.60	0.09-0.14	6.0-8.9	1.0-3.0	.17	.20	
	14-20	---	---	---	---	---	---	---	---	
Ashwood	0-6	22-40	1.20-1.40	0.60-2.00	0.14-0.18	3.0-5.9	2.0-5.0	.28	.32	2
	6-37	40-60	1.30-1.45	0.20-0.60	0.12-0.15	6.0-8.9	1.0-2.0	.24	.24	
	37-40	---	---	0.00-0.06	---	---	---	---	---	
Rock outcrop	0-60	---	---	0.06-6.00	---	---	---	---	---	---
Be:										
Beason	0-4	22-35	1.35-1.55	0.60-2.00	0.17-0.20	0.0-2.9	1.0-3.0	.37	.37	5
	4-13	26-40	1.40-1.60	0.60-2.00	0.17-0.20	0.0-2.9	0.5-1.0	.32	.32	
	13-38	35-45	1.45-1.65	0.20-0.60	0.14-0.18	0.0-2.9	0.0-0.5	.32	.32	
	38-60	---	---	0.06-0.60	---	---	0.0-0.5	---	---	
BM:										
Bethesda	0-23	18-27	1.40-1.55	0.60-2.00	0.10-0.16	0.0-2.9	0.0-0.5	.28	.49	5
	23-60	18-35	1.60-1.90	0.20-0.60	0.04-0.10	0.0-2.9	0.0-0.3	.32	.64	
Mine pits.										
Bo:										
Bonair	0-10	10-25	1.30-1.45	0.60-2.00	0.17-0.20	0.0-2.9	2.0-4.0	.37	.37	3
	10-36	18-27	1.30-1.45	0.60-2.00	0.17-0.20	0.0-2.9	0.0-0.5	.37	.37	
	36-60	10-25	1.30-1.45	0.60-2.00	0.12-0.20	0.0-2.9	0.0-0.5	.37	.37	
Ea:										
Ealy	0-10	5-18	1.40-1.60	2.00-6.00	0.14-0.18	0.0-2.9	1.0-3.0	.32	.32	5
	10-60	5-18	1.40-1.65	2.00-6.00	0.12-0.18	0.0-2.9	0.5-1.0	.32	.32	
EcB:										
Ealy	0-10	5-18	1.40-1.60	2.00-6.00	0.14-0.18	0.0-2.9	1.0-3.0	.32	.32	5
	10-60	5-18	1.40-1.65	2.00-6.00	0.12-0.18	0.0-2.9	0.5-1.0	.32	.32	
Craigsville	0-3	5-15	1.20-1.40	2.00-20.00	0.07-0.15	0.0-2.9	1.0-3.0	.20	.24	3
	3-21	5-15	1.30-1.60	2.00-20.00	0.06-0.15	0.0-2.9	0.0-0.5	.17	.28	
	21-60	5-10	1.35-1.55	6.00-20.00	0.04-0.09	0.0-2.9	0.0-0.5	.17	.28	
EtB:										
Etowah	0-7	15-27	1.30-1.45	0.60-2.00	0.15-0.20	0.0-2.9	1.0-3.0	.37	.37	5
	7-48	23-35	1.35-1.50	0.60-2.00	0.16-0.20	0.0-2.9	0.0-0.5	.32	.32	
	48-61	32-45	1.40-1.55	0.60-2.00	0.16-0.20	0.0-2.9	0.0-0.5	.32	.32	
EtC:										
Etowah	0-7	15-27	1.30-1.45	0.60-2.00	0.15-0.20	0.0-2.9	1.0-3.0	.37	.37	5
	7-48	23-35	1.35-1.50	0.60-2.00	0.16-0.20	0.0-2.9	0.0-0.5	.32	.32	
	48-61	32-45	1.40-1.55	0.60-2.00	0.16-0.20	0.0-2.9	0.0-0.5	.32	.32	
EtD2:										
Etowah	0-7	15-27	1.30-1.45	0.60-2.00	0.15-0.20	0.0-2.9	1.0-3.0	.37	.37	5
	7-48	23-35	1.35-1.50	0.60-2.00	0.16-0.20	0.0-2.9	0.0-0.5	.32	.32	
	48-61	32-45	1.40-1.55	0.60-2.00	0.16-0.20	0.0-2.9	0.0-0.5	.32	.32	

Table 15.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability (K_{sat})	Available water capacity	Linear extensibility	Organic matter	Erosion factors		
								Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	Pct			
FuE:										
Fullerton	0-12	15-27	1.45-1.55	0.60-2.00	0.10-0.16	0.0-2.9	0.5-2.0	.28	.32	5
	12-65	40-70	1.45-1.55	0.60-2.00	0.10-0.14	3.0-5.9	0.0-0.5	.20	.24	
GpC:										
Gilpin	0-5	15-27	1.20-1.40	0.60-2.00	0.12-0.18	0.0-2.9	0.5-4.0	.32	.32	3
	5-34	18-35	1.20-1.50	0.60-2.00	0.12-0.16	0.0-2.9	---	.24	.28	
	34-38	18-45	1.20-1.50	0.60-2.00	0.08-0.12	0.0-2.9	---	.24	.32	
	38-50	---	---	0.20-2.00	---	---	---	---	---	
GpD:										
Gilpin	0-5	15-27	1.20-1.40	0.60-2.00	0.12-0.18	0.0-2.9	0.5-4.0	.32	.32	3
	5-34	18-35	1.20-1.50	0.60-2.00	0.12-0.16	0.0-2.9	---	.24	.28	
	34-38	18-45	1.20-1.50	0.60-2.00	0.08-0.12	0.0-2.9	---	.24	.32	
	38-50	---	---	0.20-2.00	---	---	---	---	---	
GpF:										
Gilpin	0-5	15-27	1.20-1.40	0.60-2.00	0.12-0.18	0.0-2.9	0.5-4.0	.32	.32	3
	5-34	18-35	1.20-1.50	0.60-2.00	0.12-0.16	0.0-2.9	---	.24	.28	
	34-38	18-45	1.20-1.50	0.60-2.00	0.08-0.12	0.0-2.9	---	.24	.32	
	38-50	---	---	0.20-2.00	---	---	---	---	---	
HaD:										
Hayter	0-7	10-25	1.25-1.55	2.00-6.00	0.10-0.16	0.0-2.9	1.0-3.0	.28	.28	4
	7-40	20-35	1.30-1.60	2.00-6.00	0.11-0.19	3.0-5.9	0.0-0.5	.28	.28	
	40-60	15-27	1.30-1.60	2.00-6.00	0.06-0.10	0.0-2.9	0.0-0.5	.17	.24	
HaE:										
Hayter	0-7	10-25	1.25-1.55	2.00-6.00	0.10-0.16	0.0-2.9	1.0-3.0	.28	.28	4
	7-40	20-35	1.30-1.60	2.00-6.00	0.11-0.19	3.0-5.9	0.0-0.5	.28	.28	
	40-60	15-27	1.30-1.60	2.00-6.00	0.06-0.10	0.0-2.9	0.0-0.5	.17	.24	
HeB:										
Hendon	0-16	12-25	1.30-1.45	0.60-2.00	0.17-0.21	0.0-2.9	1.0-3.0	.37	.37	5
	16-23	18-32	1.35-1.45	0.60-2.00	0.16-0.20	0.0-2.9	---	.37	.37	
	23-29	18-35	1.45-1.60	0.20-0.60	0.13-0.17	0.0-2.9	---	.32	.32	
	29-61	20-35	1.45-1.55	0.60-2.00	0.13-0.17	0.0-2.9	---	.32	.32	
HeC:										
Hendon	0-16	12-25	1.30-1.45	0.60-2.00	0.17-0.21	0.0-2.9	1.0-3.0	.37	.37	5
	16-23	18-32	1.35-1.45	0.60-2.00	0.16-0.20	0.0-2.9	---	.37	.37	
	23-29	18-35	1.45-1.60	0.20-0.60	0.13-0.17	0.0-2.9	---	.32	.32	
	29-61	20-35	1.45-1.55	0.60-2.00	0.13-0.17	0.0-2.9	---	.32	.32	
JeC:										
Jefferson	0-7	10-25	1.30-1.50	2.00-6.00	0.10-0.16	0.0-2.9	0.5-5.0	.17	.28	5
	7-56	18-34	1.30-1.65	2.00-6.00	0.10-0.16	0.0-2.9	---	.17	.24	
	56-60	15-30	1.30-1.65	2.00-6.00	0.08-0.14	0.0-2.9	---	.17	.24	
JeD:										
Jefferson	0-7	10-25	1.30-1.50	2.00-6.00	0.10-0.16	0.0-2.9	0.5-5.0	.17	.28	5
	7-56	18-34	1.30-1.65	2.00-6.00	0.10-0.16	0.0-2.9	---	.17	.24	
	56-60	15-30	1.30-1.65	2.00-6.00	0.08-0.14	0.0-2.9	---	.17	.24	
JnD:										
Jefferson	0-7	10-25	1.30-1.50	2.00-6.00	0.10-0.16	0.0-2.9	0.5-5.0	.28	.24	5
	7-56	18-34	1.30-1.65	2.00-6.00	0.10-0.16	0.0-2.9	---	.28	.32	
	56-60	15-30	1.30-1.65	2.00-6.00	0.08-0.14	0.0-2.9	---	.17	.24	
JnF:										
Jefferson	0-7	10-25	1.30-1.50	2.00-6.00	0.10-0.16	0.0-2.9	0.5-5.0	.28	.24	5
	7-56	18-34	1.30-1.65	2.00-6.00	0.10-0.16	0.0-2.9	---	.28	.32	
	56-60	15-30	1.30-1.65	2.00-6.00	0.08-0.14	0.0-2.9	---	.17	.24	
JsD:										
Jefferson	0-7	10-25	1.30-1.50	2.00-6.00	0.10-0.16	0.0-2.9	0.5-5.0	.17	.28	5
	7-56	18-34	1.30-1.65	2.00-6.00	0.10-0.16	0.0-2.9	---	.17	.24	
	56-60	15-30	1.30-1.65	2.00-6.00	0.08-0.14	0.0-2.9	---	.17	.24	

Table 15.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability (K_{sat})	Available water capacity	Linear extensibility	Organic matter	Erosion factors		
								Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	Pct			
JsD:										
Shelocta	0-3	10-25	1.15-1.30	0.60-2.00	0.16-0.22	0.0-2.9	0.5-5.0	.32	.32	3
	3-50	18-34	1.30-1.55	0.60-2.00	0.10-0.20	0.0-2.9	0.5-2.0	.28	.32	
	50-60	15-34	1.30-1.55	0.60-6.00	0.08-0.16	0.0-2.9	0.0-0.5	.17	.28	
JsF:										
Jefferson	0-7	10-25	1.30-1.50	2.00-6.00	0.10-0.16	0.0-2.9	0.5-5.0	.17	.28	5
	7-56	18-34	1.30-1.65	2.00-6.00	0.10-0.16	0.0-2.9	---	.17	.24	
	56-60	15-30	1.30-1.65	2.00-6.00	0.08-0.14	0.0-2.9	---	.17	.24	
Shelocta	0-3	10-25	1.15-1.30	0.60-2.00	0.16-0.22	0.0-2.9	0.5-5.0	.32	.32	3
	3-50	18-34	1.30-1.55	0.60-2.00	0.10-0.20	0.0-2.9	0.5-2.0	.28	.32	
	50-60	15-34	1.30-1.55	0.60-6.00	0.08-0.16	0.0-2.9	0.0-0.5	.17	.28	
JvD:										
Jefferson	0-7	10-25	1.30-1.50	2.00-6.00	0.10-0.16	0.0-2.9	0.5-5.0	.17	.28	5
	7-56	18-34	1.30-1.65	2.00-6.00	0.10-0.16	0.0-2.9	---	.17	.24	
	56-60	15-30	1.30-1.65	2.00-6.00	0.08-0.14	0.0-2.9	---	.17	.24	
Varilla	0-7	3-20	1.00-1.40	2.00-6.00	0.10-0.13	0.0-2.9	1.0-6.0	.10	.28	3
	7-44	3-20	1.45-1.65	2.00-6.00	0.05-0.10	0.0-2.9	---	.10	.24	
	44-60	3-20	1.45-1.65	2.00-20.00	0.01-0.05	0.0-2.9	---	.10	.20	
Shelocta	0-3	10-25	1.15-1.30	0.60-2.00	0.16-0.22	0.0-2.9	0.5-5.0	.32	.32	3
	3-50	18-34	1.30-1.55	0.60-2.00	0.10-0.20	0.0-2.9	0.5-2.0	.28	.32	
	50-60	15-34	1.30-1.55	0.60-6.00	0.08-0.16	0.0-2.9	0.0-0.5	.17	.28	
JvF:										
Jefferson	0-7	10-25	1.30-1.50	2.00-6.00	0.10-0.16	0.0-2.9	0.5-5.0	.17	.28	5
	7-56	18-34	1.30-1.65	2.00-6.00	0.10-0.16	0.0-2.9	---	.17	.24	
	56-60	15-30	1.30-1.65	2.00-6.00	0.08-0.14	0.0-2.9	---	.17	.24	
Varilla	0-7	3-20	1.00-1.40	2.00-6.00	0.10-0.13	0.0-2.9	1.0-6.0	.10	.28	3
	7-44	3-20	1.45-1.65	2.00-6.00	0.05-0.10	0.0-2.9	---	.10	.24	
	44-60	3-20	1.45-1.65	2.00-20.00	0.01-0.05	0.0-2.9	---	.10	.20	
Shelocta	0-3	10-25	1.15-1.30	0.60-2.00	0.16-0.22	0.0-2.9	0.5-5.0	.32	.32	3
	3-50	18-34	1.30-1.55	0.60-2.00	0.10-0.20	0.0-2.9	0.5-2.0	.28	.32	
	50-60	15-34	1.30-1.55	0.60-6.00	0.08-0.16	0.0-2.9	0.0-0.5	.17	.28	
LlB:										
Lily	0-2	7-27	1.20-1.40	0.60-6.00	0.13-0.18	0.0-2.9	0.5-4.0	.28	.37	2
	2-31	18-35	1.25-1.35	2.00-6.00	0.12-0.18	0.0-2.9	0.1-0.5	.28	.28	
	31-35	20-35	1.25-1.35	2.00-6.00	0.08-0.17	0.0-2.9	0.1-0.5	.17	.24	
	35-40	---	---	0.00-0.20	---	---	---	---	---	
LlC:										
Lily	0-2	7-27	1.20-1.40	0.60-6.00	0.13-0.18	0.0-2.9	0.5-4.0	.28	.37	2
	2-31	18-35	1.25-1.35	2.00-6.00	0.12-0.18	0.0-2.9	0.1-0.5	.28	.28	
	31-35	20-35	1.25-1.35	2.00-6.00	0.08-0.17	0.0-2.9	0.1-0.5	.17	.24	
	35-40	---	---	0.00-0.20	---	---	---	---	---	
LlD:										
Lily	0-2	7-27	1.20-1.40	0.60-6.00	0.13-0.18	0.0-2.9	0.5-4.0	.28	.37	2
	2-31	18-35	1.25-1.35	2.00-6.00	0.12-0.18	0.0-2.9	0.1-0.5	.28	.28	
	31-35	20-35	1.25-1.35	2.00-6.00	0.08-0.17	0.0-2.9	0.1-0.5	.17	.24	
	35-40	---	---	0.00-0.20	---	---	---	---	---	
LlE:										
Lily	0-2	7-27	1.20-1.40	0.60-6.00	0.13-0.18	0.0-2.9	0.5-4.0	.28	.37	2
	2-31	18-35	1.25-1.35	2.00-6.00	0.12-0.18	0.0-2.9	0.1-0.5	.28	.28	
	31-35	20-35	1.25-1.35	2.00-6.00	0.08-0.17	0.0-2.9	0.1-0.5	.17	.24	
	35-40	---	---	0.00-0.20	---	---	---	---	---	

Table 15.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability (K_{sat})	Available water capacity	Linear extensibility	Organic matter	Erosion factors		
								Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	Pct			
LnC:										
Lily	0-2	7-27	1.20-1.40	0.60-6.00	0.13-0.18	0.0-2.9	0.5-4.0	.28	.37	2
	2-31	18-35	1.25-1.35	2.00-6.00	0.12-0.18	0.0-2.9	0.1-0.5	.28	.28	
	31-35	20-35	1.25-1.35	2.00-6.00	0.08-0.17	0.0-2.9	0.1-0.5	.17	.24	
	35-40	---	---	0.00-0.20	---	---	---	---	---	
Lonewood	0-10	15-25	1.30-1.40	0.60-2.00	0.18-0.20	0.0-2.9	1.0-3.0	.37	.37	3
	10-37	20-39	1.30-1.45	0.60-2.00	0.16-0.18	0.0-2.9	0.0-0.5	.37	.37	
	37-55	25-45	1.40-1.55	0.60-2.00	0.14-0.17	0.0-2.9	0.0-0.5	.32	.32	
	55-72	25-45	1.40-1.55	0.60-2.00	0.05-0.11	0.0-2.9	0.0-0.5	.32	.32	
	72-80	---	---	0.00-0.20	---	---	---	---	---	
LwB:										
Lonewood	0-10	15-25	1.30-1.40	0.60-2.00	0.18-0.20	0.0-2.9	1.0-3.0	.37	.37	3
	10-37	20-39	1.30-1.45	0.60-2.00	0.16-0.18	0.0-2.9	0.0-0.5	.37	.37	
	37-55	25-45	1.40-1.55	0.60-2.00	0.14-0.17	0.0-2.9	0.0-0.5	.32	.32	
	55-72	25-45	1.40-1.55	0.60-2.00	0.05-0.11	0.0-2.9	0.0-0.5	.32	.32	
	72-80	---	---	0.00-0.20	---	---	---	---	---	
LwC:										
Lonewood	0-10	15-25	1.30-1.40	0.60-2.00	0.18-0.20	0.0-2.9	1.0-3.0	.37	.37	3
	10-37	20-39	1.30-1.45	0.60-2.00	0.16-0.18	0.0-2.9	0.0-0.5	.37	.37	
	37-55	25-45	1.40-1.55	0.60-2.00	0.14-0.17	0.0-2.9	0.0-0.5	.32	.32	
	55-72	25-45	1.40-1.55	0.60-2.00	0.05-0.11	0.0-2.9	0.0-0.5	.32	.32	
	72-80	---	---	0.00-0.20	---	---	---	---	---	
MuD:										
Muse	0-5	7-27	1.20-1.40	0.60-2.00	0.16-0.22	0.0-2.9	1.0-3.0	.37	.37	4
	5-47	28-60	1.20-1.65	0.06-0.20	0.10-0.16	3.0-5.9	---	.28	.28	
	47-54	40-60	1.40-1.65	0.06-0.20	0.08-0.14	3.0-5.9	---	.28	.28	
	54-60	---	---	0.00-0.20	---	---	---	---	---	
Pl:										
Pits, limestone quarry	0-60	0-0	---	---	0.00-0.00	---	---	---	---	---
Ps:										
Pits, sandstone quarry	0-60	0-0	---	---	0.00-0.00	---	---	---	---	---
RaC:										
Ramsey	0-2	8-25	1.25-1.50	6.00-20.00	0.09-0.12	0.0-2.9	---	.20	.20	1
	2-18	8-25	1.20-1.40	6.00-20.00	0.09-0.12	0.0-2.9	---	.17	.20	
	18-25	---	---	0.00-0.20	---	---	---	---	---	
RaD:										
Ramsey	0-2	8-25	1.25-1.50	6.00-20.00	0.09-0.12	0.0-2.9	---	.20	.20	1
	2-18	8-25	1.20-1.40	6.00-20.00	0.09-0.12	0.0-2.9	---	.17	.20	
	18-25	---	---	0.00-0.20	---	---	---	---	---	
RaF:										
Ramsey	0-2	8-25	1.25-1.50	6.00-20.00	0.09-0.12	0.0-2.9	---	.20	.20	1
	2-18	8-25	1.20-1.40	6.00-20.00	0.09-0.12	0.0-2.9	---	.17	.20	
	18-25	---	---	0.00-0.20	---	---	---	---	---	
RrC:										
Ramsey	0-2	8-25	1.25-1.50	6.00-20.00	0.09-0.12	0.0-2.9	---	.20	.20	1
	2-18	8-25	1.20-1.40	6.00-20.00	0.09-0.12	0.0-2.9	---	.17	.20	
	18-25	---	---	0.00-0.20	---	---	---	---	---	
Rock outcrop	0-60	---	---	0.06-6.00	---	---	---	---	---	---
RrD:										
Ramsey	0-2	8-25	1.25-1.50	6.00-20.00	0.09-0.12	0.0-2.9	---	.20	.20	1
	2-18	8-25	1.20-1.40	6.00-20.00	0.09-0.12	0.0-2.9	---	.17	.20	
	18-25	---	---	0.00-0.20	---	---	---	---	---	
Rock outcrop	0-60	---	---	0.06-6.00	---	---	---	---	---	---

Table 15.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability (K_{sat})	Available water capacity	Linear extensibility	Organic matter	Erosion factors		
								Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	Pct			
RrF:										
Ramsey	0-2	8-25	1.25-1.50	6.00-20.00	0.09-0.12	0.0-2.9	---	.20	.20	1
	2-18	8-25	1.20-1.40	6.00-20.00	0.09-0.12	0.0-2.9	---	.17	.20	
	18-25	---	---	0.00-0.20	---	---	---	---	---	
Rock outcrop	0-60	---	---	0.06-6.00	---	---	---	---	---	---
SeB:										
Sequatchie	0-7	10-25	1.50-1.65	0.60-2.00	0.12-0.18	0.0-2.9	1.0-3.0	.32	.32	5
	7-51	18-30	1.55-1.70	0.60-2.00	0.15-0.20	0.0-2.9	0.0-0.5	.24	.28	
	51-68	12-25	1.55-1.70	0.60-6.00	0.09-0.14	0.0-2.9	0.0-0.5	.24	.24	
Su:										
Sullivan	0-42	18-25	1.30-1.45	0.60-2.00	0.12-0.20	0.0-2.9	1.0-3.0	.32	.32	5
	42-60	15-25	1.30-1.45	0.60-2.00	0.09-0.14	0.0-2.9	0.0-0.5	.32	.32	
TaC:										
Talbott	0-7	15-27	1.35-1.50	0.60-2.00	0.16-0.20	0.0-2.9	0.5-2.0	.37	.37	2
	7-26	40-60	1.30-1.50	0.20-0.60	0.10-0.14	3.0-5.9	0.0-0.5	.24	.24	
	26-33	40-60	1.30-1.50	0.20-0.60	0.09-0.13	3.0-5.9	0.0-0.5	.24	.24	
	33-40	---	---	0.00-0.06	---	---	---	---	---	
TbD:										
Talbott	0-7	15-25	1.35-1.55	0.60-2.00	0.13-0.18	0.0-2.9	0.5-2.0	.32	.32	2
	7-26	40-60	1.30-1.50	0.20-0.60	0.10-0.14	3.0-5.9	0.0-0.5	.24	.24	
	26-33	40-60	1.30-1.50	0.20-0.60	0.09-0.13	3.0-5.9	0.0-0.5	.24	.24	
	33-40	---	---	0.00-0.06	---	---	---	---	---	
Braxton	0-4	15-25	1.35-1.55	0.60-2.00	0.13-0.18	0.0-2.9	0.5-2.0	.32	.32	5
	4-8	40-60	1.25-1.45	0.60-2.00	0.12-0.17	3.0-5.9	0.0-0.5	.20	.20	
	8-61	45-65	1.25-1.45	0.20-0.60	0.10-0.15	3.0-5.9	0.0-0.5	.20	.20	
Rock outcrop	0-60	---	---	0.06-6.00	---	---	---	---	---	---
ToE:										
Talbott	0-7	15-25	1.35-1.55	0.60-2.00	0.13-0.18	0.0-2.9	0.5-2.0	.32	.32	2
	7-26	40-60	1.30-1.50	0.20-0.60	0.10-0.14	3.0-5.9	0.0-0.5	.24	.24	
	26-33	40-60	1.30-1.50	0.20-0.60	0.09-0.13	3.0-5.9	0.0-0.5	.24	.24	
	33-40	---	---	0.00-0.06	---	---	---	---	---	
Rock outcrop	0-60	---	---	0.06-6.00	---	---	---	---	---	---
Braxton	0-4	15-25	1.35-1.55	0.60-2.00	0.13-0.18	0.0-2.9	0.5-2.0	.32	.32	5
	4-8	40-60	1.25-1.45	0.60-2.00	0.12-0.17	3.0-5.9	0.0-0.5	.20	.20	
	8-61	45-65	1.25-1.45	0.20-0.60	0.10-0.15	3.0-5.9	0.0-0.5	.20	.20	
TrF:										
Talbott	0-7	15-25	1.35-1.55	0.60-2.00	0.13-0.18	0.0-2.9	0.5-2.0	.32	.32	2
	7-26	40-60	1.30-1.50	0.20-0.60	0.10-0.14	3.0-5.9	0.0-0.5	.24	.24	
	26-33	40-60	1.30-1.50	0.20-0.60	0.09-0.13	3.0-5.9	0.0-0.5	.24	.24	
	33-40	---	---	0.00-0.06	---	---	---	---	---	
Rock outcrop	0-60	---	---	0.06-6.00	---	---	---	---	---	---
VsE:										
Varilla	0-7	3-20	1.00-1.40	2.00-6.00	0.10-0.13	0.0-2.9	1.0-6.0	.10	.28	3
	7-44	3-20	1.45-1.65	2.00-6.00	0.05-0.10	0.0-2.9	---	.10	.24	
	44-60	3-20	1.45-1.65	2.00-20.00	0.01-0.05	0.0-2.9	---	.10	.20	
Shelocta	0-3	10-25	1.15-1.30	0.60-2.00	0.16-0.22	0.0-2.9	0.5-5.0	.32	.32	3
	3-50	18-34	1.30-1.55	0.60-2.00	0.10-0.20	0.0-2.9	0.5-2.0	.28	.32	
	50-60	15-34	1.30-1.55	0.60-6.00	0.08-0.16	0.0-2.9	0.0-0.5	.17	.28	

Table 15.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability (K_{sat})	Available water capacity	Linear extensibility	Organic matter	Erosion factors		
								Kw	Kf	T
	In	Pct	g/cc	In/hr	In/in	Pct	Pct			
W:										
Water.										
WaC:										
Waynesboro	0-9	10-30	1.40-1.55	0.60-2.00	0.15-0.21	0.0-2.9	0.5-2.0	.28	.28	5
	9-42	23-35	1.40-1.55	0.60-2.00	0.14-0.20	0.0-2.9	0.5-2.0	.28	.28	
	42-61	35-50	1.40-1.55	0.60-2.00	0.13-0.18	0.0-2.9	0.5-2.0	.28	.28	
WaD2:										
Waynesboro	0-9	10-30	1.40-1.55	0.60-2.00	0.15-0.21	0.0-2.9	0.5-2.0	.28	.28	5
	9-42	23-35	1.40-1.55	0.60-2.00	0.14-0.20	0.0-2.9	0.5-2.0	.28	.28	
	42-61	35-50	1.40-1.55	0.60-2.00	0.13-0.18	0.0-2.9	0.5-2.0	.28	.28	
WaD3:										
Waynesboro	0-6	10-30	1.40-1.55	0.60-2.00	0.15-0.21	0.0-2.9	0.5-2.0	.28	.28	5
	6-42	23-35	1.40-1.55	0.60-2.00	0.14-0.20	0.0-2.9	0.5-2.0	.28	.28	
	42-61	35-50	1.40-1.55	0.60-2.00	0.13-0.18	0.0-2.9	0.5-2.0	.28	.28	
WhA:										
Whitwell	0-7	10-25	1.35-1.55	0.60-2.00	0.15-0.20	0.0-2.9	1.0-3.0	.32	.24	5
	7-60	18-32	1.40-1.70	0.60-2.00	0.14-0.20	0.0-2.9	---	.32	.32	
WhB:										
Whitwell	0-7	10-25	1.35-1.55	0.60-2.00	0.15-0.20	0.0-2.9	1.0-3.0	.32	.24	5
	7-60	18-32	1.40-1.70	0.60-2.00	0.14-0.20	0.0-2.9	---	.32	.32	

Table 16.--Chemical Properties of the Soils

(Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction
	In	meq/100 g	meq/100 g	pH
At:				
Atkins	0-10	---	---	4.5-5.5
	10-52	---	---	4.5-5.5
	52-60	---	---	4.5-5.5
BaE:				
Barfield	0-4	---	---	6.1-7.8
	4-14	---	---	6.1-7.8
	14-20	---	---	---
Ashwood	0-6	25-35	---	5.6-7.8
	6-37	35-50	---	5.6-7.8
	37-40	---	---	---
Rock outcrop	0-60	---	---	---
Be:				
Beason	0-4	---	---	4.5-6.0
	4-13	---	---	4.5-5.5
	13-38	---	---	4.5-5.5
	38-60	---	---	---
BM:				
Bethesda	0-23	---	7.0-16	3.6-5.5
	23-60	---	7.0-20	3.6-5.5
Mine pits.				
Bo:				
Bonair	0-10	---	---	4.5-5.5
	10-36	---	---	4.5-5.5
	36-60	---	---	4.5-5.5
Ea:				
Ealy	0-10	---	---	4.5-5.5
	10-60	---	---	4.5-5.5
EcB:				
Ealy	0-10	---	---	4.5-5.5
	10-60	---	---	4.5-5.5
Craigsville	0-3	---	---	4.5-5.5
	3-21	---	---	4.5-5.5
	21-60	---	---	4.5-5.5
EtB:				
Etowah	0-7	---	---	4.5-5.5
	7-48	---	---	4.5-5.5
	48-61	---	---	4.5-5.5
EtC:				
Etowah	0-7	---	---	4.5-5.5
	7-48	---	---	4.5-5.5
	48-61	---	---	4.5-5.5
EtD2:				
Etowah	0-7	---	---	4.5-5.5
	7-48	---	---	4.5-5.5
	48-61	---	---	4.5-5.5

Table 16.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction
	In	meq/100 g	meq/100 g	pH
FuE:				
Fullerton	0-12	---	---	4.5-5.5
	12-65	---	---	4.5-5.5
GpC:				
Gilpin	0-5	---	---	3.6-5.5
	5-34	---	---	3.6-5.5
	34-38	---	---	3.6-5.5
	38-50	---	---	---
GpD:				
Gilpin	0-5	---	---	3.6-5.5
	5-34	---	---	3.6-5.5
	34-38	---	---	3.6-5.5
	38-50	---	---	---
GpF:				
Gilpin	0-5	---	---	3.6-5.5
	5-34	---	---	3.6-5.5
	34-38	---	---	3.6-5.5
	38-50	---	---	---
HaD:				
Hayter	0-7	---	---	5.1-6.5
	7-40	---	---	5.1-6.5
	40-60	---	---	5.1-6.5
HaE:				
Hayter	0-7	---	---	5.1-6.5
	7-40	---	---	5.1-6.5
	40-60	---	---	5.1-6.5
HeB:				
Hendon	0-16	---	---	4.5-5.5
	16-23	---	---	4.5-5.5
	23-29	---	---	4.5-5.5
	29-61	---	---	4.5-5.5
HeC:				
Hendon	0-16	---	---	4.5-5.5
	16-23	---	---	4.5-5.5
	23-29	---	---	4.5-5.5
	29-61	---	---	4.5-5.5
JeC:				
Jefferson	0-7	---	---	4.5-5.5
	7-56	---	---	4.5-5.5
	56-60	---	---	4.5-5.5
JeD:				
Jefferson	0-7	---	---	4.5-5.5
	7-56	---	---	4.5-5.5
	56-60	---	---	4.5-5.5
JnD:				
Jefferson	0-7	---	---	4.5-5.5
	7-56	---	---	4.5-5.5
	56-60	---	---	4.5-5.5

Table 16.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction
	In	meq/100 g	meq/100 g	pH
JnF:				
Jefferson	0-7	---	---	4.5-5.5
	7-56	---	---	4.5-5.5
	56-60	---	---	4.5-5.5
JsD:				
Jefferson	0-7	---	---	4.5-5.5
	7-56	---	---	4.5-5.5
	56-60	---	---	4.5-5.5
Shelocta	0-3	---	5.0-16	4.5-5.5
	3-50	---	3.0-15	4.5-5.5
	50-60	---	5.0-20	4.5-5.5
JsF:				
Jefferson	0-7	---	---	4.5-5.5
	7-56	---	---	4.5-5.5
	56-60	---	---	4.5-5.5
Shelocta	0-3	---	5.0-16	4.5-5.5
	3-50	---	3.0-15	4.5-5.5
	50-60	---	5.0-20	4.5-5.5
JvD:				
Jefferson	0-7	---	---	4.5-5.5
	7-56	---	---	4.5-5.5
	56-60	---	---	4.5-5.5
Varilla	0-7	---	---	3.6-6.5
	7-44	---	---	3.6-5.5
	44-60	---	---	3.6-5.5
Shelocta	0-3	---	5.0-16	4.5-5.5
	3-50	---	3.0-15	4.5-5.5
	50-60	---	5.0-20	4.5-5.5
JvF:				
Jefferson	0-7	---	---	4.5-5.5
	7-56	---	---	4.5-5.5
	56-60	---	---	4.5-5.5
Varilla	0-7	---	---	3.6-6.5
	7-44	---	---	3.6-5.5
	44-60	---	---	3.6-5.5
Shelocta	0-3	---	5.0-16	4.5-5.5
	3-50	---	3.0-15	4.5-5.5
	50-60	---	5.0-20	4.5-5.5
LlB:				
Lily	0-2	---	10-45	3.6-5.5
	2-31	---	5.0-50	3.6-5.5
	31-35	---	5.0-50	3.6-5.5
	35-40	---	---	---
LlC:				
Lily	0-2	---	10-45	3.6-5.5
	2-31	---	5.0-50	3.6-5.5
	31-35	---	5.0-50	3.6-5.5
	35-40	---	---	---

Table 16.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction
	In	meq/100 g	meq/100 g	pH
LlD:				
Lily	0-2	---	10-45	3.6-5.5
	2-31	---	5.0-50	3.6-5.5
	31-35	---	5.0-50	3.6-5.5
	35-40	---	---	---
LlE:				
Lily	0-2	---	10-45	3.6-5.5
	2-31	---	5.0-50	3.6-5.5
	31-35	---	5.0-50	3.6-5.5
	35-40	---	---	---
LnC:				
Lily	0-2	---	10-45	3.6-5.5
	2-31	---	5.0-50	3.6-5.5
	31-35	---	5.0-50	3.6-5.5
	35-40	---	---	---
Lonewood	0-10	---	---	4.5-5.5
	10-37	---	---	4.5-5.5
	37-55	---	---	4.5-5.5
	55-72	---	---	4.5-5.5
	72-80	---	---	---
LwB:				
Lonewood	0-10	---	---	4.5-5.5
	10-37	---	---	4.5-5.5
	37-55	---	---	4.5-5.5
	55-72	---	---	4.5-5.5
	72-80	---	---	---
LwC:				
Lonewood	0-10	---	---	4.5-5.5
	10-37	---	---	4.5-5.5
	37-55	---	---	4.5-5.5
	55-72	---	---	4.5-5.5
	72-80	---	---	---
MuD:				
Muse	0-5	---	---	4.5-5.5
	5-47	---	---	4.5-5.5
	47-54	---	---	4.5-5.5
	54-60	---	---	---
Pl:				
Pits, limestone quarry	0-60	---	---	---
Ps:				
Pits, sandstone quarry	0-60	---	---	---
RaC:				
Ramsey	0-2	---	---	4.5-5.5
	2-18	---	---	4.5-5.5
	18-25	---	---	---
RaD:				
Ramsey	0-2	---	---	4.5-5.5
	2-18	---	---	4.5-5.5
	18-25	---	---	---

Table 16.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction
	In	meq/100 g	meq/100 g	pH
RaF:				
Ramsey	0-2	---	---	4.5-5.5
	2-18	---	---	4.5-5.5
	18-25	---	---	---
RrC:				
Ramsey	0-2	---	---	4.5-5.5
	2-18	---	---	4.5-5.5
	18-25	---	---	---
Rock outcrop	0-60	---	---	---
RrD:				
Ramsey	0-2	---	---	4.5-5.5
	2-18	---	---	4.5-5.5
	18-25	---	---	---
Rock outcrop	0-60	---	---	---
RrF:				
Ramsey	0-2	---	---	4.5-5.5
	2-18	---	---	4.5-5.5
	18-25	---	---	---
Rock outcrop	0-60	---	---	---
SeB:				
Sequatchie	0-7	---	---	4.5-5.5
	7-51	---	---	4.5-5.5
	51-68	---	---	4.5-5.5
Su:				
Sullivan	0-42	---	---	5.1-7.3
	42-60	---	---	5.1-7.3
TaC:				
Talbott	0-7	---	---	5.1-6.5
	7-26	---	---	5.1-6.5
	26-33	---	---	6.1-7.8
	33-40	---	---	---
TbD:				
Talbott	0-7	---	---	5.1-6.5
	7-26	---	---	5.1-6.5
	26-33	---	---	6.1-7.8
	33-40	---	---	---
Braxton	0-4	---	---	5.1-6.0
	4-8	---	---	5.1-6.0
	8-61	---	---	5.1-6.5
Rock outcrop	0-60	---	---	---
ToE:				
Talbott	0-7	---	---	5.1-6.5
	7-26	---	---	5.1-6.5
	26-33	---	---	6.1-7.8
	33-40	---	---	---
Rock outcrop	0-60	---	---	---

Table 16.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction
	In	meq/100 g	meq/100 g	pH
ToE:				
Braxton	0-4	---	---	5.1-6.0
	4-8	---	---	5.1-6.0
	8-61	---	---	5.1-6.5
TrF:				
Talbott	0-7	---	---	5.1-6.5
	7-26	---	---	5.1-6.5
	26-33	---	---	6.1-7.8
	33-40	---	---	---
Rock outcrop	0-60	---	---	---
VsE:				
Varilla	0-7	---	---	3.6-6.5
	7-44	---	---	3.6-5.5
	44-60	---	---	3.6-5.5
Shelocta	0-3	---	5.0-16	4.5-5.5
	3-50	---	3.0-15	4.5-5.5
	50-60	---	5.0-20	4.5-5.5
W:				
Water.				
WaC:				
Waynesboro	0-9	---	5.0-12	4.5-5.5
	9-42	---	5.0-10	4.5-5.5
	42-61	---	8.0-15	4.5-5.5
WaD2:				
Waynesboro	0-9	---	5.0-12	4.5-5.5
	9-42	---	5.0-10	4.5-5.5
	42-61	---	8.0-15	4.5-5.5
WaD3:				
Waynesboro	0-6	---	5.0-12	4.5-5.5
	6-42	---	5.0-10	4.5-5.5
	42-61	---	8.0-15	4.5-5.5
WhA:				
Whitwell	0-7	---	---	4.5-6.0
	7-60	---	---	4.5-5.5
WhB:				
Whitwell	0-7	---	---	4.5-6.0
	7-60	---	---	4.5-5.5

Table 17.--Water Features

(Depths of layers are in feet. See text for definitions of terms used in this table. Estimates of the frequency of ponding and flooding apply to the whole year rather than to individual months. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Hydrologic group	Month	Water table		Flooding	
			Upper limit	Lower limit	Duration	Frequency
			Ft	Ft		
At:						
Atkins	D	January	0.0-1.0	>6.0	Very brief	Frequent
		February	0.0-1.0	>6.0	Very brief	Frequent
		March	0.0-1.0	>6.0	Very brief	Frequent
		April	0.0-1.0	>6.0	Very brief	Frequent
		May	0.0-1.0	>6.0	Very brief	Frequent
		June	0.0-1.0	>6.0	Very brief	Frequent
		July	---	---	Very brief	Frequent
		September	---	---	Very brief	Frequent
		October	---	---	Very brief	Frequent
		November	0.0-1.0	>6.0	Very brief	Frequent
		December	0.0-1.0	>6.0	Very brief	Frequent
BaE:						
Barfield	D	Jan-Dec	---	---	---	None
Ashwood	C	Jan-Dec	---	---	---	None
Rock outcrop	D	Jan-Dec	---	---	---	None
Be:						
Beason	C	January	1.0-2.0	>6.0	Very brief	Occasional
		February	1.0-2.0	>6.0	Very brief	Occasional
		March	1.0-2.0	>6.0	Very brief	Occasional
		April	1.0-2.0	>6.0	Very brief	Occasional
		December	1.0-2.0	>6.0	Very brief	Occasional
BM:						
Bethesda	C	Jan-Dec	---	---	---	None
Mine pits	---	Jan-Dec	---	---	---	None
Bo:						
Bonair	D	January	0.0-1.0	>6.0	Very brief	Occasional
		February	0.0-1.0	>6.0	Very brief	Occasional
		March	0.0-1.0	>6.0	Very brief	Occasional
		April	0.0-1.0	>6.0	Very brief	Occasional
Ea:						
Ealy	B	January	5.0-6.0	>6.0	Very brief	Occasional
		February	5.0-6.0	>6.0	Very brief	Occasional
		March	5.0-6.0	>6.0	Very brief	Occasional
		December	5.0-6.0	>6.0	---	None
EcB:						
Ealy	B	January	5.0-6.0	>6.0	Very brief	Occasional
		February	5.0-6.0	>6.0	Very brief	Occasional
		March	5.0-6.0	>6.0	Very brief	Occasional
		December	5.0-6.0	>6.0	---	None
Craigsville	B	January	---	---	---	Rare
		February	---	---	---	Rare
		March	---	---	---	Rare
		April	---	---	---	Rare
		May	---	---	---	Rare
		November	---	---	---	Rare
		December	---	---	---	Rare

Table 17.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Water table		Flooding	
			Upper limit	Lower limit	Duration	Frequency
			Ft	Ft		
EtB:						
Etowah	B	Jan-Dec	---	---	---	None
EtC:						
Etowah	B	Jan-Dec	---	---	---	None
EtD2:						
Etowah	B	Jan-Dec	---	---	---	None
FuE:						
Fullerton	B	Jan-Dec	---	---	---	None
GpC:						
Gilpin	C	Jan-Dec	---	---	---	None
GpD:						
Gilpin	C	Jan-Dec	---	---	---	None
GpF:						
Gilpin	C	Jan-Dec	---	---	---	None
HaD:						
Hayter	B	Jan-Dec	---	---	---	None
HaE:						
Hayter	B	Jan-Dec	---	---	---	None
HeB:						
Hendon	C	Jan-Dec	---	---	---	None
HeC:						
Hendon	C	Jan-Dec	---	---	---	None
JeC:						
Jefferson	B	Jan-Dec	---	---	---	None
JeD:						
Jefferson	B	Jan-Dec	---	---	---	None
JnD:						
Jefferson	B	Jan-Dec	---	---	---	None
JnF:						
Jefferson	B	Jan-Dec	---	---	---	None
JsD:						
Jefferson	B	Jan-Dec	---	---	---	None
Shelocta	B	Jan-Dec	---	---	---	None
JsF:						
Jefferson	B	Jan-Dec	---	---	---	None
Shelocta	B	Jan-Dec	---	---	---	None
JvD:						
Jefferson	B	Jan-Dec	---	---	---	None
Varilla	B	Jan-Dec	---	---	---	None
Shelocta	B	Jan-Dec	---	---	---	None

Table 17.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Water table		Flooding	
			Upper limit	Lower limit	Duration	Frequency
			Ft	Ft		
JvF:						
Jefferson	B	Jan-Dec	---	---	---	None
Varilla	B	Jan-Dec	---	---	---	None
Shelocta	B	Jan-Dec	---	---	---	None
LlB:						
Lily	B	Jan-Dec	---	---	---	None
LlC:						
Lily	B	Jan-Dec	---	---	---	None
LlD:						
Lily	B	Jan-Dec	---	---	---	None
LlE:						
Lily	B	Jan-Dec	---	---	---	None
LnC:						
Lily	B	Jan-Dec	---	---	---	None
Lonewood	B	Jan-Dec	---	---	---	None
LwB:						
Lonewood	B	Jan-Dec	---	---	---	None
LwC:						
Lonewood	B	Jan-Dec	---	---	---	None
MuD:						
Muse	C	January	4.0	>6.0	---	None
		February	4.0	>6.0	---	None
		March	4.0	>6.0	---	None
		April	4.0	>6.0	---	None
Pl:						
Pits, limestone quarry	---	Jan-Dec	---	---	---	None
Ps:						
Pits, sandstone quarry	---	Jan-Dec	---	---	---	None
RaC:						
Ramsey	D	Jan-Dec	---	---	---	None
RaD:						
Ramsey	D	Jan-Dec	---	---	---	None
RaF:						
Ramsey	D	Jan-Dec	---	---	---	None
RrC:						
Ramsey	D	Jan-Dec	---	---	---	None
Rock outcrop	D	Jan-Dec	---	---	---	None
RrD:						
Ramsey	D	Jan-Dec	---	---	---	None
Rock outcrop	D	Jan-Dec	---	---	---	None

Table 17.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Water table		Flooding	
			Upper limit	Lower limit	Duration	Frequency
			Ft	Ft		
RrF:						
Ramsey	D	Jan-Dec	---	---	---	None
Rock outcrop	D	Jan-Dec	---	---	---	None
SeB:						
Sequatchie	B	Jan-Dec	---	---	---	None
Su:						
Sullivan	B	January	4.0-6.0	>6.0	Brief	Occasional
		February	4.0-6.0	>6.0	Brief	Occasional
		March	4.0-6.0	>6.0	Brief	Occasional
		December	4.0-6.0	>6.0	Brief	Occasional
TaC:						
Talbott	C	Jan-Dec	---	---	---	None
TbD:						
Talbott	C	Jan-Dec	---	---	---	None
Braxton	C	Jan-Dec	---	---	---	None
Rock outcrop	D	Jan-Dec	---	---	---	None
ToE:						
Talbott	C	Jan-Dec	---	---	---	None
Rock outcrop	D	Jan-Dec	---	---	---	None
Braxton	C	Jan-Dec	---	---	---	None
TrF:						
Talbott	C	Jan-Dec	---	---	---	None
Rock outcrop	D	Jan-Dec	---	---	---	None
VsE:						
Varilla	B	Jan-Dec	---	---	---	None
Shelocta	B	Jan-Dec	---	---	---	None
WaC:						
Waynesboro	B	Jan-Dec	---	---	---	None
WaD2:						
Waynesboro	B	Jan-Dec	---	---	---	None
WaD3:						
Waynesboro	B	Jan-Dec	---	---	---	None
WhA:						
Whitwell	C	January	2.0-3.0	>6.0	Very brief	Occasional
		February	2.0-3.0	>6.0	Very brief	Occasional
		March	2.0-3.0	>6.0	Very brief	Occasional
		December	2.0-3.0	>6.0	Very brief	Occasional
WhB:						
Whitwell	C	January	2.0-3.0	>6.0	---	None
		February	2.0-3.0	>6.0	---	None
		March	2.0-3.0	>6.0	---	None
		December	2.0-3.0	>6.0	---	None

Table 18.--Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Restrictive layer		Potential for frost action	Risk of corrosion	
	Kind	Depth to top		Uncoated steel	Concrete
		In			
At:					
Atkins	---	---	High	High	Moderate
BaE:					
Barfield	Bedrock (lithic)	8-20	None	High	Low
Ashwood	Bedrock (lithic)	20-40	None	High	Low
Rock outcrop	Bedrock (lithic)	0-0	None	---	---
Be:					
Beason	---	---	None	High	High
BM:					
Bethesda	---	---	Moderate	Moderate	High
Mine pits.					
Bo:					
Bonair	Bedrock (lithic)	40-60	None	High	High
Ea:					
Ealy	---	---	None	Low	Moderate
EcB:					
Ealy	---	---	None	Low	Moderate
Craigsville	---	---	Moderate	Moderate	Moderate
EtB:					
Etowah	---	---	None	Low	Moderate
EtC:					
Etowah	---	---	None	Low	Moderate
EtD2:					
Etowah	---	---	None	Low	Moderate
FuE:					
Fullerton	---	---	None	High	Moderate
GpC:					
Gilpin	Bedrock (paralithic)	20-40	Moderate	Low	High
GpD:					
Gilpin	Bedrock (paralithic)	20-40	Moderate	Low	High
GpF:					
Gilpin	Bedrock (paralithic)	20-40	Moderate	Low	High
HaD:					
Hayter	---	---	Moderate	Moderate	Moderate
HaE:					
Hayter	---	---	Moderate	Moderate	Moderate

Table 18.--Soil Features--Continued

Map symbol and soil name	Restrictive layer		Potential for frost action	Risk of corrosion	
	Kind	Depth to top		Uncoated steel	Concrete
		In			
HeB:					
Hendon	---	---	None	Low	Moderate
HeC:					
Hendon	---	---	None	Low	Moderate
JeC:					
Jefferson	---	---	None	Moderate	High
JeD:					
Jefferson	---	---	None	Moderate	High
JnD:					
Jefferson	---	---	Moderate	Moderate	High
JnF:					
Jefferson	---	---	Moderate	Moderate	High
JsD:					
Jefferson	---	---	None	Moderate	High
Shelocta	Bedrock (lithic)	40-40	None	Low	High
JsF:					
Jefferson	---	---	None	Moderate	High
Shelocta	Bedrock (lithic)	40-40	None	Low	High
JvD:					
Jefferson	---	---	None	Moderate	High
Varilla	Bedrock (lithic)	48-48	Moderate	Low	High
Shelocta	Bedrock (lithic)	40-40	None	Low	High
JvF:					
Jefferson	---	---	None	Moderate	High
Varilla	Bedrock (lithic)	48-48	Moderate	Low	High
Shelocta	Bedrock (lithic)	40-40	None	Low	High
LlB:					
Lily	Bedrock (lithic)	20-40	None	Moderate	High
LlC:					
Lily	Bedrock (lithic)	20-40	None	Moderate	High
LlD:					
Lily	Bedrock (lithic)	20-40	None	Moderate	High
LlE:					
Lily	Bedrock (lithic)	20-40	None	Moderate	High
LnC:					
Lily	Bedrock (lithic)	20-40	None	Moderate	High
Lonewood	Bedrock (lithic)	40-72	None	Low	Moderate
LwB:					
Lonewood	Bedrock (lithic)	40-72	None	Low	Moderate

Table 18.--Soil Features--Continued

Map symbol and soil name	Restrictive layer		Potential for frost action	Risk of corrosion	
	Kind	Depth to top		Uncoated steel	Concrete
		In			
LwC:					
Lonewood	Bedrock (lithic)	40-72	None	Low	Moderate
MuD:					
Muse	Bedrock (paralithic)	40-40	None	High	High
Pl:					
Pits, limestone quarry-	Bedrock (lithic)	0-0	None	---	---
Ps:					
Pits, sandstone quarry-	Bedrock (lithic)	0-0	None	---	---
RaC:					
Ramsey	Bedrock (lithic)	7-20	None	Low	Moderate
RaD:					
Ramsey	Bedrock (lithic)	7-20	None	Low	Moderate
RaF:					
Ramsey	Bedrock (lithic)	7-20	None	Low	Moderate
RrC:					
Ramsey	Bedrock (lithic)	7-20	None	Low	Moderate
Rock outcrop	Bedrock (lithic)	0-0	None	---	---
RrD:					
Ramsey	Bedrock (lithic)	7-20	None	Low	Moderate
Rock outcrop	Bedrock (lithic)	0-0	None	---	---
RrF:					
Ramsey	Bedrock (lithic)	7-20	None	Low	Moderate
Rock outcrop	Bedrock (lithic)	0-0	None	---	---
SeB:					
Sequatchie	---	---	None	Low	Moderate
Su:					
Sullivan	---	---	None	Low	Low
TaC:					
Talbott	Bedrock (lithic)	20-40	None	High	Moderate
TbD:					
Talbott	Bedrock (lithic)	20-40	None	High	Moderate
Braxton	---	---	None	High	Moderate
Rock outcrop	Bedrock (lithic)	0-0	None	---	---
ToE:					
Talbott	Bedrock (lithic)	20-40	None	High	Moderate
Rock outcrop	Bedrock (lithic)	0-0	None	---	---
Braxton	---	---	None	High	Moderate

Table 18.--Soil Features--Continued

Map symbol and soil name	Restrictive layer		Potential for frost action	Risk of corrosion	
	Kind	Depth to top		Uncoated steel	Concrete
		In			
TrF:					
Talbott	Bedrock (lithic)	20-40	None	High	Moderate
Rock outcrop	Bedrock (lithic)	0-0	None	---	---
VsE:					
Varilla	Bedrock (lithic)	48-48	Moderate	Low	High
Shelocta	Bedrock (lithic)	40-40	None	Low	High
W:					
Water.					
WaC:					
Waynesboro	---	---	None	High	High
WaD2:					
Waynesboro	---	---	None	High	High
WaD3:					
Waynesboro	---	---	None	High	High
WhA:					
Whitwell	---	---	None	Moderate	Moderate
WhB:					
Whitwell	---	---	None	Moderate	Moderate

Table 19.--Classification of the Soils

Soil name	Family or higher taxonomic class*
Ashwood	Fine, mixed, thermic Vertic Argiudolls
Atkins	Fine-loamy, mixed, acid, mesic Typic Fluvaquents
Barfield	Clayey, mixed, thermic Lithic Hapludolls
Beason	Clayey, mixed, thermic Aquic Hapludults
Bethesda	Loamy-skeletal, mixed, acid, mesic Typic Udorthents
Bonair	Fine-loamy, siliceous, mesic Humic Endoaquepts
Braxton	Fine, mixed, thermic Typic Paleudalfs
Craigsville	Loamy-skeletal, mixed, mesic Fluventic Dystrochrepts
Ealy	Coarse-loamy, siliceous, mesic Fluventic Dystrochrepts
Etowah	Fine-loamy, siliceous, thermic Typic Paleudults
Fullerton	Clayey, kaolinitic, thermic Typic Paleudults
Gilpin	Fine-loamy, mixed, mesic Typic Hapludults
Hayter	Fine-loamy, mixed, mesic Ultic Hapludalfs
Hendon	Fine-loamy, siliceous, mesic Fragic Paleudults
Jefferson	Fine-loamy, siliceous, mesic Typic Hapludults
Lily	Fine-loamy, siliceous, mesic Typic Hapludults
Lonewood	Fine-loamy, siliceous, mesic Typic Hapludults
Muse	Clayey, mixed, mesic Typic Hapludults
Ramsey	Loamy, siliceous, mesic Lithic Dystrochrepts
Sequatchie	Fine-loamy, siliceous, thermic Humic Hapludults
Shelocta	Fine-loamy, mixed, mesic Typic Hapludults
Sullivan	Fine-loamy, siliceous, thermic Dystric Fluventic Eutrochrepts
Talbott	Fine, mixed, thermic Typic Hapludalfs
Varilla	Loamy-skeletal, siliceous, mesic Typic Dystrochrepts
Waynesboro	Clayey, kaolinitic, thermic Typic Paleudults
Whitwell	Fine-loamy, siliceous, thermic Aquic Hapludults

* The soils are classified based on the sixth edition of “Keys to Soil Taxonomy” (Soil Survey Staff 1994).