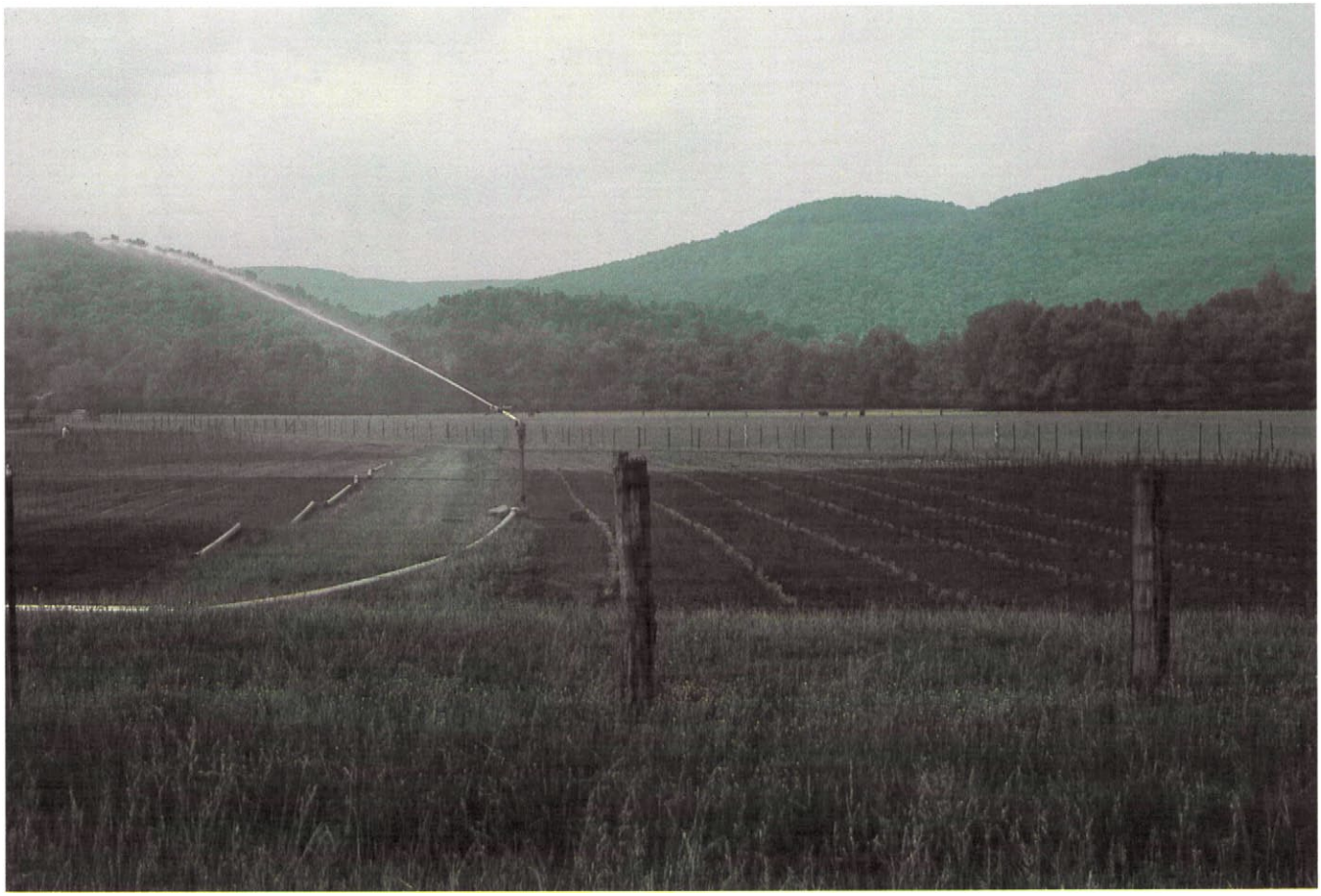
United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with the Tennessee Agricultural Experiment Station, Grundy County Board of Commissioners, Tennessee Department of Agriculture, and Tennessee Valley Authority

Soil Survey of Grundy County, Tennessee



How to Use This Soil Survey

General Soil Map

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

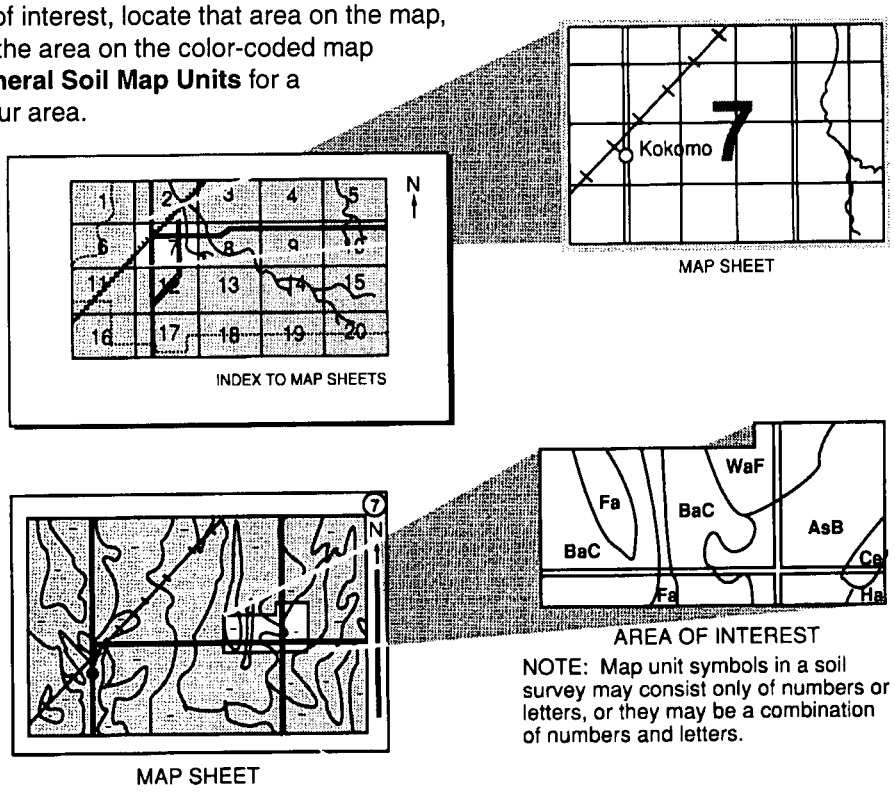
To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

Detailed Soil Maps

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

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

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.



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

The **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.

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) leads the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1988. Soil names and descriptions were approved in 1990. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1988. This survey was made cooperatively by the Natural Resources Conservation Service, the Tennessee Agricultural Experiment Station, the Grundy County Board of Commissioners, the Tennessee Department of Agriculture, and the Tennessee Valley Authority. The survey is part of the technical assistance furnished to the Grundy 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 tree and ornamentals nursery in the Collins River Valley in Grundy County. The soil is Sequatchie loam, 0 to 2 percent slopes, rarely flooded.

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 (click on "Technical Resources").

Contents

Issued 2001

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, ranchers, 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 that affect 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
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Soil Survey of Grundy County, Tennessee

By Jerry L. Prater, Natural Resources Conservation Service

Fieldwork by Charles L. Davis, Hershel D. Dollar, William C. Moffitt, and Jerry L. Prater, Natural Resources Conservation Service, and William P. Goins, Grundy County

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

GRUNDY COUNTY is in the southeastern part of Tennessee (fig. 1). Altamont, the county seat, is in the northern part of the county.

The county lies in two Major Land Resource Areas. About 88 percent of Grundy County is on the Cumberland Plateau and Cumberland Plateau Escarpment. The rest is on the Highland Rim. Grundy County has a total area of 358 square miles, or 231,000 acres.

About 78 percent of Grundy County is woodland, 10 percent is pasture, and 8 percent is cropland. The rest is in urban, recreation, and other uses.

Poultry production and horticultural crops are the main farm enterprises in Grundy County. Wood products and coal mining are the leading industries. Trees are produced on large tracts under commercial or private ownership. Several sawmills are operational.

The soils in Grundy County range widely in texture, natural drainage, and other characteristics. The soils on Cumberland Plateau are undulating to steep, well drained, and loamy throughout. They range from shallow to very deep and overlie acid sandstone or shale.

The soils on the Highland Rim in the southwestern and northern parts of Grundy County are nearly level to hilly. They are very deep and well drained to poorly drained. They have a loamy surface layer and a loamy or clayey subsoil.

Under good management practices, many nearly level and most undulating soils in Grundy County are suited to pasture, hay, and row crops. Most row crops are grown on the Highland Rim. Most of the Cumberland Plateau and all of the Cumberland Plateau Escarpment are used as woodland. Suitability for woodland is varied.

General Nature of the County

This section gives general information about the county. It describes the history and development, physiography and drainage, and climate.

History and Development

The first inhabitants of the survey area likely were Indians of the Archaic Period. They were followed by Indians of the Mississippi and Woodland Periods.

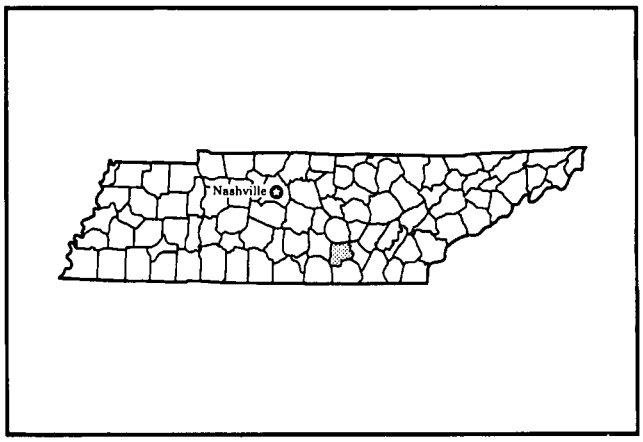

Figure 1.—Location of Grundy County in Tennessee.

Cherokee, Chickasaw, and Creek Indians hunted in the area. The Nickajack Expedition in 1794 is the first record of Europeans in the area. In the early 1800's, the western and northern parts of the area were settled.

Grundy County was created by act of the General Assembly of Tennessee on January 29, 1844 (*3*). It was formed from parts of Coffee, Franklin, Warren, and Marion Counties. The county was named for Felix Grundy, U.S. Senator and Attorney General of the United States under President Martin Van Buren. Altamont was chosen as the county seat in 1846.

Coal was discovered near Tracy City in the 1840's. By 1858, the railroad had been built to Tracy City. It provided transportation and opened markets for the coal industry. From the late 1800's to the early 1900's, the lumber industry increased its harvest of the abundant timber. Reports were common of chestnut and yellow-poplar logs that each yielded 1,200 board feet or more of lumber.

In the 1800's, most general farming was practiced on the Highland Rim. Before the 1930's, the Cumberland Plateau was used as open range for livestock and only a small acreage was used for row crops and horticultural crops. In the 1950's, poultry production increased. Horticultural crops and poultry production continue to be important throughout the county, especially on the Cumberland Plateau.

The 1980 census showed a population of 13,787 for Grundy County. The population of Altamont, the county seat, was 679.

Physiography and Drainage

Slope in Grundy County ranges from nearly level to very steep. It reflects different rates of geologic erosion of various geologic formations.

The elevation is about 880 feet above mean sea level (m.s.l.) along the Collins River at the Warren County line. Lockhart, in the southeastern part of the county, is about 2,382 feet above m.s.l. The average elevation of the Cumberland Plateau is about 2,000 feet above m.s.l.

The Cumberland Plateau Escarpment separates the Cumberland Plateau from the Highland Rim. The Highland Rim is at an elevation of about 1,000 feet below the Cumberland Plateau. It extends into Grundy County in coves from the southwest and the north.

The Tennessee Valley Divide extends across Grundy County. The drainage systems are dendritic, or branching, like a tree. Their flow is southward or northward. The southern two-fifths of the county flows to the Tennessee River. The northern three-fifths of the county flows to the Cumberland River. The Collins River and Hickory Creek are major drainages in the northern part of the county. The Elk River is a major drainage in the southwestern part of the county.

Climate

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

In winter, the average temperature is 39 degrees F and the average daily minimum temperature is 30 degrees. The lowest temperature on record, which occurred on January 30, 1966, is -14 degrees. In summer, the average temperature is 74 degrees and the average daily maximum temperature is 84 degrees. The highest recorded temperature, which occurred on July 28, 1952, is 101 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 61.99 inches. Of this, 29 inches, or 45 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 25 inches. The heaviest 1-day rainfall during the period of record was 5.97 inches on March 16, 1973. Thunderstorms occur on about 56 days each year, and most occur in summer.

The average seasonal snowfall is about 12 inches. The greatest snow depth at any one time during the period of record was 17 inches. On the average, 5 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 55 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 60 percent of the time possible in summer and 45 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 8 miles per hour, in spring.

How This Survey Was Made

This survey was made to provide information about the soils 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 soil 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 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 soil 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 at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils 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. Beersheba-Lonewood-Lily

Undulating to hilly, moderately deep and deep, well drained soils that have a loamy subsoil; formed in residuum derived from sandstone

This map unit is on broad, undulating to hilly uplands on the Cumberland Plateau (fig. 2). It consists mainly of a smooth plateau weakly dissected by narrow bottom lands along intermittent drainageways. Slopes are mainly 2 to 20 percent.

This map unit makes up about 57 percent of the county. About 44 percent of this unit is Beersheba soils, 22 percent is Lonewood soils, 18 percent is Lily soils, and the rest is soils of minor extent.

Beersheba soils are well drained. They have a brownish, loamy surface layer and subsoil. They are 20 to 40 inches deep to soft, acid sandstone.

Lonewood soils are well drained. They have a brownish, loamy surface layer and subsoil. They are 40 to 72 inches deep to soft, acid sandstone.

Lily soils are well drained. They have a brownish, loamy surface layer and subsoil. They are 20 to 40 inches deep to hard, acid sandstone.

Of minor extent in this map unit are the well drained Bethesda, Gilpin, and Monteagle soils. Also of minor extent are the somewhat excessively drained Ramsey soils on uplands, the moderately well drained Sewanee soils, and the poorly drained Bonair soils on bottom lands.

In most areas this map unit is used as woodland. In a few areas it is used mainly for pasture, horticultural crops, and row crops.

There are no limitations to use or management of this unit as woodland. Productivity of this unit is moderate or moderately high for upland oaks and for shortleaf, loblolly, and Virginia pines.

This map unit is well suited or moderately suited to most horticultural and row crops. It is well suited to pasture. Slope is the main limitation for row crops.

This map unit is well suited to poorly suited to urban use. Depth to bedrock and slope are the main limitations for many urban uses.

2. Bouldin-Talbott-Carbo

Hilly to very steep, very deep and moderately deep, well drained soils that have a loamy or clayey subsoil; formed in colluvium derived from sandstone or residuum derived from limestone

This map unit is on long slopes of the Cumberland Plateau Escarpment (fig. 3). The escarpment leads mainly from the Highland Rim to the Cumberland Plateau. The rise in elevation is about 1,000 feet. Commonly, a nearly vertical sandstone cliff is at the uppermost part of the map unit. Slopes range from 15 to 75 percent.

This map unit makes up about 21 percent of the county. About 65 percent of this unit is Bouldin soils, 10 percent is Talbott soils, 9 percent is Carbo soils, and the rest is soils of minor extent.

Bouldin soils are steep and very steep. They are at higher elevations in the map unit. They extend to the bottom of the unit in the deep gorges. They are very deep and well drained. They have a brownish, loamy surface layer and a brownish and reddish, loamy subsoil. The content of sandstone boulders and stones is high both on the surface and throughout the soil profile.

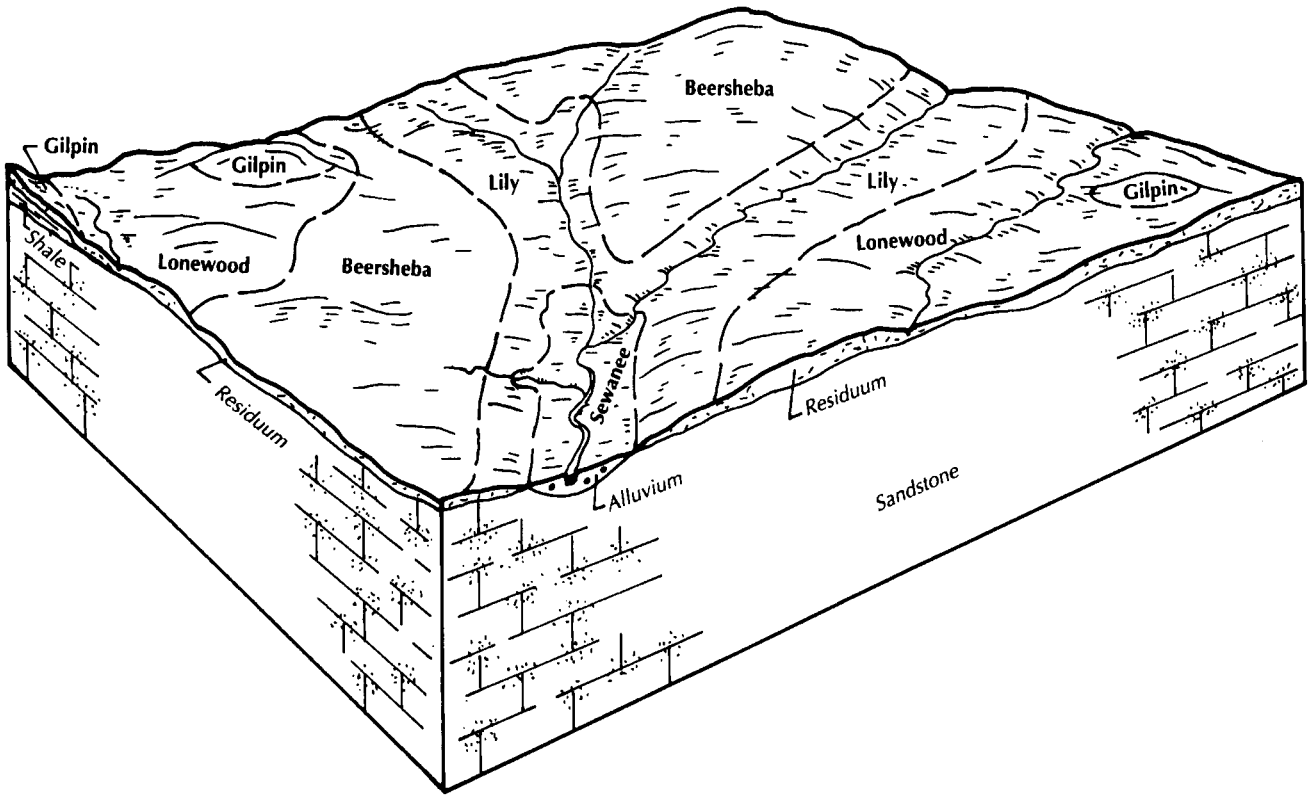

Figure 2.—Typical pattern of soils and the underlying material in the Beersheba-Lonewood-Lily general soil map unit.

Talbott and Carbo soils are hilly to very steep. They are both well drained. They are at lower elevations in the map unit and on outlying ridges. They are 20 to 40 inches deep to limestone. Limestone crops out in numerous places on these soils. Talbott soils have a brownish, loamy surface layer and a reddish, clayey subsoil. Carbo soils have a brownish, loamy surface layer and a brownish, clayey subsoil.

Of minor extent in this map unit are the well drained Allen soils on foot slopes and the well drained Cobstone and Sequatchie soils on fans and terraces in the lowest part of the map unit. Also of minor extent are the somewhat excessively drained Ramsey soils in the uppermost part of this unit, above sandstone cliffs.

This map unit is used as woodland.

Slope, stoniness, and rock outcrop limit use and management for woodland. The better quality timber in the county is in coves in this map unit. On Bouldin soils, productivity is moderately high for upland oaks and yellow-poplar. On Talbott and Carbo soils, it is moderate for upland oaks and eastern red cedar.

This map unit is poorly suited to pasture, row crops, and most urban uses. Slope, depth to bedrock, boulders, rock outcrop, and slippage are major limitations for most uses.

3. Lily-Jefferson-Gilpin

Undulating to steep, moderately deep and very deep, well drained soils that have a loamy subsoil; formed in residuum or colluvium derived from sandstone, shale, or siltstone

This map unit is mainly on small, undulating and rolling plateaus and hilly and steep, long hillslopes (fig. 4). The hillslopes rise 200 to 300 feet in elevation above the adjacent landscape. This unit is deeply dissected. It is in the eastern part of the county on the Cumberland Plateau. Slopes are 2 to 40 percent.

This map unit makes up about 9 percent of the county. About 30 percent is Lily soils, 22 percent is Jefferson soils, 19 percent is Gilpin soils, and the rest is soils of minor extent.

Lily soils are undulating to hilly. They are on plateaus, mainly at higher elevations in the map unit. They are well drained. They have a brownish, loamy surface layer and subsoil. They are 20 to 40 inches deep to hard, acid sandstone.

Jefferson soils are hilly and steep. They are mainly on concave side slopes and head slopes on hillslopes. They are very deep and well drained. They have a brownish, loamy surface layer and subsoil.

Gilpin soils are hilly and steep. They are mainly on convex nose slopes and on side slopes of hillslopes. They are well drained. They have a brownish, loamy surface layer and subsoil. They are 20 to 40 inches deep to weathered, acid shale.

Of minor extent in this map unit are the well drained Lonewood and Monteagle soils on broad uplands. Also of minor extent are the somewhat excessively drained Ramsey soils on upland shoulders and back slopes.

In most areas this map unit is used as woodland. In a few areas it is used mainly for pasture and horticultural crops.

Slope of more than 15 percent is the main limitation to use and management for forest land. Productivity is moderate or moderately high for upland oaks and for shortleaf, loblolly, and Virginia pines. On Jefferson soils, it is high for yellow-poplar and pine trees.

This map unit is well suited to poorly suited to pasture. It is well suited to poorly suited to most row crops. Slope is the main limitation.

This unit is poorly suited to many urban uses. Slope and depth to bedrock are the main limitations for many urban uses.

4. Lily-Ramsey

Undulating to steep, moderately deep and shallow, well drained and somewhat excessively drained soils that have a loamy subsoil; formed in residuum derived from sandstone.

This map unit is in highly dissected areas that have rolling ridges and short steep side slopes and that are shallow to sandstone. Sandstone crops out in places. The unit is on the edge of the Cumberland Plateau adjoining the escarpment. Slopes are 5 to 40 percent.

This map unit makes up about 4 percent of the county. About 50 percent of the unit is Lily soils, 40

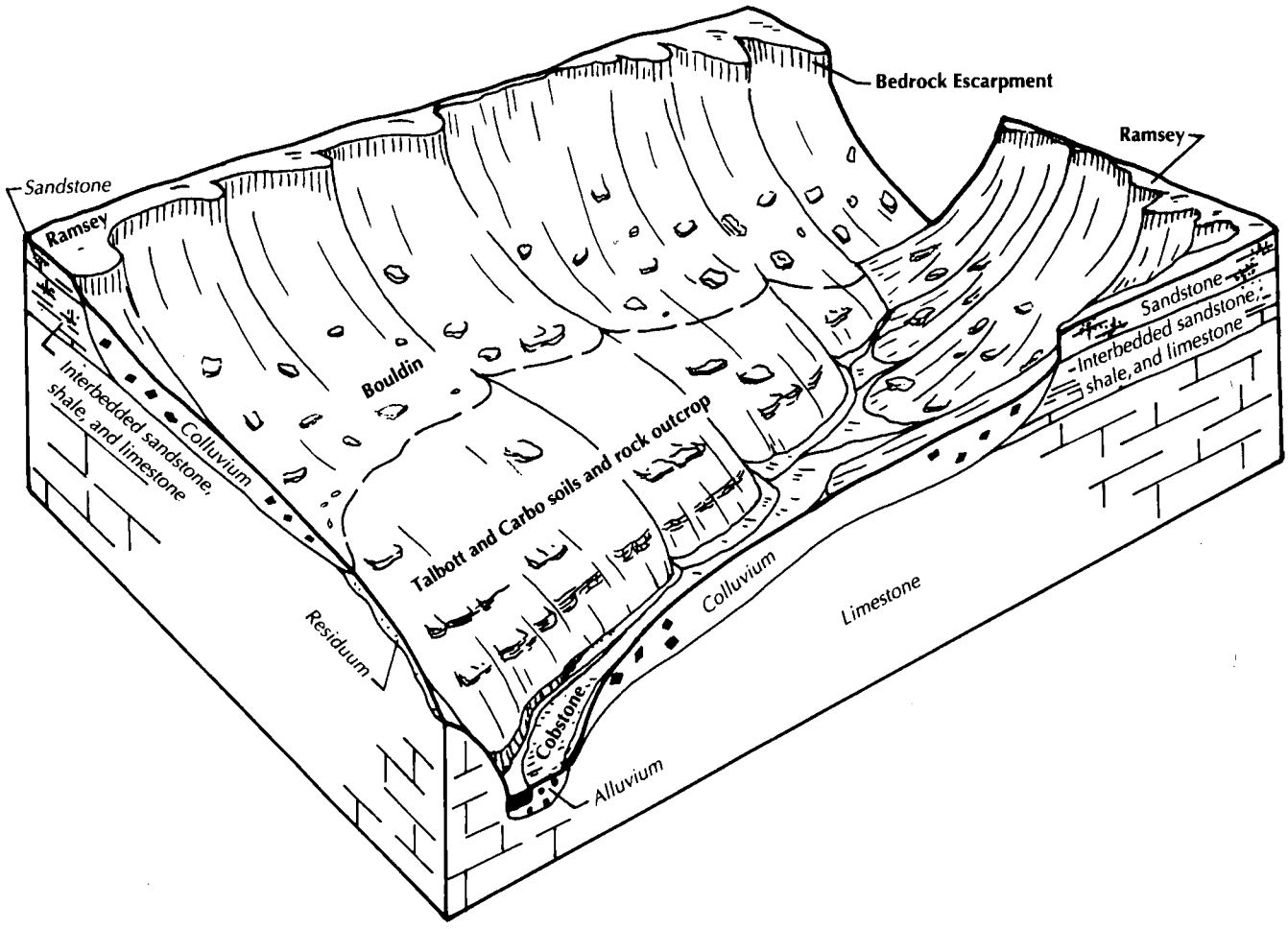

Figure 3.—Typical pattern of soils and the underlying material in the Bouldin-Talbott-Carbo general soil map unit.

percent is Ramsey soils, and the rest is soils of minor extent.

Lily soils are undulating to hilly. They are on ridges and side slopes on uplands. They are well drained. They have a brownish, loamy surface layer and subsoil. They are 20 to 40 inches deep to hard, acid sandstone.

Ramsey soils are rolling to steep. They are on side slopes on uplands. They are somewhat excessively drained. They have a brownish, loamy surface layer and subsoil. They are less than 20 inches deep to hard, acid sandstone.

Of minor extent in this map unit are the well drained Beersheba and Lonewood soils. They are on upland ridges at higher elevations in the map unit.

In most areas this map unit is used as woodland. In a few areas it is used for pasture and horticultural crops.

In most areas of this unit, slope, rockiness, and depth to bedrock are the main limitations to use and management for woodland. Productivity is moderate on this map unit for upland oaks and shortleaf, loblolly, and Virginia pines.

In most areas this unit is moderately suited to pasture. On the steeper slopes Ramsey soils are poorly suited to pasture. This unit is moderately suited or poorly suited to many row crops. Slope and depth to bedrock are limitations.

This unit is poorly suited to most urban uses. Depth to bedrock and slope are limitations for many urban uses.

5. Waynesboro-Etowah

Undulating to hilly, very deep, well drained soils that have a clayey or loamy subsoil; formed in alluvium

This map unit is on long, broad, undulating to hilly uplands, terraces, and toe slopes (fig. 5). It extends from the base of the Cumberland Plateau Escarpment as the Highland Rim emerges from coves in the southwestern and northern parts of the county. Slopes are 2 to 25 percent.

This map unit makes up about 4 percent of the county. About 49 percent of the unit is Waynesboro soils, 19 percent is Etowah and similar soils, and the rest is soils of minor extent.

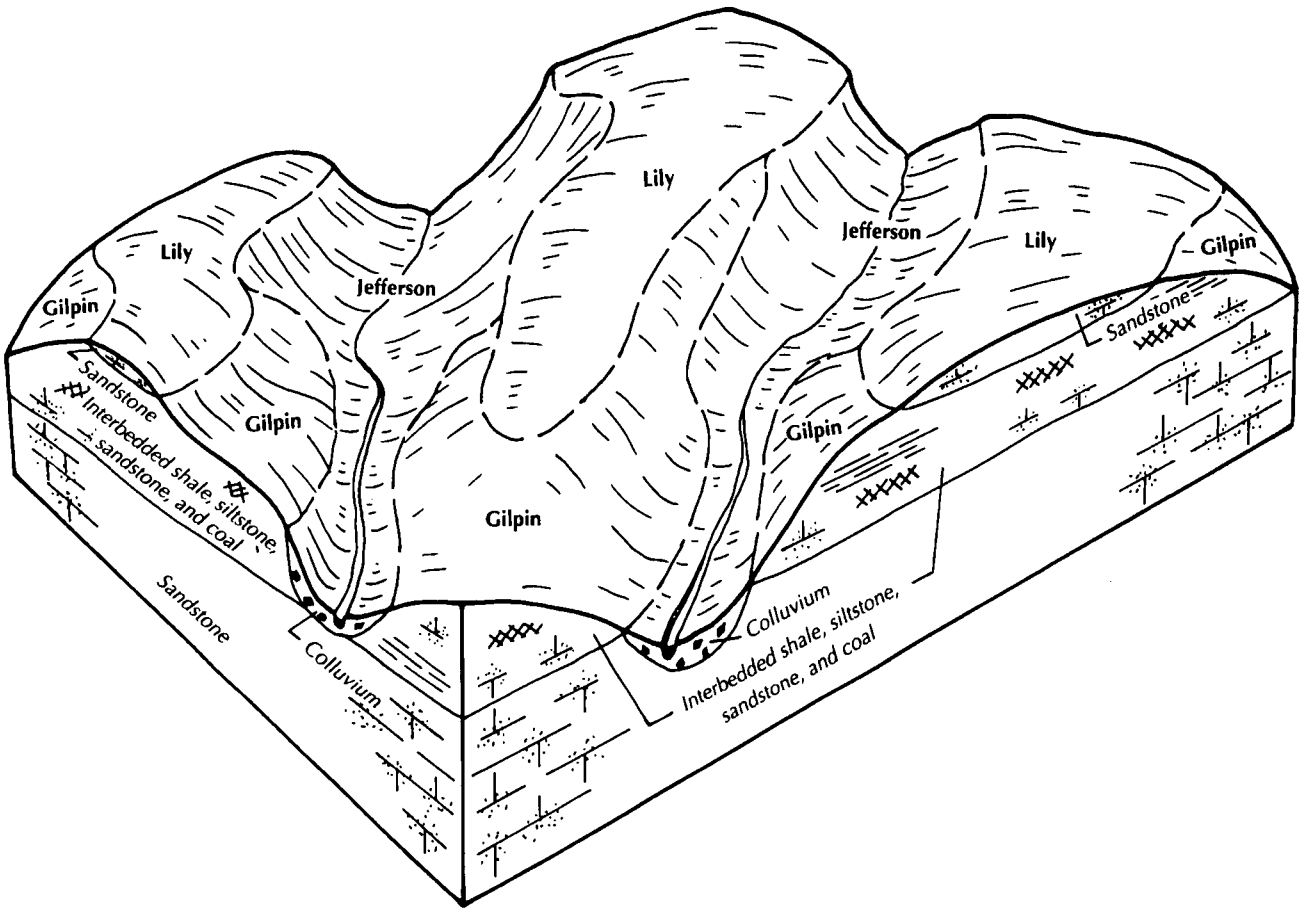

Figure 4.—Typical pattern of soils and the underlying material in the Lily-Jefferson-Gilpin general soil map unit.

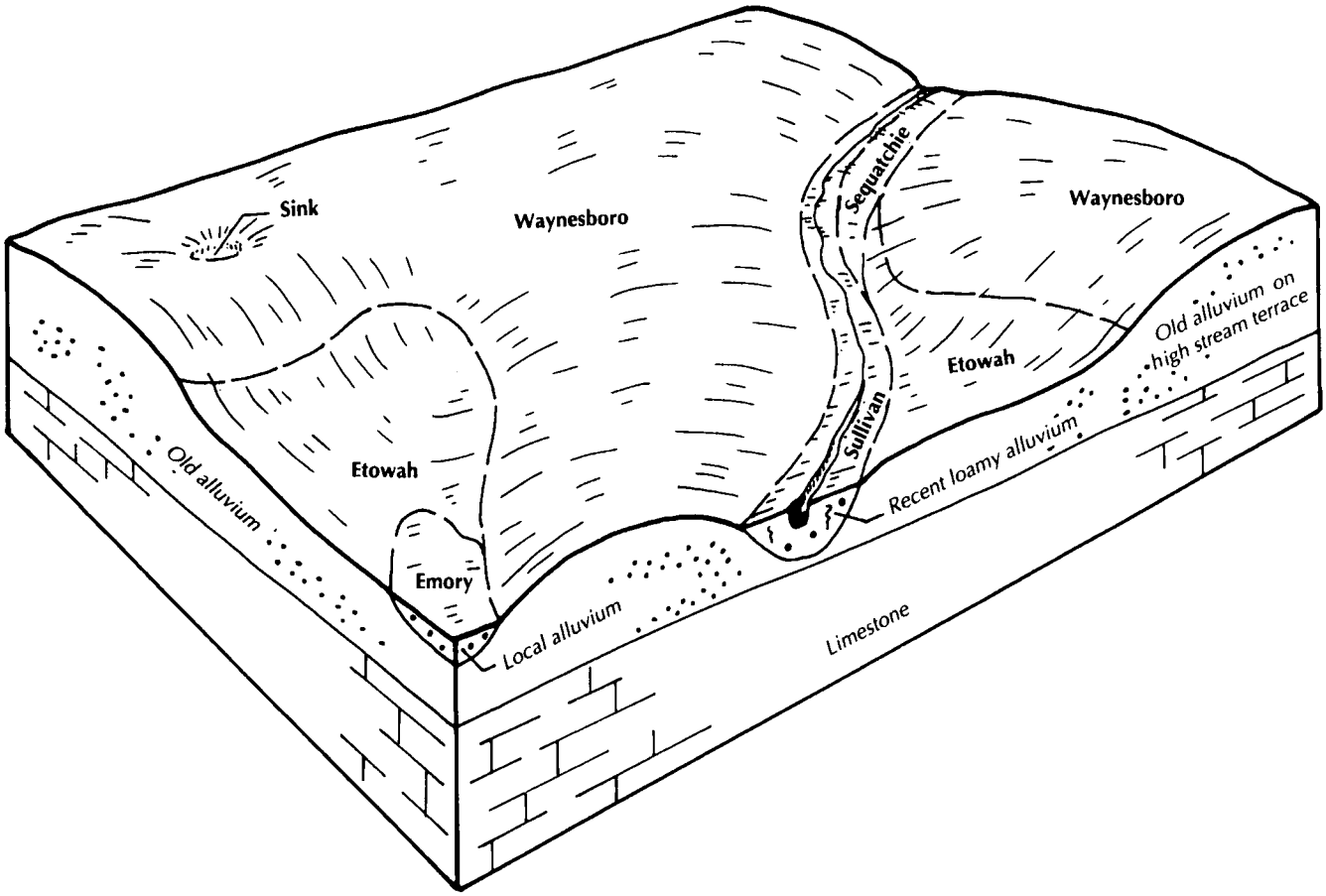

Figure 5.—Typical pattern of soils and the underlying material in the Waynesboro-Etowah general soil map unit.

Waynesboro soils are undulating to hilly. They are on uplands and high terraces. They are very deep and well drained. They have a brownish, loamy surface layer and a reddish, clayey subsoil.

Etowah soils are on gently sloping and moderately sloping terraces and foot slopes. They are very deep and well drained. They have a brownish, loamy surface layer and a reddish, loamy subsoil.

Of minor extent in this map unit are Emory, Sequatchie, Swafford, Whitwell, Sullivan, and Hamblen soils. Emory soils are well drained and on toe slopes and in slight depressions. On terraces, Sequatchie soils are well drained and Swafford and Whitwell soils are moderately well drained. On bottom lands, Sullivan soils are well drained and Hamblen soils are moderately well drained.

This map unit is used for row crops, horticultural crops, and pasture. In a few areas it is used as woodland.

This map unit is well suited to pasture. It is well suited or moderately suited to most horticultural and row crops. Slope is the main limitation for row crops.

This map unit is well suited to yellow-poplar, upland oaks, and loblolly pine.

This map unit is well suited or moderately suited to many urban uses. Slope is the main limitation.

6. Sequatchie-Cobstone-Sullivan

Nearly level and gently sloping, very deep, well drained soils that have a loamy subsoil; formed in alluvium

This map unit is on low terraces, alluvial fans, and bottom lands in coves that finger into the Cumberland Plateau Escarpment from the Highland Rim. The coves begin in narrow mountain gorges. They gradually widen as they emerge onto the Highland Rim in the southwestern and northern parts of the county. Slopes are mainly 0 to 6 percent.

This map unit makes up about 3 percent of the county. About 50 percent of the unit is Sequatchie soils, 15 percent is Cobstone soils, 15 percent is Sullivan soils, and the rest is soils of minor extent.

Sequatchie soils are nearly level and gently sloping.

They are are on low terraces. They are very deep and well drained. They have a brownish, loamy surface layer and subsoil.

Cobstone soils are nearly level and gently sloping. They are on alluvial fans and low terraces mainly at the head of coves. They are very deep and well drained. They have a brownish, loamy surface layer and subsoil. The surface layer and subsoil have a high content of sandstone cobbles and stones.

Sullivan soils are nearly level. They are on bottom lands adjacent to large drainageways. They are very deep and well drained. They have a brownish, loamy surface layer and subsoil.

Of minor extent in this map unit are the well drained Allen, Etowah, and Waynesboro soils and the moderately well drained Whitwell soils. Allen soils on foot slopes, Etowah soils on high terraces, and Waynesboro soils on uplands and high terraces are at higher elevations than Sequatchie soils. Whitwell soils on low terraces are at lower elevations than Sequatchie soils.

In most areas this map unit is used for row crops and horticultural crops. In a few areas it is used for pasture and hay. In a few areas, mainly on Cobstone soils, it is used as woodland.

In most areas this map unit is well suited to pasture, hay, row crops, and horticultural crops. Cobstone soils are moderately suited to pasture, but are not suited to hay, row crops, and horticultural crops. On Cobstone soils, the main limitation is the high content of sandstone cobbles and stones both on the surface and within the soil profile.

For reforestation, plant competition is the main woodland management limitation. On Cobstone soils, cobbles and stones are also a limitation. Potential productivity of this unit is high for yellow-poplar, upland oaks, and loblolly pine.

Flooding is a severe limitation to most urban uses.

7. Hamblen-Newark-Melvin

Nearly level, very deep, moderately well drained to poorly drained soils that have a loamy subsoil; formed in alluvium

This map unit is on flood plains along the major streams on the Highland Rim in the southwestern and northwestern parts of the county. Drainageways meandering across this map unit form oxbows in places. Random slight depressions in this map unit are ponded in winter and early spring. Slopes are 0 to 2 percent.

This map unit makes up about 2 percent of the county. About 28 percent is Hamblen soils, 24 percent is Newark soils, 22 percent is Melvin soils, and the rest is soils of minor extent.

Hamblen soils are on bottom lands adjacent to drainageways. They are very deep and moderately well drained. They have a brownish, loamy surface layer and subsoil.

Newark soils are on bottom lands between Hamblen and Melvin soils. They are very deep and somewhat poorly drained. They have a brownish, loamy surface layer and a brownish and grayish, loamy subsoil.

Melvin soils are in slight depressions. They are very deep and poorly drained. They have a brownish, loamy surface layer and a grayish, loamy subsoil.

Of minor extent in this map unit are Agee, Beason, Whitwell, and Wolftever soils. The poorly drained Agee soils are on bottom lands and low terraces. The somewhat poorly drained Beason soils and the moderately well drained Whitwell and Wolftever soils are on low terraces.

In most areas this map unit is used for pasture and hay. In some areas it is used for trees and row crops. Some areas of mainly Hamblen, Newark, and soils of minor extent have been drained and are used for row crops. Some areas of mainly Melvin soils are used as woodland.

This map unit is well suited to water-tolerant pasture and hay crops. It is moderately suited to row crops plantable late in spring. Occasional flooding and the seasonal high water table are the main limitations. In drained areas the unit is well suited to pasture and many row crops.

The seasonal high water table limits use and management of this map unit as forest land. Productivity is high for bottom land oaks and sweetgum.

This map unit is not suited to most urban uses because of flooding and the seasonal high water table.

Detailed Soil Map Units

The map units delineated on the detailed maps at the back of 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. More information about each map unit is given under the heading "Use and Management of the Soils."

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 or miscellaneous areas. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas 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, but if intensive use of small areas is planned, 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, Beersheba loam, 2 to 6 percent slopes, is a phase of the Beersheba series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

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-Carbo-Rock outcrop, 15 to 30 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. There are no associations in Grundy County.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. There are no undifferentiated groups in Grundy County.

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

Ae—Agee silty clay loam, rarely flooded

This is a very deep, poorly drained, nearly level soil. It is in slight depressions on low terraces of the Highland Rim. Slopes are 0 to 2 percent. Mapped areas range from 5 to 80 acres in size.

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

Surface layer:
0 to 5 inches, very dark gray silty clay loam
5 to 15 inches, very dark gray clay

Subsoil:
15 to 41 inches, olive gray and gray clay

Substratum:
41 to 61 inches, dark gray clay

Important soil properties and features—

Permeability: Very slow
Available water capacity: Moderate
Soil reaction: Neutral or mildly alkaline
Organic matter content: Moderate
Depth to bedrock: More than 60 inches
Effective rooting depth: 20 to 40 inches for water-tolerant plants
Depth to a high water table: 0 to 12 inches
Flooding: Rare

Included with this soil in mapping are small areas of Beason and Wolftever soils mainly near the edge of the map unit. Beason soils are somewhat poorly drained. Wolftever soils are moderately well drained. Also included, in slight depressions, are small areas of Agee soils that have an overwash of brownish loam or silt loam 10 to 15 inches thick. Included soils make up about 10 percent of this map unit.

In most areas this Agee soil is used for pasture. In some drained areas it is used for field crops. In some areas it is used as woodland.

This soil is poorly suited to most field crops. In drained areas it is moderately suited to soybeans, corn, and grain sorghum. The high water table and poor tilth of the surface layer when either wet or dry limit access for planting and cultivation. The drained areas can be tilled when the condition of the surface layer will prevent the formation of clods and crust.

This soil is well suited to pasture and hay of water-tolerant grasses and legumes. Controlling grazing when the soil is wet helps to prevent surface compaction.

This soil is moderately suited to woodland. It is well suited to bottom land oaks, sweetgum, and eastern cottonwood. The seasonal high water table is the main limitation to use and management for woodland. Use of equipment is limited to drier periods of the year. Undesirable plants reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is not suited to most urban uses because of flooding, the seasonal high water, slow permeability, and the high shrink-swell potential.

The capability subclass is IIIw in undrained areas and IIw in drained areas.

Ag—Agee silty clay loam, occasionally flooded

This is a very deep, poorly drained, nearly level soil. It is on bottom lands along rivers and creeks on the Highland Rim. Slopes are 0 to 2 percent. Mapped areas range from 10 to 35 acres in size.

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

Surface layer:
0 to 8 inches, very dark grayish brown silty clay loam
8 to 12 inches, very dark gray silty clay

Subsoil:
12 to 32 inches, dark grayish brown clay

Substratum:
32 to 61 inches, mottled very dark grayish brown, dark grayish brown, and light olive brown clay

Important soil properties and features—

Permeability: Very slow
Available water capacity: Moderate
Soil reaction: Neutral or mildly alkaline
Organic matter content: Moderate
Depth to bedrock: More than 60 inches
Effective rooting depth: 20 to 40 inches for water-tolerant plants
Depth to a high water table: 0 to 12 inches
Flooding: Occasional; brief; January-April

Included with this soil in mapping are small areas of Beason and Melvin soils. Beason soils are somewhat poorly drained. They are on low terraces at the edge of the map unit. Melvin soils are poorly drained. They are mainly in slight depressions. Also included, in slight depressions, are small areas of Agee soils that have an overwash of brownish loam or silt loam 10 to 15 inches thick. Included soils make up about 10 percent of this map unit.

In most areas this Agee soil is used for pasture. In a few areas it is used for field crops. In a few areas it is used as woodland.

This soil is poorly suited to most field crops. In drained areas it is moderately suited to soybeans, corn, and grain sorghum. The seasonal high water table and poor tilth in the surface layer when either wet or dry limit access for planting and cultivation. The drained areas can be tilled when the condition of the surface layer will prevent the formation of clods and crust.

This soil is well suited to pasture and hay of water-tolerant grasses and legumes. Controlled grazing when the soil is wet helps to control surface compaction.

This soil is moderately suited to woodland. It is well suited to bottom land oaks, sweetgum, and eastern cottonwood. The seasonal high water table is the main limitation to woodland use and management. Use of equipment is limited to drier periods of the year. Undesirable plants reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is not suited to most urban uses. Flooding, the seasonal high water table, slow permeability, and high shrinking and swelling are the main limitations.

The capability subclass is IIIw in undrained areas and IIw in drained areas.

AnC—Allen loam, 5 to 12 percent slopes

This is a very deep, well drained, moderately sloping soil. It is on short, concave toe slopes at the base of the Cumberland Plateau Escarpment. Mapped areas range from 5 to 20 acres in size.

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

Surface layer:
0 to 11 inches, brown and dark yellowish brown loam

Subsoil:
11 to 35 inches, strong brown clay loam
35 to 61 inches, yellowish red clay loam

Important soil properties and features—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: More than 60 inches
Effective rooting depth: More than 40 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping, mainly on alluvial fans, are small areas of Sequatchie soils and well drained soils that contain more cobbles and stones. Sequatchie soils are also well drained. Included soils make up about 10 percent of this map unit.

In most areas this Allen soil is used for pasture and woodland. In some areas it is used for field and horticultural crops.

This soil is moderately suited to most field crops. Slope is the main limitation. A tillage system that leaves crop residue on the surface, contour farming, winter cover crops, and grassed waterways help to reduce runoff and to control erosion.

This soil is well suited to pasture and hay crops. Most grasses and legumes are suited.

This soil is well suited to yellow-poplar, upland oaks, and shortleaf and Virginia pines. Plant competition limits woodland use and management. Undesirable plants will reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is moderately suited to most urban uses. Slope and low strength are moderate limitations for some uses. Most limitations can be overcome by good design and construction.

The capability subclass is IIIe.

AnD—Allen loam, 12 to 25 percent slopes

This is a very deep, well drained, hilly soil. It is on foot slopes of the Cumberland Plateau Escarpment. Mapped areas range from 10 to 75 acres in size.

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

Surface layer:
0 to 10 inches, very dark grayish brown and dark yellowish brown loam

Subsoil:
10 to 19 inches, yellowish brown loam
19 to 23 inches, strong brown loam
23 to 72 inches, yellowish red and red clay loam

Important soil properties and features—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: More than 60 inches
Effective rooting depth: More than 40 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Bouldin, Etowah, and Waynesboro soils. Bouldin soils are mainly along drainageways. Etowah soils are on toe slopes at lower elevations in the map unit. Also included are small areas of soils that contain 15 to 35 percent cobbles and stones. These soils and Waynesboro soils are scattered randomly throughout the map unit. Included soils make up about 15 percent of this map unit.

In most areas this Allen soil is used as woodland. In some areas it is used for pasture.

This soil is poorly suited to most field crops. Slope is the main limitation. A conservation tillage system that leaves crop residue on the surface, contour farming, winter cover crops, and grassed waterways help to reduce runoff and to control erosion. This soil is moderately suited to pasture and hay. Most grasses and legumes are suited.

This soil is well suited to yellow-poplar, upland oaks, and shortleaf and Virginia pines. Plant competition is the main limitation to woodland use and management. Undesirable plants will reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used. This soil is poorly suited to most urban uses because of slope. For some uses proper design can overcome slope.

The capability subclass is IVe.

Ba—Beason silt loam, rarely flooded

This soil is a very deep, somewhat poorly drained, nearly level soil. It is on low terraces on the Highland Rim. Slopes are 0 to 2 percent. Mapped areas are irregular in shape and range from 5 to 100 acres in size.

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

Surface layer:
0 to 9 inches, brown and pale brown silt loam

Subsoil:
9 to 20 inches, brown silty clay loam
20 to 34 inches, pale brown, light silty clay loam
34 to 55 inches, light gray silty clay

Substratum:
55 to 72 inches, gray silty clay

Important soil properties and features—

Permeability: Moderately slow
Available water capacity: High
Soil reaction: Strongly acid or medium acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: More than 60 inches
Effective rooting depth: More than 40 inches for water-tolerant plants
Depth to a high water table: 1.0 to 2.0 feet
Flooding: Rare

Included with this soil in mapping are small areas of soils that have a loamy subsoil. Also included are small areas of Agee and Wolftever soils. Agee soils are poorly drained. They are in slight depressions. Wolftever soils are moderately well drained. They are mainly at the edge of this map unit. Included soils make up about 10 percent of this map unit.

In most areas this Beason soil is used for pasture. In a few areas it is used as woodland. In a few areas it is used for field crops.

This soil is moderately suited to water-tolerant plants and field crops planted late in spring. The seasonal high water table is the main limitation for most field crops. This soil is well suited to pasture of water-tolerant plants. Controlled grazing when the soil is wet helps to prevent surface compaction.

This soil is moderately suited to woodland. It is well suited to sweetgum, upland oaks, and loblolly pine. The seasonal high water table is the main limitation to woodland use and management. Use of

equipment is limited to drier periods of the year. Undesirable plants reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is poorly suited to most urban uses. Flooding, the seasonal high water table, and low strength are limitations for most urban uses.

The capability subclass is IIw.

BbB—Beersheba loam, 2 to 6 percent slopes

This is a moderately deep, well drained, gently sloping soil. It is on broad, convex ridgetops on the Cumberland Plateau. Mapped areas range from 5 to 150 acres in size.

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

Surface layer:
0 to 5 inches, dark brown and brown loam

Subsoil:
5 to 14 inches, yellowish brown loam
14 to 36 inches, yellowish brown sandy clay loam

Substratum:
36 to 50 inches, soft, weathered sandstone

Important soil properties and features—

Permeability: Moderately rapid
Available water capacity: Moderate
Soil reaction: Extremely acid to strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: 20 to 40 inches
Effective rooting depth: 20 to 40 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Lily, Lonewood, and Ramsey soils. Lily and Lonewood soils are well drained. Lily soils are scattered randomly throughout the map unit. Lonewood soils are mainly in broad, smooth areas at higher elevations in the map unit. Ramsey soils are somewhat excessively drained. They are in the steepest areas near the edge of the map unit. Included soils make up about 15 percent of this map unit.

In most areas this Beersheba soil is used as woodland. In some areas it is used for pasture, field crops, and horticultural crops.

This soil is well suited to field crops. Erosion is the main limitation for field crops. A conservation tillage system that leaves crop residue on the surface, contour farming, winter cover crops, and grassed waterways help to reduce runoff and to control erosion.

This soil is well suited to pasture. Many grasses and legumes are suited. Deep-rooted plants, such as alfalfa, are poorly suited.

This soil is well suited to upland oaks and shortleaf and Virginia pines. Plant competition is the main limitation to woodland use and management. Undesirable plants will reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is moderately suited or poorly suited to most urban uses. Depth to bedrock is the main limitation.

The capability subclass is IIe.

BbC—Beersheba loam, 6 to 12 percent slopes

This is a moderately deep, well drained, rolling soil. It is on ridgetops and side slopes on the Cumberland Plateau. Mapped areas range from 5 to 300 acres in size.

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

Surface layer:
0 to 5 inches, dark brown and brown loam

Subsoil:
5 to 14 inches, yellowish brown loam
14 to 36 inches, yellowish brown sandy clay loam

Substratum:
36 to 50 inches, soft, weathered sandstone

Important soil properties and features—

Permeability: Moderately rapid
Available water capacity: Moderate
Soil reaction: Extremely acid to strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: 20 to 40 inches
Effective rooting depth: 20 to 40 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Lily, Lonewood, Ramsey, and Sewanee soils. Lily soils are scattered randomly throughout the map unit. Lonewood soils are mainly on ridges at higher elevations in the map unit. Ramsey soils are mainly on short, steep slopes near drainageways. Sewanee soils are on narrow bottom lands along drainageways.

Included soils make up about 15 percent of this map unit.

In most areas this Beersheba soil is used as woodland. In some areas it is used for pasture, field crops, and horticultural crops.

This soil is moderately suited to field crops. Slope is the main limitation for field crops. A conservation tillage system that leaves crop residue on the surface, contour farming, winter cover crops, and grassed waterways help to reduce runoff and to control erosion. This soil is well suited to pasture. Many grasses and legumes are suited. Deep-rooted plants, such as alfalfa, are poorly suited.

This soil is well suited to upland oaks and shortleaf and Virginia pines. Plant competition is the main limitation to woodland use and management. Undesirable plants will reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is moderately suited or poorly suited to most urban uses. Depth to bedrock and slope are the main limitations.

The capability subclass is IIIe.

BbD—Beersheba loam, 12 to 20 percent slopes

This is a moderately deep, well drained, hilly soil. It is on side slopes on the Cumberland Plateau. Mapped areas range from 5 to 100 acres in size.

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

Surface layer:
0 to 5 inches, dark brown and brown loam

Subsoil:
5 to 14 inches, yellowish brown loam
14 to 36 inches, yellowish brown sandy clay loam

Substratum:
36 to 50 inches, soft, weathered sandstone

Important soil properties and features—

Permeability: Moderately rapid
Available water capacity: Moderate
Soil reaction: Extremely acid to strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: 20 to 40 inches
Effective rooting depth: 20 to 40 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Lily, Gilpin, Ramsey, and Sewanee soils. Lily and Gilpin soils are well drained. Lily soils are scattered randomly throughout the map unit. Gilpin soils overlie thin bands of shale that extend around the slope on the contour. Ramsey soils are somewhat excessively drained. They are mainly on short, steep slopes. Sewanee soils are moderately well drained. They are on narrow bottom lands along drainageways. Included soils make up about 15 percent of this map unit.

In most areas this Beersheba soil is used as woodland. In some areas it is used for pasture.

This soil is poorly suited to field crops. Erosion is the main limitation for field crops. A conservation tillage system that leaves crop residue on the surface and winter cover crops help to reduce runoff and to control erosion. This soil is moderately suited to pasture. Many grasses and legumes are suited. Deep-rooted plants, such as alfalfa, are poorly suited.

This soil is well suited to upland oaks and shortleaf and Virginia pines. Slope causes a moderate erosion hazard and a moderate equipment limitation during timber harvesting. Undesirable plants reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

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

The capability subclass is IVe.

BdD—Bethesda channery loam, 8 to 25 percent slopes

This is a very deep, well drained, moderately sloping and steep soil. It is in areas of old surface coal mines on the Cumberland Plateau. These areas have been smoothed and planted. Some places have a highwall that is almost vertical. Mapped areas range from 5 to 200 acres in size.

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

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

Substratum:
2 to 10 inches, strong brown extremely channery clay loam
10 to 63 inches, brownish yellow extremely stony clay loam

Important soil properties and features—

Permeability: Moderately slow

Available water capacity: Very low or low
Soil reaction: Extremely acid or very strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: More than 60 inches
Effective rooting depth: Variable
Depth to a high water table: More than 72 inches
Flooding: None

Included with this unit in mapping and scattered randomly throughout the unit are small, undisturbed areas of Beersheba, Gilpin, Lily, and Ramsey soils. Beersheba, Gilpin, and Lily soils are well drained. Ramsey soils are somewhat excessively drained. Included soils make up less than 5 percent of this map unit.

This Bethesda soil is mostly idle. It has been planted to grasses and legumes or pine trees to help control erosion.

This soil is poorly suited to pasture, woodland, and most urban uses. It is not suited to field crops. Plants that tolerate droughtiness and high acidity are best suited. Slope, droughtiness, high acidity, unstable fill, and content of rock fragments are limitations for many uses. Onsite evaluation is needed to determine suitability and conservation practices needed for a particular use.

The capability subclass is VIs.

BhF—Bethesda-Pits complex, 20 to 90 percent slopes

This map unit consists mainly of areas of active or inactive surface coal mines on the Cumberland Plateau. In places this map unit consists of a highwall, a pit, and a spoil pile of soil and rock extending around hill slopes more or less on the contour. In other places it consists of a series of spoil piles and pits parallel to each other. The Bethesda soil is very deep, well drained, and steep and very steep. It makes up about 55 to 85 percent of this map unit. The pits range from 25 to 200 feet in width and are several hundred feet in length. Some pits have a highwall that ranges from 25 to 75 feet in height and generally extends the length of the pit. Pits make up about 10 to 45 percent of this map unit. Individual areas of this map unit range from 5 to 1,000 acres in size.

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

Surface layer:
0 to 4 inches, mottled yellowish brown, brown and strong brown channery loam

Substratum:
4 to 61 inches, mottled yellowish brown, brown, and strong brown extremely channery loam

Important soil properties and features—

Permeability: Moderately slow
Available water capacity: Very low or low
Soil reaction: Extremely acid or very strongly acid
Organic matter content: Low
Depth to bedrock: More than 60 inches
Effective rooting depth: Variable
Depth to a high water table: More than 72 inches
Flooding: None

Included with this unit in mapping and scattered randomly throughout the unit are small, undisturbed areas of Beersheba, Gilpin, Lily, and Ramsey soils. These included soils are less than 40 inches deep to bedrock. Included soils make up less than 5 percent of this map unit.

The Bethesda soil in this map unit is idle. It either has no vegetation or sparse vegetation of weeds, pine trees, and black locust.

The Bethesda soil is poorly suited to woodland and most urban uses. It is not suited to pasture and field crops. Plants that tolerate droughtiness and high acidity are best suited. Slope, droughtiness, acidity, unstable fill, and a large amount of fragments are limitations for most uses. Onsite evaluation is needed to determine suitability and conservation practices needed for a particular use.

The capability subclass is VIIs.

Bn—Bonair loam, occasionally flooded

This is a deep, poorly drained, nearly level soil. It is on narrow bottom lands along drainageways on the Cumberland Plateau. Slopes are 0 to 2 percent. Mapped areas range from 5 to 40 acres in size.

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

Surface layer:
0 to 8 inches, very dark gray loam

Subsoil:
8 to 13 inches, dark gray silt loam
13 to 29 inches, gray clay loam
29 to 46 inches, mottled gray, yellowish brown and light gray loam

Substratum:
46 to 52 inches, light gray loam
52 inches, hard sandstone

Important soil properties and features—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Moderate
Depth to bedrock: More than 40 inches
Effective rooting depth: More than 30 inches for water-tolerant plants
Depth to a high water table: 0 to 12 inches
Flooding: Occasional; very brief; January-April

Included with this soil in mapping are small areas of Sewanee soils mainly near the edge of the map unit. They are moderately well drained. Also included are small areas of poorly drained soils that have a lighter colored surface layer than the Bonair soil. Also included, along drainageways below former sites of coal washers and coke ovens, are small areas of somewhat poorly drained and poorly drained soils that have an overwash of coal dust. Included soils make up about 15 percent of this map unit.

In most areas this Bonair soil is used as woodland. In some areas it is used for pasture.

This soil is poorly suited to most field crops. The seasonal high water table is the main limitation.

This soil is moderately suited to pasture of water-tolerant plants. Controlled grazing when the soil is wet helps prevent surface compaction.

This soil is moderately suited to woodland. It is well suited to sweetgum, willow oaks, and loblolly pine. The seasonal high water table is the main limitation to woodland use and management. Use of equipment is limited to drier periods of the year. Undesirable plants reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is not suited to most urban uses. Flooding and the seasonal high water table are the main limitations to most urban uses.

The capability subclass is IIIw.

BoF—Bouldin stony loam, 30 to 75 percent slopes, bouldery

This is a very deep, well drained, steep and very steep soil. It is on long, concave side slopes and head slopes on the Cumberland Plateau Escarpment. A nearly vertical sandstone cliff is at the upper part of most mapped areas. Boulders of sandstone 2 to 20 feet across cover 0.01 to 0.1 percent of the surface. Mapped areas range from 20 to 1,000 acres in size.

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

Surface layer:
0 to 5 inches, very dark grayish brown and brown stony loam

Subsoil:
5 to 12 inches, strong brown cobbly loam
12 to 30 inches, yellowish red very stony loam
30 to 90 inches, yellowish red extremely stony clay loam

Important soil properties and features—

Permeability: Moderately rapid
Available water capacity: Low
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Low
Depth to bedrock: More than 60 inches
Effective rooting depth: More than 40 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Talbott and Carbo soils and areas where limestone crops out. These areas are on convex nose slopes at lower elevations in this map unit. Also included are small areas of soils that are similar to this Bouldin soil but that have fewer stones. These soils are scattered throughout the map unit, but generally are on benches. Included soils make up about 15 percent of this map unit.

This Bouldin soil is used as woodland.

This soil is not suited to field crops or pasture. Slope, the content of stones, and boulders on the surface are the main limitations.

This soil is moderately suited to woodland. It is well suited to upland oaks, yellow-poplar, and loblolly pine. Slope, the content of stones, and boulders on the surface are the main limitations to woodland use and management. They restrict the use of wheeled and tracked equipment. Cable yarding generally is safer and disturbs less soil. The limitations restrict methods used in site preparation in reforestation.

This soil is poorly suited to most urban uses. Slope, the content of stones, boulders on the surface, and slippage are the main limitations to most urban uses.

The capability subclass is VIIs.

CaB—Clarkrange silt loam, 1 to 5 percent slopes

This is a deep, moderately well drained, nearly level and gently sloping soil. A compact fragipan is in the subsoil. It is on broad, smooth uplands on the Cumberland Plateau. Mapped areas range from 5 to 100 acres in size.

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

Surface layer:
0 to 6 inches, brown silt loam

Subsoil:
6 to 22 inches, yellowish brown silt loam
22 to 35 inches, mottled pale brown and yellowish brown silt loam fragipan
35 to 49 inches, yellowish brown clay loam fragipan
49 to 54 inches, yellowish brown clay loam

Substratum:
54 to 61 inches, weathered sandstone

Important soil properties and features—

Permeability: Moderate above the fragipan and slow within the fragipan
Available water capacity: Moderate or high
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: 40 to 80 inches
Effective rooting depth: 20 to 30 inches
Depth to a high water table: 18 to 30 inches
Flooding: None

Included with this soil in mapping are small, rolling, convex areas of Lily and Lonewood soils. They do not have a fragipan. Included soils make up about 10 percent of this map unit.

In most areas this Clarkrange soil is used as woodland. In some cleared areas it is used for cultivated crops, hay, or pasture.

This soil is moderately suited to cultivated crops. The main limitations are a perched water table above the fragipan in winter and early spring and a restricted root zone that limits available water capacity. Crops that have a shorter season and that can be planted later, such as soybeans, are best suited. In the most rolling areas, erosion is a moderate hazard. Conservation tillage, contour farming, and grassed waterways help to control erosion. This soil is well suited to hay and pasture. Most cool-season grasses and legumes are suited. Alfalfa is poorly suited because of the perched water table and restricted root zone.

This soil is well suited to upland oaks and loblolly, shortleaf, and Virginia pines. Windthrow can cause some damage because of the restricted root zone. Plant competition will reduce adequate natural or artificial reforestation. In some areas site preparation and cultivation or spraying are needed to control undesirable plants.

This soil is moderately suited for building sites and most other urban uses. Septic tank absorption fields are poorly suited because of the seasonal high water table and slow permeability.

The capability subclass is IIe.

CoB—Cobstone cobbly loam, 1 to 5 percent slopes, rarely flooded

This is a very deep, well drained, nearly level and undulating soil. It is on alluvial fans and low terraces in coves at the base of the Cumberland Plateau Escarpment. Mapped areas range from 5 to 150 acres in size.

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

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

Subsoil:
7 to 16 inches, strong brown cobbly loam
16 to 28 inches, strong brown very cobbly clay loam
28 to 42 inches, strong brown very cobbly loam

Substratum:
42 to 61 inches, yellowish brown extremely cobbly sandy loam

Important soil properties and features—

Permeability: Moderately rapid
Available water capacity: Low
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: More than 60 inches
Effective rooting depth: More than 40 inches
Depth to a high water table: More than 72 inches
Flooding: Rare

Included with this soil in mapping are small areas of Sequatchie and Sullivan soils. Sequatchie soils are scattered randomly throughout this map unit. Sullivan soils are mainly adjacent to drainageways at lower elevations in this map unit. Also included, scattered

randomly throughout this map unit, are small areas of cobbly soils that have only 15 to 35 percent cobbles and stones throughout. Included soils make up about 15 percent of this map unit.

In most areas this Cobstone soil is used as woodland. In some areas it is used as pasture. Cobbles and stones have been removed from the surface and piled in random places. These cleared areas are used for pasture or in places have reverted to woodland.

This soil is poorly suited to field crops and hay. It is moderately suited to pasture. The content of cobbles and stones on the surface limit both tillage and mowing. Most grasses and legumes are suited.

This soil is moderately suited to upland oaks and shortleaf, loblolly, and Virginia pines. The high content of cobbles increases the seedling mortality rate. Undesirable plants reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is not suited to many urban uses. Flooding and the content of cobbles and stones are severe limitations.

The capability subclass is VIs.

Em—Emory silt loam

This is a very deep, well drained, nearly level soil. It is on concave toe slopes and in slight depressions on the Highland Rim. Slopes are 0 to 3 percent. Mapped areas range from 5 to 10 acres in size.

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

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

Subsoil:
7 to 25 inches, dark reddish brown silt loam
25 to 61 inches, reddish brown and strong brown silty clay loam

Important soil properties and features—

Permeability: Moderate
Available water capacity: High
Soil reaction: Strongly acid or medium acid, but in limed areas the surface layer is less acid
Organic matter content: Moderate
Depth to bedrock: More than 60 inches
Effective rooting depth: More than 40 inches
Depth to a high water table: 60 to 72 inches
Flooding: None

Included with this soil in mapping are small areas of Etowah, Sullivan, and Sequatchie soils. Etowah soils are mainly on toe slopes at higher elevations in this map unit. Sequatchie soils are on terraces at lower elevations in this map unit. Sullivan soils are mainly in depressions at lower elevations in this map unit. Included soils make up about 10 percent of this map unit.

In most areas this Emory soil is used for field crops. In some areas it is used for pasture and hay.

This soil is well suited to field crops, pasture, and hay. Most grasses and legumes are suited.

This soil is well suited to upland oaks, black walnut, yellow-poplar, and loblolly pine. Plant competition is the main limitation to woodland use and management. Undesirable plants will reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is well suited or moderately suited to most urban uses. Most limitations can be easily overcome by good design and construction.

The capability subclass is I.

EtB—Etowah silt loam, 2 to 5 percent slopes

This is a very deep, well drained, gently sloping soil. It is on terraces on the Highland Rim. Mapped areas range from 5 to 100 acres in size.

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

Surface layer:
0 to 10 inches, dark brown silt loam

Subsoil:
10 to 21 inches, strong brown silty clay loam
21 to 63 inches, yellowish red silty clay loam

Important soil properties and features—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low or moderate
Depth to bedrock: More than 60 inches
Effective rooting depth: More than 40 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Emory, Sequatchie, Swafford, and Waynesboro soils. Emory, Sequatchie, and Waynesboro soils are well drained. Swafford soils are moderately well drained.

Emory soils are on toe slopes or in slight depressions at lower elevations in this map unit. Sequatchie and Swafford soils are on terraces and toe slopes at lower elevations in this map unit. Waynesboro soils are on convex slopes at higher elevations in this map unit. Included soils make up about 15 percent of this map unit.

In most areas this Etowah soil is used for field crops, horticultural and nursery crops, and hay. In a few areas it is used as woodland. In a few areas it is used for pasture.

This soil is well suited to field crops and horticultural and nursery crops. Slope is the main limitation. A conservation tillage system that leaves crop residue on the surface, contour farming, winter cover crops, and grassed waterways help to reduce runoff and to control erosion (fig. 6). This soil is well suited to pasture and hay crops. Most grasses and legumes are suited.

This soil is well suited to upland oaks, yellow-poplar, and shortleaf and loblolly pines. Plant competition is the main limitation to woodland use and management. Undesirable plants will reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

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

The capability subclass is IIe.

EtC2—Etowah silt loam, 5 to 12 percent slopes, eroded

This is a very deep, well drained, moderately sloping soil. It is on terraces and foot slopes on the Highland Rim. Mapped areas range from 5 to 30 acres in size. The plow layer consists of mixed original surface layer and subsoil. Erosion has removed part of the original surface layer.

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

Surface layer:
0 to 8 inches, brown silt loam

Subsoil:
8 to 12 inches, reddish brown silty clay loam

Figure 6.—Soybeans growing on Etowah silt loam, 2 to 5 percent slopes. No-till farming practices help to conserve moisture and to control erosion.

12 to 61 inches, yellowish red and red silty clay loam

Important soil properties and features—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: More than 60 inches
Effective rooting depth: More than 40 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Emory, Sequatchie, and Waynesboro soils. Emory and Sequatchie soils are on toe slopes and along drainageways at lower elevations in this map unit. Waynesboro soils are on convex slopes mainly at higher elevations in this map unit. Also included are small areas of soils that contain 15 to 25 percent fragments of chert. These soils are mainly on foot slopes near the base of the Cumberland Plateau Escarpment. Included soils make up about 15 percent of this map unit.

In most areas this Etowah soil is used for pasture and hay. In some areas it is used for field crops and as woodland.

This soil is moderately suited to field crops. Slope is the main limitation. A conservation tillage system that leaves crop residue on the surface, contour farming, winter cover crops, and grassed waterways help to reduce runoff and to control erosion. This soil is well suited to pasture and hay crops. Most grasses and legumes are suited.

This soil is well suited to upland oaks, yellow-poplar, and shortleaf and loblolly pines. Plant competition is the main limitation to woodland use and management. Undesirable plants will reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is moderately suited to most urban uses. Slope is the dominant limitation. Most limitations can be overcome by good design and proper construction.

The capability subclass is IIIe.

GpC—Gilpin channery silt loam, 6 to 12 percent slopes

This is a moderately deep, well drained, rolling soil. It is on convex ridges on the Cumberland Plateau. Mapped areas range from 5 to 100 acres in size.

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

Surface layer:
0 to 5 inches, very dark grayish brown and yellowish brown channery silt loam

Subsoil:
5 to 24 inches, yellowish brown and strong brown channery silty clay loam
24 to 31 inches, strong brown very channery silty clay loam

Substratum:
31 inches, soft, weathered shale

Important soil properties and features—

Permeability: Moderate
Available water capacity: Low or moderate
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: 20 to 40 inches
Effective rooting depth: 20 to 40 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Beersheba, Lily, Lonewood, and Sewanee soils. Beersheba, Lily, and Lonewood soils are well drained. Beersheba and Lily soils are mainly near the edge of this map unit. Lonewood soils are mainly on broad ridgetops. Also included are small areas of Sewanee soils on bottom lands along drainageways. Sewanee soils are moderately well drained. Included soils make up about 15 percent of this map unit.

In most areas this Gilpin soil is used as woodland. In some areas it is used for pasture.

This soil is moderately suited to field crops. Slope is the main limitation. A conservation tillage system that leaves crop residue on the surface, contour farming, winter cover crops, and grassed waterways help to reduce runoff and to control erosion. This soil is well suited to pasture. Many grasses and legumes are suited. Deep-rooted plants, such as alfalfa, are poorly suited.

This soil is well suited to upland oaks and shortleaf and Virginia pines. Plant competition is the main limitation to woodland use and management. Undesirable plants will reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is moderately suited or poorly suited to most urban uses. Depth to bedrock is a moderate or severe limitation. Slope is also a limitation.

The capability subclass is IIIe.

GpD—Gilpin channery silt loam, 12 to 20 percent slopes

This is a moderately deep, well drained, hilly soil. It is on convex side slopes on the Cumberland Plateau. Mapped areas range from 5 to 250 acres in size.

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

Surface layer:
0 to 7 inches, brown and yellowish brown channery silt loam

Subsoil:
7 to 17 inches, yellowish brown channery silt loam
17 to 38 inches, strong brown channery and very channery silty clay loam

Substratum:
38 inches, soft, weathered shale

Important soil properties and features—

Permeability: Moderate
Available water capacity: Low or moderate
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: 20 to 40 inches
Effective rooting depth: 20 to 40 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Jefferson, Lily, Ramsey, and Sewanee soils. Jefferson and Lily soils are well drained. Ramsey soils are somewhat excessively drained. Jefferson soils are mainly on concave foot slopes at lower elevations in this map unit. Lily and Ramsey soils are mainly on ridgetops and shoulders at higher elevations in this map unit. Sewanee soils are moderately well drained. They are on bottom lands along drainageways at lower elevations in this map unit. Included soils make up about 15 percent of this map unit.

In most areas this Gilpin soil is used as woodland. In some areas it is used for pasture.

This soil is poorly suited to field crops. A conservation tillage system that leaves crop residue on the surface, contour farming, and winter cover crops help to reduce runoff and to control erosion. This soil is moderately well suited to pasture. Many grasses and legumes are suited. Deep-rooted plants, such as alfalfa, are poorly suited.

This soil is moderately suited to woodland. It is suited to upland oaks and shortleaf and Virginia pines. Plant competition is the main limitation to woodland use and management. Undesirable plants will reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

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

The capability subclass is IVe.

GpE—Gilpin channery silt loam, 20 to 45 percent slopes

This is a moderately deep, well drained, steep soil. It is on convex side slopes on the Cumberland Plateau. Mapped areas range from 5 to 250 acres in size.

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

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

Subsoil:
6 to 25 inches, yellowish brown and strong brown channery silty clay loam

Substratum:
25 inches, soft, weathered siltstone

Important soil properties and features—

Permeability: Moderate
Available water capacity: Low or moderate
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: 20 to 40 inches
Effective rooting depth: 20 to 40 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Jefferson, Lily, and Ramsey soils. Jefferson and Lily soils are well drained. Ramsey soils are somewhat excessively drained. Jefferson soils are mainly on concave foot slopes and along drainageways at lower elevations in this map unit. Lily and Ramsey soils are mainly on convex shoulders at higher elevations in this map unit. Included soils make up about 15 percent of this map unit.

In most areas this Gilpin soil is used as woodland. In some areas it is used for pasture.

This soil is not suited to field crops and is poorly suited to pasture. Slope is the main limitation.

This soil is moderately suited to upland oaks and

shortleaf and Virginia pines. Slope is the main limitation to woodland use and management. Wheeled and tracked equipment can be used, but cable yarding is generally safer and disturbs less soil. Undesirable plants reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

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

The capability subclass is VIIe.

GrE—Gilpin-Ramsey-Rock outcrop complex, 20 to 60 percent slopes

This map unit consists of the moderately deep, well drained Gilpin soil, the shallow, somewhat excessively drained Ramsey soil, and Rock outcrop. It is on steep, convex side slopes on the Cumberland Plateau in the eastern part of the county. It is 55 to 75 percent Gilpin soil, 10 to 20 percent Ramsey soil, and 5 to 15 percent Rock outcrop. The Rock outcrop is sandstone. Individual areas of this unit range from 20 to 400 acres in size. The Gilpin and Ramsey soils and areas of Rock outcrop are so intricately mixed that they could not be separated at the scale used in mapping.

The typical sequence, depth, and composition of the layers of the Gilpin soil are as follows—

Surface layer:
0 to 4 inches, dark brown and dark yellowish channery loam

Subsoil:
4 to 16 inches, dark yellowish brown and yellowish brown channery loam
16 to 26 inches, yellowish brown channery silty clay loam
26 to 33 inches, brownish yellow very channery silt loam

Substratum:
33 inches, soft, weathered siltstone

The typical sequence, depth, and composition of the layers of the Ramsey soil are as follows—

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

Subsoil:
4 to 13 inches, yellowish brown stony loam

Substratum:
13 inches, hard sandstone

Important soil properties and features of the Gilpin soil—

Permeability: Moderate
Available water capacity: Low or moderate
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Low
Depth to bedrock: 20 to 40 inches
Effective rooting depth: 20 to 40 inches
Depth to a high water table: More than 72 inches
Flooding: None

Important soil properties and features of the Ramsey soil—

Permeability: Rapid
Available water capacity: Very low
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Low
Depth to bedrock: 7 to 20 inches
Effective rooting depth: 7 to 20 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this unit in mapping are small areas of Lily and Jefferson soils. Lily soils are mainly on shoulders at higher elevations in this map unit. Jefferson soils are mainly in concave areas at lower elevations in this map unit. Also included are small areas of stony soils mainly below areas of rock outcrop or along drainageways. Included soils make up about 15 percent of this map unit.

In almost all areas the Gilpin and Ramsey soils are used as woodland.

The Gilpin and Ramsey soils are not suited to field crops and are poorly suited to pasture. Slope, depth to bedrock, rock outcrop, and stoniness are the main limitations. Shallow-rooted, drought-tolerant plants are best suited.

The Gilpin and Ramsey soils are moderately suited to upland oaks and shortleaf and Virginia pines. Slope, stoniness, and depth to bedrock are the main limitations to woodland use and management. Wheeled and tracked equipment can be used, but cable yarding is generally safer and disturbs less soil.

The Gilpin and Ramsey soils are poorly suited to urban uses. Slope, stoniness, and depth to bedrock are the main limitations.

The capability subclass is VIIs.

Ha—Hamblen loam, occasionally flooded

This is a very deep, moderately well drained, nearly level soil. It is on bottom lands along drainageways on

the Highland Rim. Slopes are 0 to 2 percent. Mapped areas range from 5 to 150 acres in size.

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

Surface layer:
0 to 5 inches, dark brown loam

Subsoil:
5 to 24 inches, brown and yellowish brown loam

Substratum:
24 to 45 inches, brown loam
45 to 61 inches, light brownish gray silt loam

Important soil properties and features—

Permeability: Moderate
Available water capacity: High
Soil reaction: Strongly acid or medium acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: More than 60 inches
Effective rooting depth: More than 40 inches for water-tolerant plants
Depth to a high water table: 24 to 36 inches
Flooding: Occasional; very brief; January-April

Included with this soil in mapping are small areas of Newark, Sullivan, and Whitwell soils. Newark soils are somewhat poorly drained. They are mainly in slight depressions. Sullivan soils are well drained. They are mainly adjacent to drainageways. Whitwell soils are moderately well drained. They are on low terraces at higher elevations than the Hamblen soil. Also included, near the banks of larger drainageways, are narrow areas of somewhat excessively drained soils that contain more sand than this Hamblen soil. Included soils make up about 15 percent of this map unit.

In most areas this Hamblen soil is used for pasture and hay. In some areas it is used for field crops.

This soil is well suited to field crops. Occasional flooding is the main limitation.

This soil is well suited to pasture and hay. Many grasses and legumes are suited. Plants that are deep rooted but not water tolerant, such as alfalfa, are poorly suited.

This soil is well suited to bottom land oaks, yellow-poplar, and loblolly pine. Flooding is a moderate limitation for seedlings. Undesirable plants reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

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

The capability subclass is IIw.

JeC—Jefferson loam, 5 to 12 percent slopes

This is a very deep, well drained, moderately sloping soil. It is on concave foot slopes on the Cumberland Plateau. Mapped areas range from 5 to 30 acres in size.

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

Surface layer:
0 to 8 inches, brown loam

Subsoil:
8 to 53 inches, yellowish brown and strong brown gravelly loam

Substratum:
53 to 61 inches, yellowish brown gravelly sandy loam

Important soil properties and features—

Permeability: Moderately rapid
Available water capacity: Moderate or high
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: More than 60 inches
Effective rooting depth: More than 40 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Lily and Lonewood soils mainly near the edge of this map unit. Also included are small areas of soils that are similar to this Jefferson soil but that have more fragments on the surface and throughout the soil profile. These soils are mainly on alluvial fans and adjacent to drainageways. Included soils make up about 10 percent of this map unit.

In most areas this Jefferson soil is used as woodland. In some areas it is used for pasture and for horticultural and field crops.

This soil is moderately suited to field crops. Slope is the main limitation for field crops. A conservation tillage system that leaves crop residue on the surface, contour farming, winter cover crops, and grassed waterways help to reduce runoff and to control erosion. This soil is well suited to pasture. Most grasses and legumes are suited.

This soil is well suited to yellow-poplar, upland oaks, and loblolly pine. Plant competition is the main limitation to woodland use and management. Undesirable plants will reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is moderately suited to many urban uses. Slope is a limitation. Slope can be overcome by good design and construction.

The capability subclass is IIIe.

JeD—Jefferson loam, 12 to 20 percent slopes

This is a very deep, well drained, hilly soil. It is mainly on concave foot slopes and head slopes on the Cumberland Plateau. Mapped areas range from 5 to 100 acres in size.

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

Surface layer:
0 to 12 inches, dark brown and yellowish brown loam

Subsoil:
12 to 22 inches, strong brown gravelly loam
22 to 56 inches, strong brown gravelly clay loam

Substratum:
56 to 84 inches, mottled strong brown, yellowish brown and pale brown gravelly loam

Important soil properties and features—

Permeability: Moderately rapid
Available water capacity: Moderate or high
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: More than 60 inches
Effective rooting depth: More than 40 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Lily, Gilpin, and Ramsey soils. Lily and Gilpin soils are well drained. Ramsey soils are somewhat excessively drained. Lily and Ramsey soils are mainly on shoulders at higher elevations in this map unit. Gilpin soils are mainly on convex nose slopes. Also included, mainly along drainageways, are areas of stony soils that have more fragments on the surface and throughout the surface layer and the subsoil than this Jefferson soil. Included soils make up about 15 percent of this map unit.

In nearly all areas this Jefferson soil is used as woodland. In a few areas it is used for pasture.

This soil is poorly suited to field crops because of slope. A conservation tillage system that leaves crop residue on the surface, contour farming, winter cover crops, and grassed waterways help to reduce runoff and to control erosion. This soil is well suited to pasture. Most grasses and legumes are suited.

This soil is well suited to yellow-poplar, upland oaks, and loblolly pine. Erosion is a moderate hazard. Slope limits the use of equipment for timber harvesting. Undesirable plants reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is poorly suited to most urban uses because of slope. This limitation can be overcome for some uses by good design and construction.

The capability subclass is IVe.

JeE—Jefferson loam, 20 to 40 percent slopes

This is a very deep, well drained, steep soil. It is mainly on concave side slopes and head slopes on the Cumberland Plateau. Mapped areas range from 30 to 250 acres in size.

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

Surface layer:
0 to 12 inches, very dark grayish brown and yellowish brown loam

Subsoil:
12 to 26 inches, yellowish brown and strong brown gravelly loam
26 to 47 inches, strong brown gravelly clay loam
47 to 52 inches, strong brown gravelly loam

Substratum:
52 to 63 inches, yellowish brown gravelly sandy loam

Important soil properties and features—

Permeability: Moderately rapid
Available water capacity: Moderate or high
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Low
Depth to bedrock: More than 60 inches
Effective rooting depth: More than 40 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Lily, Ramsey, and Gilpin soils. Lily and Gilpin soils are well drained. Ramsey soils are somewhat excessively drained. Lily and Ramsey soils are mainly on shoulders at higher elevations in this map unit. Gilpin soils are mainly on convex nose slopes. Also included are small areas of sandstone outcrops at higher elevations in this map unit. Also included are small areas of soils below sandstone outcrops and

along drainageways at higher elevations in this map unit. These soils have stones and boulders on the surface and have more rock fragments throughout the surface layer and the subsoil than this Jefferson soil. Included soils and rock outcrops make up about 15 percent of this map unit.

In nearly all areas this Jefferson soil is used as woodland. In a few areas it is used for pasture.

This soil is poorly suited to field crops. It is moderately suited or poorly suited to pasture depending on steepness of slope. Most grasses and legumes are suited.

This soil is moderately suited to yellow-poplar, upland oaks, and shortleaf pine. Slope is a limitation to woodland use and management. Wheeled and tracked equipment can be used, but cable yarding is generally safer and disturbs less soil. Undesirable plants reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is poorly suited to most urban uses. Slope is a limitation. Slope is difficult to overcome for most uses.

The capability subclass is VIIe.

LaB—Lily loam, 2 to 6 percent slopes

This is a moderately deep, well drained, gently sloping soil. It is on broad, convex uplands on the Cumberland Plateau. Mapped areas range from 5 to 50 acres in size.

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

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

Subsoil:
6 to 27 inches, yellowish brown loam

Substratum:
27 to 31 inches, yellowish brown sandy loam
31 inches, hard sandstone

Important soil properties and features—

Permeability: Moderately rapid
Available water capacity: Moderate
Soil reaction: Extremely acid to strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: 20 to 40 inches
Effective rooting depth: 20 to 40 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Beersheba, Lonewood, and Ramsey soils. Beersheba and Lonewood soils are well drained. Beersheba soils are scattered randomly throughout the map unit. Lonewood soils are mainly in broad, smooth areas at higher elevations in the map unit. Ramsey soils are somewhat excessively drained. They are in the more sloping areas mainly near the edge of the map unit. Included soils make up about 15 percent of this map unit.

In most areas this Lily soil is used as woodland. In some areas it is used for pasture and for field and horticultural crops.

This soil is well suited to field crops. Slope is the main limitation for field crops. A conservation tillage system that leaves crop residue on the surface, contour farming, winter cover crops, and grassed waterways help to reduce runoff and to control erosion. This soil is well suited to pasture. Most grasses and legumes are suited. Deep-rooted plants, such as alfalfa, are poorly suited.

This soil is well suited to upland oaks and shortleaf and Virginia pines. Plant competition is the main limitation to woodland use and management. Undesirable plants will reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is moderately suited to some urban uses and poorly suited to others. Depth to bedrock is a severe limitation for most uses.

The capability subclass is IIe.

LaC—Lily loam, 6 to 12 percent slopes

This is a moderately deep, well drained, rolling soil. It is on the upland ridges and side slopes on the Cumberland Plateau. Mapped areas range from 5 to 200 acres in size.

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

Surface layer:
0 to 7 inches, dark brown and yellowish brown loam

Subsoil:
7 to 27 inches, yellowish brown clay loam

Substratum:
27 inches, hard sandstone

Important soil properties and features—

Permeability: Moderately rapid
Available water capacity: Moderate
Soil reaction: Extremely acid to strongly acid, but in limed areas the surface layer is less acid

Organic matter content: Low
Depth to bedrock: 20 to 40 inches
Effective rooting depth: 20 to 40 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Beersheba, Lonewood, Ramsey, and Sewanee soils. Beersheba soils are scattered randomly throughout the map unit. Lonewood soils are mainly on ridges at higher elevations in the map unit. Ramsey soils are mainly on short, steep slopes near drainageways. Sewanee soils are on narrow bottom lands along drainageways. Included soils make up about 15 percent of this map unit.

In most areas this Lily soil is used as woodland. In some areas it is used for pasture and for field and horticultural crops.

This soil is moderately suited to field crops. Slope is the main limitation for field crops. A conservation tillage system that leaves crop residue on the surface, contour farming, winter cover crops, and grassed waterways help to reduce runoff and to control erosion. This soil is well suited to pasture. Most grasses and legumes are suited. Deep-rooted plants, such as alfalfa, are poorly suited.

This soil is well suited to upland oaks and shortleaf and Virginia pines. Plant competition is the main limitation to woodland use and management. Undesirable plants will reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is moderately suited to some urban uses and poorly suited to others. Depth to bedrock and slope are severe limitations for some uses.

The capability subclass is IIIe.

LaD—Lily loam, 12 to 20 percent slopes

This is a moderately deep, well drained, hilly soil. It is on upland side slopes on the Cumberland Plateau. Mapped areas range from 5 to 150 acres in size.

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

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

Subsoil:
2 to 24 inches, yellowish brown loam

Substratum:
24 inches, hard sandstone

Important soil properties and features—

Permeability: Moderately rapid
Available water capacity: Moderate
Soil reaction: Extremely acid to strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: 20 to 40 inches
Effective rooting depth: 20 to 40 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Beersheba, Gilpin, Ramsey, and Sewanee soils. Beersheba and Gilpin soils are well drained. Beersheba soils are scattered randomly throughout the map unit. Gilpin soils overlie thin bands of shale that extend around the contour in some areas of the map unit. Ramsey soils are somewhat excessively drained. They are mainly on short, steep slopes. Sewanee soils are moderately well drained. They are on narrow bottom lands along drainageways. Included soils make up about 15 percent of this map unit.

In most areas this Lily soil is used as woodland. In some areas it is used for pasture.

This soil is poorly suited to field crops. Slope is the main limitation for field crops. A conservation tillage system that leaves crop residue on the surface and winter cover crops help to reduce runoff and to control erosion. This soil is well suited to pasture. Most grasses and legumes are suited. Deep-rooted plants, such as alfalfa, are poorly suited.

This soil is moderately suited to upland oaks and shortleaf and Virginia pines. Erosion is a moderate hazard. Slope limits the use of equipment in timber harvesting. Undesirable plants reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

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

The capability subclass is IVe.

LoB—Lonewood silt loam, 2 to 5 percent slopes

This is a deep, well drained, gently sloping soil. It is mainly on broad uplands on the Cumberland Plateau. Mapped areas range from 5 to 200 acres in size.

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

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

Subsoil:
7 to 29 inches, yellowish brown silt loam
29 to 58 inches, strong brown and yellowish red clay loam

Substratum:
58 to 62 inches, yellowish red sandy loam
62 to 67 inches, soft, weathered sandstone

Important soil properties and features—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: 40 to 72 inches
Effective rooting depth: 40 inches or more
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Beersheba, Clarkrange, Lily, Monteagle, and Sewanee soils. Beersheba and Lily soils are well drained. They are scattered randomly throughout the map unit. Clarkrange and Sewanee soils are moderately well drained. Clarkrange soils are mainly in broad, less sloping areas. Sewanee soils are on bottom lands along drainageways. Monteagle soils are well drained. They are mainly at higher elevations in this map unit. Included soils make up about 15 percent of this map unit.

In most areas this Lonewood soil is used as woodland. In some areas it is used for field crops, horticultural crops, and pasture.

This soil is well suited to field crops. Slope is the main limitation for field crops. A conservation tillage system that leaves crop residue on the surface, contour farming, winter cover crops, and grassed waterways help to reduce runoff and to control erosion. This soil is well suited to pasture. Most grasses and legumes are suited.

This soil is well suited to upland oaks and loblolly, shortleaf, and Virginia pines. Plant competition is the main limitation to woodland use and management. Undesirable plants will reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is well suited to many urban uses. Low strength and depth to bedrock are limitations for some urban uses.

The capability subclass is IIe.

LoC—Lonewood silt loam, 5 to 12 percent slopes

This is a deep, well drained, rolling soil. It is mainly on broad ridges and long side slopes on the Cumberland Plateau. Mapped areas range from 5 to 200 acres in size.

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

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

Subsoil:
8 to 23 inches, yellowish brown silt loam and loam
23 to 50 inches, strong brown clay loam

Substratum:
50 inches, soft, weathered sandstone

Important soil properties and features—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: 40 to 72 inches
Effective rooting depth: 40 inches or more
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Beersheba, Lily, Monteagle, and Sewanee soils. Beersheba, Lily, and Monteagle soils are well drained. Beersheba and Lily soils are scattered randomly throughout this map unit. Monteagle soils are mainly on ridgetops at higher elevations in this map unit. Sewanee soils are moderately well drained. They are on narrow bottom lands along drainageways. Included soils make up about 15 percent of this map unit.

In most areas this Lonewood soil is used as woodland. In some areas it is used for field crops, horticultural crops, and pasture.

This soil is moderately suited to field crops. Slope is the main limitation for field crops. A conservation tillage system that leaves crop residue on the surface, contour farming, winter cover crops, and grassed waterways help to reduce runoff and to control erosion. This soil is well suited to pasture. It is suited to most grasses and legumes.

This soil is well suited to upland oaks and loblolly, shortleaf, and Virginia pines. Plant competition is the main limitation to woodland use and management.

This soil is moderately suited to most urban uses. Slope, depth to bedrock, and low strength are limitations to many uses. These limitations can be overcome for most uses by good design and construction.

The capability subclass is IIIe.

Me—Melvin silt loam, depressional

This is a very deep, poorly drained, nearly level soil. It is in slight depressions on bottom lands on the Highland Rim. Mapped areas are irregular in shape and range from 5 to 150 acres in size.

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

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

Subsoil:
3 to 44 inches, light brownish gray silt loam

Substratum:
44 to 61 inches, light brownish gray silt loam

Important soil properties and features—

Permeability: Moderate
Available water capacity: High
Soil reaction: Strongly acid or medium acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: More than 60 inches
Effective rooting depth: More than 40 inches for water-tolerant plants
Depth to a high water table: About 6 inches; the range includes ponding
Flooding: Frequent; long duration; December-April

Included with this soil in mapping are small areas of Agee, Beason, Newark, and Hamblen soils. Agee soils are poorly drained. Beason soils are somewhat poorly drained. They are both mainly near the edge of this map unit. Newark soils are somewhat poorly drained. They are scattered randomly throughout this map unit. Hamblen soils are moderately well drained. They are adjacent to drainageways. Included soils make up about 15 percent of this map unit.

In most areas this Melvin soil is used as woodland. In some areas it is used for pasture.

This soil is poorly suited to field crops. The seasonal high water table and flooding are the main limitations to field crops. This soil is moderately suited or poorly suited to pasture. Only water-tolerant plants are suited. The seasonal high water table restricts grazing. In some areas ponding kills pasture plants.

This soil is moderately suited to woodland. Eastern cottonwood, sweetgum, and bottom land oaks are best suited. The seasonal high water table is the main limitation to woodland use and management. It restricts the use of equipment to periods when the soil is dry. Flooding and ponding increase the seedling mortality rate. In some areas undesirable plants prevent adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is not suited to most urban uses. The seasonal high water table and flooding are the main limitations.

The capability subclass is Vw.

MoB—Monteagle loam, 2 to 5 percent slopes

This is a very deep, well drained, gently sloping soil. It is on convex ridgetops on the Cumberland Plateau. Mapped areas range from 5 to 75 acres in size.

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

Surface layer:
0 to 4 inches, very dark grayish brown and yellowish brown loam

Subsoil:
4 to 12 inches, strong brown clay loam
12 to 72 inches, yellowish red and red clay loam

Substratum:
72 to 79 inches, yellowish red sandy clay loam
79 inches, soft sandstone

Important soil properties and features—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: More than 60 inches
Effective rooting depth: More than 40 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Beersheba and Lonewood soils. Beersheba soils are mainly near the edge of this map unit. Lonewood soils are scattered randomly throughout this map unit.

Included soils make up about 10 percent of this map unit.

In most areas this Monteagle soil is used as woodland. In some areas it is used for pasture and for horticultural and field crops.

This soil is well suited to field crops. Slope is the main limitation for field crops. A conservation tillage system that leaves crop residue on the surface, contour farming, winter cover crops, and grassed waterways help to reduce runoff and to control erosion. This soil is well suited to pasture. Most grasses and legumes are suited.

This soil is well suited to upland oaks, yellow-poplar, and shortleaf and Virginia pines. Plant competition is the main limitation to woodland use and management. Undesirable plants will reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

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

The capability subclass is IIe.

MoC—Monteagle loam, 5 to 12 percent slopes

This is a very deep, well drained, moderately sloping soil. It is on convex ridgetops and side slopes on the Cumberland Plateau. Mapped areas range from 5 to 100 acres in size.

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

Surface layer:
0 to 9 inches, dark yellowish brown and yellowish brown loam

Subsoil:
9 to 16 inches, strong brown loam
16 to 69 inches, yellowish red and red clay loam

Substratum:
69 inches, soft, weathered sandstone

Important soil properties and features—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: More than 60 inches
Effective rooting depth: More than 40 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Beersheba and Lonewood soils. Beersheba soils are mainly near the edge of this map unit. Lonewood soils are scattered randomly throughout this map unit. Included soils make up about 10 percent of this map unit.

In most areas this Monteagle soil is used as woodland. In some areas it is used for pasture and for horticultural and field crops.

This soil is moderately suited to field crops. Slope is the main limitation. A conservation tillage system that leaves crop residue on the surface, contour farming, winter cover crops, and grassed waterways help to reduce runoff and to control erosion. This soil is well suited to pasture. Most grasses and legumes are suited.

This soil is well suited to upland oaks, yellow-poplar, and shortleaf and Virginia pines. Plant competition is the main limitation to woodland use and management. Undesirable plants will reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is well suited or moderately suited to urban uses. Slope is a limitation for most uses. Generally, it can be overcome by good design and construction.

The capability subclass is IIIe.

Ne—Newark silt loam, occasionally flooded

This is a very deep, somewhat poorly drained, nearly level soil. It is on bottom lands along drainageways on the Highland Rim. Slopes are 0 to 2 percent. Mapped areas range from 5 to 75 acres in size.

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

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

Subsoil:
7 to 46 inches, brown and light brownish gray silt loam

Substratum:
46 to 61 inches, gray silty clay loam

Important soil properties and features—

Permeability: Moderate
Available water capacity: High
Soil reaction: Strongly acid or medium acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: More than 60 inches

Effective rooting depth: More than 40 inches for water-tolerant plants
Depth to a high water table: 6 to 18 inches
Flooding: Occasional; brief duration; January-April

Included with this soil in mapping are small areas of Agee, Beason, Hamblen, and Melvin soils. Agee and Melvin soils are poorly drained. They are mainly in slight depressions. Beason soils are somewhat poorly drained. They are mainly on low terraces at the edge of this map unit. Hamblen soils are moderately well drained. They are mainly adjacent to drainageways. Included soils make up about 10 percent of this map unit.

In most areas this Newark soil is used for pasture. In some areas it has been drained and is in intensive use for field crops. In a few areas it is used for trees or field crops.

This soil is suited to field crops that are water-tolerant or that can be planted late in spring. The seasonal high water table is the main limitation for most field crops. This soil is well suited to pasture of water-tolerant plants. Controlling grazing when the soil is wet helps to prevent surface compaction.

This soil is moderately suited to woodland. It is well suited to sweetgum, eastern cottonwood, and bottom land oaks. The seasonal high water table is the main limitation to woodland use and management. It restricts the use of equipment to periods when the soil is dry. Undesirable plants reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is not suited to most urban uses because of the seasonal high water table and flooding.

The capability subclass is IIw.

RaC—Ramsey sandy loam, 5 to 15 percent slopes

This is a shallow, somewhat excessively drained, rolling and hilly soil. It is on convex ridges and side slopes on the Cumberland Plateau. Mapped areas range from 5 to 200 acres in size.

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

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

Subsoil:
4 to 19 inches, yellowish brown loam

Substratum:
19 inches, sandstone

Important soil properties and features—

Permeability: Rapid
Available water capacity: Very low
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: 7 to 20 inches
Effective rooting depth: 7 to 20 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Beersheba and Lily soils. These soils are scattered randomly throughout this map unit. In some places small areas of sandstone outcrops are also included. Included soils and rock outcrops make up about 10 percent of this map unit.

In most areas this Ramsey soil is used as woodland. In some areas it is used for pasture.

This soil is poorly suited to field crops. Slope, available water capacity, and depth to bedrock are the main limitations. This soil is moderately suited to pasture of shallow-rooted, drought-tolerant plants.

This soil is moderately suited or poorly suited to woodland. Upland oaks and shortleaf and Virginia pines are best suited. The shallow rooting depth and very low available water capacity cause seedling mortality and the windthrow hazard to be management concerns.

This soil is poorly suited to most urban uses. Depth to rock is a severe limitation for urban uses.

The capability subclass is VIe.

RaE—Ramsey sandy loam, 15 to 35 percent slopes

This is a shallow, somewhat excessively drained, steep and hilly soil. It is on convex ridges and side slopes on the Cumberland Plateau. Mapped areas range from 5 to 300 acres in size.

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

Surface layer:
0 to 4 inches, dark grayish brown sandy loam and brown loam

Subsoil:
4 to 14 inches, yellowish brown and brown loam

Substratum:
14 inches, sandstone

Important soil properties and features—

Permeability: Rapid

Available water capacity: Very low
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: 7 to 20 inches
Effective rooting depth: 7 to 20 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Beersheba, Lily, and Sewanee soils. Beersheba and Lily soils are well drained. They are scattered randomly throughout this map unit. Sewanee soils are moderately well drained. They are on narrow bottom lands along drainageways. Included soils make up 10 to 15 percent of this map unit.

In most areas this Ramsey soil is used as woodland. In some areas it is used for pasture.

This soil is not suited to field crops. Slope, available water capacity, and depth to bedrock are the main limitations. This soil is poorly suited to pasture. Only shallow-rooted, drought-tolerant plants are suited.

This soil is poorly suited to woodland. Upland oaks and shortleaf and Virginia pines are best suited. Shallow rooting depth, very low available water capacity, and slope are the main limitations to woodland use and management.

This soil is poorly suited to most urban uses. Slope and depth to bedrock are severe limitations.

The capability subclass is VIIe.

RrE—Ramsey-Rock outcrop complex, 15 to 40 percent slopes

This map unit consists of Ramsey soil and Rock outcrop. It is steep and hilly and occurs on convex side slopes of the Cumberland Plateau. The Ramsey soil is shallow and somewhat excessively drained. The Ramsey soil and areas of Rock outcrop are so intricately mixed they could not be separated at the scale used in mapping. The Ramsey soil makes up 50 to 70 percent of mapped areas and Rock outcrop 20 to 40 percent. Mapped areas range from 5 to 250 acres in size.

The typical sequence, depth, and composition of the layers of the Ramsey soil are as follows—

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

Subsoil:
5 to 18 inches, dark yellowish brown loam

Substratum:
18 inches, hard sandstone

Important soil properties and features—

Permeability: Rapid
Available water capacity: Very low
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Low
Depth to bedrock: 7 to 20 inches
Effective rooting depth: 7 to 20 inches
Depth to a high water table: More than 72 inches
Flooding: None

Rock outcrop consists of sandstone that crops out a few inches to 3 feet. It is mainly in bands parallel to the slope.

Included with this unit in mapping are random, small, scattered areas of the well drained Lily soils. Also included are small areas of soils high in content of stones and boulders both on the surface and in the subsoil. These soils are mainly at lower elevations in this map unit. Included soils make up about 10 percent of this map unit.

The Ramsey soil in this map unit is used as woodland.

This soil is not suited to field crops. Slope, available water capacity, depth to bedrock, and rock outcrops are severe limitations. This soil is poorly suited to pasture. It is suited only to shallow-rooted, drought-tolerant plants.

This soil is poorly suited to woodland. Productivity is low for upland oaks and moderate for shortleaf and Virginia pines. Rockiness, shallow rooting depth, very low available water capacity, and slope are the main limitations to woodland use and management.

This soil is poorly suited to urban uses. Slope and depth to bedrock are severe limitations.

The capability subclass is VIIs.

SeA—Sequatchie loam, 0 to 2 percent slopes, rarely flooded

This is a very deep, well drained, nearly level soil. It is on low terraces along drainageways extending from coves on the Highland Rim. Mapped areas range from 10 to 225 acres in size.

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

Surface layer:
0 to 8 inches, dark brown loam

Subsoil:
8 to 16 inches, strong brown loam
16 to 36 inches, strong brown clay loam
36 to 45 inches, brown loam

Substratum:
45 to 64 inches, strong brown sandy loam

Important soil properties and features—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low or moderate
Depth to bedrock: More than 60 inches
Effective rooting depth: More than 40 inches
Depth to a high water table: More than 72 inches
Flooding: Rare

Included with this soil in mapping are small areas of Cobstone, Sullivan, and Whitwell soils. Cobstone soils are mainly on alluvial fans extending into this map unit. Sullivan soils are on bottom lands along drainageways. Whitwell soils are mainly in slight depressions. Also included, scattered randomly throughout this map unit, are small areas of soils that contain more cobbles than this Sequatchie soil but less than the included Cobstone soils. Included soils make up about 5 to 10 percent of this map unit.

In most areas this Sequatchie soil is used for field crops and for horticultural and nursery crops. In a few areas it is used as woodland. In a few areas it is used for pasture and hay.

This soil is well suited to field crops and horticultural and nursery crops. It is well suited to pasture and hay. Most grasses and legumes are suited.

This soil is well suited to yellow-poplar, black walnut, upland oaks, and loblolly pine. Plant competition is the main limitation to woodland use and management. Undesirable plants will reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is poorly suited to some urban uses because of flooding. Other soil properties are favorable for most uses.

The capability subclass is I.

SeB—Sequatchie loam, 2 to 6 percent slopes

This is a very deep, well drained, gently sloping soil. It is on low terraces along drainageways extending from coves on the Highland Rim. Mapped areas range from 5 to 70 acres in size.

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

Surface layer:
0 to 8 inches, dark brown loam

Subsoil:
8 to 23 inches, brown and strong brown loam
23 to 35 inches, strong brown clay loam
35 to 43 inches, yellowish brown loam

Substratum:
43 to 61 inches, yellowish brown sandy loam

Important soil properties and features—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low or moderate
Depth to bedrock: More than 60 inches
Effective rooting depth: More than 40 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Cobstone, Swafford, and Whitwell soils. Cobstone soils are well drained. They are mainly on alluvial fans extending into this map unit. Swafford and Whitwell soils are moderately well drained. They are mainly in slight depressions or at the edge of this map unit. Also included, scattered randomly throughout this map unit, are small areas of soils that contain more cobbles than this Sequatchie soil but less than the included Cobstone soils. Included soils make up about 10 percent of this map unit.

In most areas this Sequatchie soil is used for field crops and for horticultural and nursery crops. In a few areas it is used as woodland. In a few areas it is used for pasture and hay.

This soil is well suited to field crops and horticultural and nursery crops. Slope is a moderate limitation. A conservation tillage system that leaves crop residue on the surface, contour farming, winter cover crops, and grassed waterways help to reduce runoff and to control erosion. This soil is well suited to pasture and hay. Most grasses and legumes are suited.

This soil is well suited to yellow-poplar, black walnut, upland oaks, and loblolly pine. Plant competition is the main limitation to woodland use and management. Undesirable plants will reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

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

The capability subclass is IIe.

Sn—Sewanee loam, occasionally flooded

This is a deep, moderately well drained, nearly level soil. It is on narrow bottom lands along drainageways on the Cumberland Plateau. Slopes are 0 to 2 percent. Mapped areas range from 5 to 25 acres in size.

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

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

Subsoil:
6 to 34 inches, yellowish brown loam

Substratum:
34 to 54 inches, yellowish brown and light brownish gray sandy loam
54 inches, sandstone

Important soil properties and features—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: 40 to 60 inches
Effective rooting depth: 40 inches or more for water-tolerant plants
Depth to a high water table: 12 to 24 inches
Flooding: Occasional; very brief duration; January-April

Included with this soil in mapping are small areas of Bonair and Clarkrange soils. Bonair soils are poorly drained. They are mainly in slight depressions. Clarkrange soils are moderately well drained. They are mainly near the edge of this map unit. Also included are small areas of well drained soils scattered randomly throughout this map unit. Also included, along drainageways below former sites of coal washers and coke ovens, are small areas of moderately well drained to poorly drained soils that have an overwash of coal dust. Included soils make up 10 to 15 percent of this map unit.

In most areas this Sewanee soil is used as woodland. In some areas it is used for pasture.

This soil is well suited to such field crops as soybeans and grain sorghum planted late in spring. Flooding and the seasonal high water table are limitations to most field crops. This soil is well suited to pasture. Most grasses and legumes are suited. Plants that are deep-rooted but not water-tolerant, such as alfalfa, are poorly suited.

This soil is well suited to yellow-poplar, sweetgum, bottom land oaks, and loblolly and shortleaf pines. The seasonal high water limits the use of equipment. After harvesting, careful management of reforestation helps to reduce competition from undesirable plants. Intensive site preparation and maintenance can be used as required.

This soil is not suited to most urban uses because of flooding and the seasonal high water table.

The capability subclass is IIw.

Su—Sullivan loam, occasionally flooded

This is a very deep, well drained, nearly level soil. It is on bottom lands along rivers and large streams on the Highland Rim. Slopes are 0 to 2 percent. Mapped areas range from 5 to 100 acres in size.

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

Surface layer:
0 to 8 inches, dark brown loam

Subsoil:
8 to 28 inches, dark yellowish brown loam and silt loam
28 to 38 inches, dark grayish brown silt loam
38 to 61 inches, brown loam

Important soil properties and features—

Permeability: Moderate
Available water capacity: High
Soil reaction: Strongly acid to slightly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: More than 60 inches
Effective rooting depth: More than 40 inches
Depth to a high water table: 48 inches or more
Flooding: Occasional; very brief duration; January-April

Included with this soil in mapping are small areas of Hamblen and Sequatchie soils. Hamblen soils are moderately well drained. They are mainly in slight depressions. Sequatchie soils are well drained. They are on low terraces at higher elevations in this map unit. Also included are small areas of somewhat excessively drained soils that contain more sand. They are mainly adjacent to drainageways. Included soils make up about 10 percent of this map unit.

In most areas this Sullivan soil is used for pasture. In a few areas it is used as woodland. In a few areas it is used for field crops.

This soil is well suited to field crops. Flooding is a limitation. This soil is well suited to pasture. Most grasses and legumes are suited.

This soil is well suited to yellow-poplar, black walnut, and loblolly and shortleaf pines. Plant competition is the main limitation to woodland use and management. Undesirable plants will reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is not suited to many urban uses because of flooding.

The capability subclass is IIw.

SwB—Swafford loam, 2 to 5 percent slopes

This is a very deep, moderately well drained, gently sloping soil. It is on terraces on the Highland Rim. Mapped areas range from 5 to 50 acres in size.

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

Surface layer:
0 to 9 inches, brown loam

Subsoil:
9 to 23 inches, yellowish brown loam
23 to 38 inches, brownish yellow loam
38 to 62 inches, brownish yellow clay loam

Important soil properties and features—

Permeability: Moderately slow
Available water capacity: Moderate or high
Soil reaction: Very strongly acid to medium acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: More than 60 inches
Effective rooting depth: More than 40 inches for water-tolerant plants
Depth to a high water table: 24 to 36 inches, perched above a compact layer
Flooding: None

Included with this soil in mapping are small areas of Whitwell soils. They are mainly on toe slopes at lower elevations in this map unit. Also included are small areas of somewhat poorly drained soils. They are mainly in slight depressions or along drainageways. Also included are small areas of well drained soils mainly at higher elevations in this map unit. Included soils make up about 10 to 15 percent of this map unit.

In most areas this Swafford soil is used for field crops, hay, and pasture. In a few areas it is used as woodland.

This soil is well suited to field crops. Slope is a limitation for field crops. A conservation tillage system that leaves crop residue on the surface, contour farming, winter cover crops, and grassed waterways help to reduce runoff and to control erosion. This soil is well suited to pasture and hay. Many grasses and legumes are suited. Plants that are deep-rooted but not water-tolerant, such as alfalfa, are only moderately suited.

This soil is well suited to yellow-poplar, sweetgum, upland oaks, and loblolly pine. Plant competition is the main management concern. Undesirable plants will reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is moderately suited to many urban uses. The seasonal high water table is a limitation for many uses.

The capability subclass is IIe.

TaC2—Talbott silt loam, 5 to 12 percent slopes, eroded

This is a moderately deep, well drained, moderately sloping soil. It is on convex uplands on the Highland Rim. Mapped areas range from 5 to 20 acres in size.

Erosion has removed part of the original surface layer. The surface layer consists of mixed original surface layer and subsoil.

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

Surface layer:
0 to 7 inches, brown silt loam

Subsoil:
7 to 34 inches, strong brown and yellowish red clay

Substratum:
34 to 37 inches, yellowish brown clay
37 inches, limestone

Important soil properties and features—

Permeability: Moderately slow
Available water capacity: Low or moderate
Soil reaction: Strongly acid to slightly acid, but near bedrock, the range includes mildly alkaline
Organic matter content: Low
Depth to bedrock: 20 to 40 inches
Effective rooting depth: 15 to 35 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Carbo soils scattered randomly throughout this map

unit. Also included are random areas of soils that are more than 40 inches deep over bedrock. Also included, mainly at lower elevations in this map unit, are small areas of moderately well drained clayey soils. Included soils make up about 15 percent of this map unit.

In most areas this Talbott soil is used as pasture. In a few areas it is used for field crops or trees.

This soil is poorly suited to field crops. Slope and low available water capacity are the main limitations. A conservation tillage system that leaves crop residue on the surface, contour farming, winter cover crops, and grassed waterways help to reduce runoff and to control erosion. This soil is moderately suited to pasture. Plants that are deep rooted or not drought tolerant are poorly suited.

This soil is well suited to woodland. Upland oaks, loblolly and shortleaf pines, and eastern redcedar are best suited. Plant competition is the main limitation to woodland use and management. Undesirable plants will reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is poorly suited to many urban uses. Shrink-swell potential, slope, low strength, and depth to bedrock are the main limitations to many urban uses.

The capability subclass is IVe.

TcE—Talbott-Carbo-Rock outcrop complex, 15 to 30 percent slopes

This map unit consists of Talbott and Carbo soils and Rock outcrop (fig. 7). It is steep and hilly on ridges, nose slopes, and side slopes at lower

Figure 7.—Woodland is a suitable use on Talbott-Carbo-Rock outcrop complex, 15 to 30 percent slopes.

elevations on the Cumberland Plateau Escarpment and on outlying ridges of the Highland Rim. It is 20 to 50 percent Talbott soil, 20 to 45 percent Carbo soil, and 30 to 40 percent Rock outcrop. The Talbott and Carbo soils are moderately deep and well drained. The Talbott and Carbo soils and areas of Rock outcrop are so intricately mixed they could not be separated at the scale used in mapping. Mapped areas range from 10 to 250 acres in size.

The typical sequence, depth, and composition of the layers of the Talbott soil are as follows—

Surface layer:
0 to 3 inches, very dark grayish brown and light yellowish brown silt loam

Subsoil:
3 to 6 inches, strong brown silty clay loam
6 to 18 inches, yellowish red and red clay
18 to 24 inches, strong brown clay

Substratum:
24 to 32 inches, light olive brown clay
32 inches, hard limestone

The typical sequence, depth, and composition of the layers of the Carbo soil are as follows—

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

Subsoil:
2 to 4 inches, yellowish brown silty clay loam
4 to 23 inches, yellowish brown clay

Substratum:
23 to 34 inches, light olive brown clay
34 inches, hard limestone

Important soil properties and features of the Talbott soil—

Permeability: Moderately slow
Available water capacity: Low or moderate
Soil reaction: Strongly acid to slightly acid, but near bedrock the range includes mildly alkaline
Organic matter content: Low
Depth to bedrock: 20 to 40 inches
Effective rooting depth: 15 to 35 inches
Depth to a high water table: More than 72 inches
Flooding: None

Important soil properties and features of the Carbo soil—

Permeability: Slow
Available water capacity: Low or moderate
Soil reaction: Medium acid to mildly alkaline
Organic matter content: Low
Depth to bedrock: 20 to 40 inches
Effective rooting depth: 15 to 30 inches
Depth to a high water table: More than 72 inches
Flooding: None

Rock outcrop consists of limestone that crops out 3 to 48 inches. It extends mainly in bands on the contour around the slope.

Included with this unit in mapping are small areas of soils more than 40 inches deep over bedrock. Also included are small areas of soils less than 20 inches deep over bedrock. Included soils make up about 5 to 15 percent of this map unit.

These Talbott and Carbo soils are used as woodland. They are not suited to field crops. They are poorly suited to pasture. Slope, depth to bedrock, low available water capacity, and rock outcrops are the main limitations.

The Talbott and Carbo soils are moderately suited or poorly suited to woodland. Upland oaks, loblolly and shortleaf pines, and eastern redcedar are best suited. Slope and rockiness are the main limitations to woodland use and management. In some areas rock outcrops can break timber and obstruct yarding. Cable systems that fully or partly suspend logs are preferred. Generally, they are safer and disturb less soil than conventional wheeled and tracked equipment. Undesirable plants reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

The Talbott and Carbo soils are poorly suited to most urban uses. Slope, rockiness, depth to bedrock, shrinking and swelling, and low strength limit most urban uses.

The capability subclass is VIs.

TcF—Talbott-Carbo-Rock outcrop complex, 30 to 60 percent slopes

This map unit consists of Talbott and Carbo soils and Rock outcrop. It is steep and very steep mainly on convex nose slopes and side slopes at lower elevations on the Cumberland Plateau Escarpment and on outlying ridges of the Highland Rim. It is 20 to 50 percent Talbott soil, 20 to 45 percent Carbo soil, and 30 to 40 percent Rock outcrop. The Talbott and Carbo soils are moderately deep and well drained. The Talbott and Carbo soils and areas of Rock outcrop are so intricately mixed they could not be separated at the scale used in mapping. Mapped areas range from 10 to more than 500 acres in size.

The typical sequence, depth, and composition of the layers of the Talbott soil are as follows—

Surface layer:
0 to 4 inches, dark brown and yellowish brown silt loam

Subsoil:
4 to 8 inches, strong brown silty clay loam
8 to 28 inches, yellowish red and red clay

Substratum:
28 to 33 inches, yellowish brown clay
33 inches, hard limestone

The typical sequence, depth, and composition of the layers of the Carbo soil are as follows—

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

Subsoil:
2 to 5 inches, yellowish brown silty clay loam
5 to 24 inches, yellowish brown clay

Substratum:
24 to 32 inches, light olive brown clay
32 inches, hard limestone

Important soil properties and features of the Talbott soil—

Permeability: Moderately slow
Available water capacity: Low or moderate
Soil reaction: Strongly acid to slightly acid; near bedrock the range includes mildly alkaline
Organic matter content: Low
Depth to bedrock: 20 to 40 inches
Effective rooting depth: 15 to 35 inches
Depth to a high water table: More than 72 inches
Flooding: None

Important soil properties and features of the Carbo soil—

Permeability: Slow
Available water capacity: Low or moderate
Soil reaction: Medium acid to mildly alkaline
Organic matter content: Low
Depth to bedrock: 20 to 40 inches
Effective rooting depth: 15 to 30 inches
Depth to a high water table: More than 72 inches
Flooding: None

Rock outcrop consists of limestone that crops out 12 inches to more than 10 feet. In some places it forms vertical cliffs. It extends mainly in bands on the contour around the slope.

Included with this unit in mapping are small areas of Bouldin soils. These soils are on concave benches and along drainageways. Also included are areas of soils more than 40 inches deep over bedrock or less than 20 inches deep over bedrock. These soils are scattered randomly throughout this map unit. Included soils make up about 5 to 15 percent of this map unit.

The Talbott and Carbo soils are used as woodland.

The Talbott and Carbo soils are not suited to field crops and pasture. Slope, depth to bedrock, low available water capacity, and rock outcrops are the main limitations.

The Talbott and Carbo soils are moderately suited or poorly suited to woodland. Upland oaks, loblolly and shortleaf pines, and eastern redcedar are best suited. Slope and rockiness are the main limitations to woodland use and management. In some areas rock outcrops can break timber and obstruct yarding. Cable systems that fully or partly suspend logs are preferred. Generally, they are safer and disturb less soil than conventional wheeled and tracked equipment. Undesirable plants reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

The Talbott and Carbo soils are poorly suited to most urban uses. Slope, rockiness, depth to bedrock, shrinking and swelling, and low strength are limitations for most urban uses.

The capability subclass is VIIs.

WaB—Waynesboro loam, 2 to 7 percent slopes

This is a very deep, well drained, undulating soil. It is on broad ridgetops of the Highland Rim. Mapped areas range from 5 to 350 acres in size.

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

Surface layer:
0 to 9 inches, dark reddish brown loam

Subsoil:
9 to 16 inches, reddish brown loam
16 to 24 inches, red clay loam
24 to 68 inches, dark red clay

Important soil properties and features—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low

Depth to bedrock: More than 60 inches
Effective rooting depth: More than 40 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Emory and Etowah soils. Emory soils are in depressions or on toe slopes. Etowah soils are also on toe slopes or are scattered randomly throughout this map unit. Included soils make up about 10 percent of this map unit.

In most areas this Waynesboro soil is used for field crops and horticultural crops. In a few areas it is used as woodland. In a few areas it is used for pasture and hay.

This soil is well suited to field crops. Slope is the main limitation for field crops. A conservation tillage system that leaves crop residue on or near the soil surface, contour farming, winter cover crops, and grassed waterways help to reduce runoff and to control erosion. This soil is well suited to pasture and hay. Most grasses and legumes are suited.

This soil is well suited to yellow-poplar, upland oaks, and loblolly, shortleaf, and Virginia pines. Plant competition is the main limitation to woodland use and management. Undesirable plants will reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is suited to most urban uses. Low strength and the clayey subsoil are limitations for several uses. These limitations can generally be overcome by good design and construction.

The capability subclass is IIe.

WaC2—Waynesboro loam, 7 to 12 percent slopes, eroded

This is a very deep, well drained, rolling soil. It is on ridges and side slopes on the Highland Rim. Erosion has removed part of the original surface layer. Mapped areas range from 5 to 60 acres in size.

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

Surface layer:
0 to 6 inches, reddish brown loam

Subsoil:
6 to 17 inches, yellowish red clay loam
17 to 61 inches, red clay

Important soil properties and features—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: More than 60 inches
Effective rooting depth: More than 40 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Emory and Etowah soils. Emory soils are in depressions or on toe slopes. Etowah soils are on toe slopes or scattered randomly throughout this map unit. Included soils make up about 10 percent of this map unit.

In most areas this Waynesboro soil is used for field crops and horticultural crops. In a few areas it is used as woodland. In a few areas it is used for pasture and hay.

This soil is moderately suited to field crops. Slope is the main limitation for field crops. A conservation tillage system that leaves crop residue on the surface, contour farming, winter cover crops, and grassed waterways help to reduce runoff and to control erosion. This soil is well suited to pasture and hay. Most grasses and legumes are suited.

This soil is well suited to yellow-poplar, upland oaks, and loblolly, shortleaf, and Virginia pines. Plant competition is the main limitation for woodland use and management.

This soil is moderately suited to most urban uses. Slope, low strength, and the clayey subsoil are moderate limitations for several uses. These limitations can normally be overcome by good design and construction.

The capability subclass is IIIe.

WaD3—Waynesboro clay loam, 12 to 25 percent slopes, severely eroded

This is a very deep, well drained, hilly soil. It is on side slopes on the Highland Rim. Erosion has removed most of the original surface layer. Some places have gullies as much as 3 feet deep and 10 feet wide. Mapped areas range from 5 to 40 acres in size.

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

Surface layer:
0 to 4 inches, yellowish red clay loam

Subsoil:
4 to 13 inches, yellowish red clay loam
13 to 61 inches, red clay

Important soil properties and features—

Permeability: Moderate
Available water capacity: Moderate or high
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: More than 60 inches
Effective rooting depth: More than 40 inches
Depth to a high water table: More than 72 inches
Flooding: None

Included with this soil in mapping are small areas of Etowah and Talbott soils. Etowah soils are mainly on concave foot slopes and along drainageways. Talbott soils are near the edge of this map unit, at upper elevations adjacent to the base of the Cumberland Plateau Escarpment. Also included are soils that contain more than 15 percent chert fragments. Included soils make up about 10 percent of this map unit.

In most areas this Waynesboro soil is used for pasture. In some areas it has reverted to woodland.

This soil is poorly suited to field crops. Slope and past erosion are limitations for field crops. This soil is moderately suited to pasture. Most grasses and legumes are suited.

This soil is moderately suited to woodland. Upland oaks and loblolly, shortleaf, and Virginia pines are best suited. Erosion is a moderate hazard. Slope limits use of equipment during harvesting. Undesirable plants reduce adequate natural or artificial reforestation unless intensive site preparation and maintenance are used.

This soil is moderately suited or poorly suited to urban uses. Slope is a severe limitation for most uses; however, this limitation can be overcome in many cases by designing structures and facilities to fit the landscape.

The capability subclass is VIe.

Wh—Whitwell loam, rarely flooded

This is a very deep, moderately well drained, nearly level soil. It is on low terraces on the Highland Rim. Slopes are 0 to 2 percent. Mapped areas range from 5 to 50 acres in size.

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

Surface layer:
0 to 7 inches, brown loam

Subsoil:
7 to 20 inches, dark yellowish brown and strong brown loam
20 to 30 inches, yellowish brown and light yellowish brown loam

Substratum:
30 to 61 inches, pale brown loam

Important soil properties and features—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid, but in limed areas the surface layer is less acid
Organic matter content: Low
Depth to bedrock: More than 60 inches
Effective rooting depth: More than 40 inches for water-tolerant plants
Depth to a high water table: 24 to 36 inches
Flooding: Rare

Included with this soil in mapping are small areas of Hamblen, Newark, Swafford, and Sequatchie soils. Hamblen and Sequatchie soils are well drained. Hamblen soils are in slight depressions or along drainageways. Sequatchie soils are at higher elevations in this map unit. Newark soils are somewhat poorly drained. They are in slight depressions. Swafford soils are moderately well drained. They are mainly on toe slopes at higher elevations in this map unit. Included soils make up 10 to 15 percent of this map unit.

In most areas this Whitwell soil is used for field crops. In a few areas it is used as woodland or for pasture and hay.

This soil is well suited to field crops. The seasonal high water table is a limitation for some field crops. This soil is well suited to pasture and hay. Most grasses and legumes are suited. Plants that are deep rooted but not water tolerant, such as alfalfa, are poorly suited.

This soil is well suited to yellow-poplar, sweetgum, upland oaks, and loblolly pine. The seasonal high water table is a slight limitation for woodland use and management. Reforestation, after harvesting, must be carefully managed to reduce competition from undesirable plants.

This soil is poorly suited to many urban uses because of flooding and the seasonal high water table.

The capability subclass is IIw.

Wo—Wolftever silt loam, rarely flooded

This is a very deep, moderately well drained, nearly level soil. It is on low terraces and toe slopes on the Highland Rim. Slopes are 0 to 3 percent. Mapped areas range from 5 to 40 acres in size.

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

Surface layer:
0 to 9 inches, brown silt loam

Subsoil:
9 to 14 inches, dark yellowish brown silty clay loam
14 to 20 inches, yellowish brown silty clay
20 to 50 inches, brown and dark grayish brown clay

Substratum:
50 to 61 inches, mottled dark grayish brown, dark yellowish brown, and light brownish gray clay loam

Important soil properties and features—

Permeability: Moderately slow
Available water capacity: High
Soil reaction: Strongly acid, but in limed areas the surface layer and the upper part of the subsoil are less acid
Organic matter content: Low or moderate
Depth to bedrock: More than 60 inches
Effective rooting depth: More than 30 inches for water-tolerant plants
Depth to a high water table: 30 to 40 inches
Flooding: Rare

Included with this soil in mapping are small areas of Beason, Hamblen, Sequatchie, and Whitwell soils. Beason soils are somewhat poorly drained. They are mainly in slight depressions. Hamblen, Sequatchie, and Whitwell soils are well drained. Hamblen soils are along drainageways. Sequatchie and Whitwell soils are mainly along drainageways. Included soils make up about 10 to 15 percent of this map unit.

In most areas this Wolftever soil is used for field crops. In a few areas it is used as woodland. In a few areas it is used for pasture.

This soil is well suited to field crops. The seasonal high water table is a limitation for some field crops. This soil is well suited to pasture. Most grasses and legumes are suited. Plants that are deep rooted but not water tolerant, such as alfalfa, are poorly suited.

This soil is well suited to upland oaks, sweetgum, yellow-poplar, and loblolly pine. The seasonal high water table is a slight limitation for woodland use and management. Reforestation, after harvesting, must be carefully managed to reduce competition from undesirable plants.

This soil is poorly suited to most urban uses. Flooding and the seasonal high water table are the main limitations to many urban uses.

The capability subclass is IIw.

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. The 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 55,728 acres in the survey area, or nearly 24 percent of the total acreage, meets the soil requirements for prime farmland. Scattered areas of this land are throughout the county, but most are mainly in associations 1, 5, 6, and 7. Associations are described under the heading "General Soil Map Units." The crops grown on this land, mainly corn and soybeans, account for an estimated two-thirds of the county's total agricultural income each year.

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 5. 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, the seasonal high water table, 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 at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

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 for each soil. The system of land capability classification used by the Natural Resources Conservation Service is explained. 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 1986 in Grundy County, crops were grown on about 8,900 acres and pasture and hayland, 26,200 acres. Soybeans and corn are common row crops. These totals for crops include acreage used for commercial horticultural crops. Most pastures consist of mixed tall fescue and white clover.

In many areas of Grundy County the soils are suited to the commonly grown crops. In some areas, however, they are not suited. For example, many commercial vegetable crops are poor on Talbott and other soils that have a subsoil of heavy clay.

Most soils in Grundy County require lime, fertilizer, or both. The amounts needed depend on the pH level of the soil and the natural content of plant nutrients as determined by laboratory analyses of soil samples; the needs of the crops; and the level of desired yields. The Cooperative Extension Service operates a soil testing laboratory as a service to landowners and operators who wish to have a laboratory analysis of their soils. The analysis determines the application rates for lime and fertilizer.

Most soils in Grundy County are low in organic matter content. Organic matter is an important source of nitrogen for crops. It also increases water infiltration and available moisture capacity, improves soil structure, reduces surface crusting and soil losses from erosion, and promotes good tilth. It is not possible to build up the organic matter content to a high level because of existing climatic conditions. It is important, however, to return organic material to the soil by adding farm manure, leaving plant residue on the surface, growing sod crops, and incorporating cover crops and green manure crops into the soil.

Erosion is a hazard if cultivated crops are grown

on soils that are gently sloping or steeper. Soil erosion reduces soil productivity. If the surface layer is lost through erosion, most available plant nutrients and the organic matter are also lost. On Talbott and other soils that have a clayey subsoil, special erosion control practices are needed. In many areas of farmland, soil erosion causes such pollutants as sediment, nutrients, and pesticides to enter streams. Thus, controlling erosion minimizes pollution and improves water quality.

A cropping system that keeps a vegetative cover on the soil for extended periods helps to control erosion and to preserve the productive capacity of the soils. A cropping system that includes grass and legume forage crops helps to control erosion on sloping soils, provides nitrogen to plants, and improves soil tilth for the following crop.

Many conservation practices help to control erosion on cropland. These include reduced tillage, terraces, diversions, contour farming, stripcropping, and cropping systems. In cropping systems, grasses and legumes or close-growing crops are rotated with row crops.

Terraces and diversions reduce the length of slope and conduct runoff to stabilized outlets. They help to reduce runoff and to control erosion. They are most practical on deep, well drained soils that have uniform, regular slopes. Some examples are Etowah and Sequatchie soils.

Contour farming is most practical on soils that have relatively smooth, uniform slopes. Some examples are Etowah and Sequatchie soils.

Pasture is effective in controlling erosion on most soils. The practices needed in pasture management include applying lime and fertilizers, controlling grazing, and using adapted plants in the pasture mixtures (fig. 8). These practices help to maintain good ground cover and to produce high quality forage for livestock. Controlled grazing requires rotating livestock from one pasture to another to allow regrowth of pasture plants.

An effective management system consists of a combination of conservation practices. The local office of the Natural Resources Conservation Service can provide assistance in planning an effective management system.

Yields per Acre

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

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the 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 rangeland, for woodland, and for engineering purposes.

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

Figure 8.—Tall fescue and white clover are well suited to pasture on Waynesboro loam, 7 to 12 percent slopes, eroded.

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

Class I soils have few limitations that restrict their use.

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

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

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

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

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

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

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop, pasture, and woodland production. Class VIII soils have not been identified in Grundy County.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless 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. The *c* capability subclass is not used in Grundy County.

In class I there are no subclasses because the soils of this class have few limitations. In Grundy County class V contains only the subclass indicated by *w* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 and IIIe-6.

Woodland Management and Productivity

Joseph H. Paugh, forester, Natural Resources Conservation Service, helped to prepare this section.

Woodland covers 181,000 acres, or about 78 percent, of the total area of Grundy County. In most areas the timber has been cut over, but a few areas consist of virgin timber (fig. 9). Nearly all woodland is privately owned.

Oak-hickory covers 150,800 acres and is the most common forest type. It generally grows on uplands. The loblolly-shortleaf pine type covers 12,600 acres. It grows throughout the county and is commonly planted in eroded areas. The oak-pine type covers 17,600 acres. It typically occurs on dry ridges and steep, south- and west-facing slopes.

In Grundy County the average woodland growth is 36 cubic feet per acre per year. This growth rate has resulted from understocking, improper species making up the stand, poor quality trees, and poor management. The potential average growth in Grundy County is 66 cubic feet per acre per year. This potential can be obtained if the forest is stocked with the best species, if the correct number of trees per acre are planted, and if the forest is well managed. The greatest growth potential is normally on the lower third of the north- and east-facing slopes, where growth may reach 120 cubic feet per acre per year. Other values of woodland include wildlife habitat, recreation, natural beauty, and watershed protection.

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

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

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 are also 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 *common trees* on a soil is expressed as a *site index* and as a *volume* number. Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate.

The *site index* is determined by taking height measurements and determining the age of selected

Figure 9.—Virgin forest on Bouldin stony loam, 30 to 75 percent slopes, bouldery.

trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands.

The *volume* is the yield likely to be produced by the most important trees, expressed in cubic feet per acre per year calculated at the age of culmination of mean annual increment. Cubic feet can be converted to board feet by multiplying by a factor of about 5. For example, a volume of 114 means the soil can be expected to produce about 570 board feet per acre per year.

Trees to plant are those that are used for reforestation or, under suitable conditions, natural regeneration. They are suited to the soils and can produce a commercial wood crop. The desired product, topographic position (such as a low, wet area), and personal preference are three factors among many that can influence the choice of trees for use in reforestation.

Recreation

Joseph H. Paugh, forester, Natural Resources Conservation Service, helped to prepare this section.

Grundy County has potential for a wide variety of recreational activities. Those with high potential include vacation cabins; camping grounds; big game hunting; and natural, scenic, and historic areas. Activities with medium potential include vacation farms, shooting preserves, small game hunting, warm water fishing, cold water fishing, water sports areas, picnicking and field sport areas, and riding stables. Golf courses have low development potential.

The soils in Grundy County generally have fair characteristics for recreation activities. Attention is needed to soil depth, permeability, texture, slope, surface stones, and drainage in developing recreation enterprises. Most problems presented by soil characteristics can be overcome by careful site selection and planning.

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 are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In 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 measures.

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

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

Gerald Montgomery, biologist, Natural Resources Conservation Service, helped to prepare this section.

Grundy County has varied populations of fish and wildlife. The abundance and distribution of particular species depend on land use, amount of water, and kind of vegetation present.

Numerous species prefer the open land of cropland, pasture, brushy fence rows, thickets, and scattered woodlots. These include cottontail, bobwhite quail, mourning dove, meadowlark, eastern bluebird, groundhog, and cardinal. These species are most abundant in diversified vegetative conditions.

Some species prefer the woodland in woodlots and timber tracts. They include white-tailed deer, grey squirrel, raccoon, and a variety of nongame birds.

Shallow lakes and other wetlands provide breeding habitat for wood ducks and resting and feeding areas for other migratory waterfowl. These wetlands are also important to furbearers, such as mink, muskrat, and aquatic, nongame birds.

Most areas in the county can be improved for use as wildlife habitat. The food, water, and cover needed for wildlife needs to be increased.

The streams, lakes, and ponds of Grundy County support crappie, bream, largemouth bass, and catfish. Nongame species, such as carp, buffalo, and drum, are also abundant, especially in lakes.

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.

Elements of Wildlife Habitat

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

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, orchardgrass, clover, annual lespedeza, and alfalfa.

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

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, ash, sweetgum, dogwood, hickory, blackberry, and walnut. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are shrub lespedeza, autumn-olive, and crabapple.

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

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

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, stones on the surface, slope, and permeability. Examples of shallow water areas are marshes, lake margins, and ponds.

Habitat for Various Kinds of Wildlife

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.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas.

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, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, and shrinking and swelling can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, 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 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 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, bedrock, and toxic material.

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

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and 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 and embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so

difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives 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 greater depth than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

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

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. Availability of drainage outlets is not considered in the ratings.

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

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

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts and sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

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

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. 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 grain-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 omitted in the table.

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $^1/_3$-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems 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 major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

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

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

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

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; *high*, more than 6 percent; and *very high*, more than 9 percent.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.64. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

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

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

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

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are 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.

If a soil is assigned to two hydrologic groups in the table, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary inundation of an area, is 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.

The table gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of flooding is more than 50 percent in any year). *Common* is used when the occasional and frequent classes are grouped for certain purposes. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

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.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The

estimates are based mainly on observations of the water table at selected sites and on the evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. Indicated in the table are the depth to the seasonal high water table; the kind of water table—that is, perched, apparent, or artesian; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in the table.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone. An *artesian* water table is under hydrostatic head, generally below an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

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

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

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

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

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*4*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 17 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

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 Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of 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 Fluvaquents (*Fluv*, meaning flood plain, plus *aquent*, the suborder of the Entisols that have a aquic 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 Fluvaquents.

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-silty, mixed, nonacid, mesic Typic Fluvaquents.

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 soil profile. An example is the Melvin series.

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" (*6*). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (*4*) and in "Keys to Soil Taxonomy" (*5*). 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."

Agee Series

The Agee series consists of very deep, poorly drained soils. Permeability is very slow. These soils formed in clayey alluvium. They are in slight

depressions on low terraces and on bottom lands on the Highland Rim in the southwestern and northwestern parts of the county. Slopes are 0 to 2 percent.

Agee soils are near Beason, Hamblen, Newark, and Wolftever soils. Beason and Newark soils are somewhat poorly drained. Hamblen and Wolftever soils are moderately well drained. Hamblen and Newark soils are not clayey. Beason, Hamblen, Newark, and Wolftever soils do not have a mollic epipedon.

Typical pedon of Agee silty clay loam, rarely flooded, 2 miles south of intersection of Highway 41 and Highway 50, at Pelham, 0.3 mile east of Highway 41, on a farm lane to a field (Burrow Cove quadrangle):

Ap—0 to 5 inches; very dark gray (10YR 3/1) silty clay loam; moderate medium granular structure; friable; many very fine and fine roots; common very fine pores; neutral; abrupt smooth boundary.

A—5 to 15 inches; very dark gray (10YR 3/1) clay; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine and fine roots; common very fine and fine pores; neutral; abrupt smooth boundary.

Bg1—15 to 20 inches; olive gray (5Y 5/2) clay; common fine prominent light olive brown (2.5Y 5/4) mottles; weak medium subangular blocky structure; very firm; few very fine and fine roots; neutral; clear smooth boundary.

Bg2—20 to 41 inches; gray (5Y 5/1) clay; common fine prominent light olive brown (2.5Y 5/4) mottles; moderate medium prismatic structure parting to moderate medium angular blocky structure; very firm; neutral; gradual smooth boundary.

Cg—41 to 61 inches; dark gray (N 4/0) clay; few fine prominent light olive brown (2.5Y 5/4) mottles; massive; very firm; neutral.

The solum ranges from 30 to 60 inches in thickness. Bedrock is at a depth of more than 60 inches. These soils are neutral or mildly alkaline.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. In some pedons the Ap horizon also includes chroma of 3. It is silty clay loam, silty clay, or clay.

The Bg horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2. It has few to common mottles of higher chroma. In some pedons it is silty clay, but in most pedons it is clay.

The Cg horizon is neutral and has value of 4 to 6, or has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2. In some pedons it is mottled without a dominant matrix color. It is clay.

Allen Series

The Allen series consists of very deep, well drained soils. Permeability is moderate. These soils formed in loamy colluvium on foot slopes and toe slopes. They are at the base of the Cumberland Plateau Escarpment in the western and northern parts of the county. Slopes range from 5 to 25 percent.

Allen soils are near Bouldin, Carbo, Sequatchie, and Talbott soils. Bouldin soils contain more than 35 percent cobbles, stones, and boulders of sandstone. Carbo and Talbott soils are clayey and are less than 40 inches deep over bedrock. Sequatchie soils have a solum less than 60 inches thick.

Typical pedon of Allen loam, 12 to 25 percent slopes, 1.8 miles south on Gross Cove Road from the intersection with Highway 56 at the Collins River Bridge, 500 feet south on a logging road, 25 feet west of logging road (Altamont quadrangle):

Oi—1 inch to 0; partly decomposed leaf litter.

A1—0 to 1 inch; very dark grayish brown (10YR 3/2) loam; moderate fine granular structure; very friable; many fine and medium roots; many fine and medium pores; strongly acid; abrupt smooth boundary.

A2—1 to 10 inches; dark yellowish brown (10YR 4/4) loam; moderate medium granular and weak fine subangular blocky structure; very friable; common fine and medium and few coarse roots; many very fine and fine pores; strongly acid; clear smooth boundary.

BA—10 to 19 inches; yellowish brown (10YR 5/4) loam; moderate fine subangular blocky structure; very friable; common fine and medium and few coarse roots; many very fine and fine pores; strongly acid; clear smooth boundary.

Bt1—19 to 23 inches; strong brown (7.5YR 5/6) loam; moderate medium subangular blocky structure; friable; common fine and medium roots; many very fine and fine pores; few faint clay films; strongly acid; clear smooth boundary.

Bt2—23 to 28 inches; yellowish red (5YR 5/6) clay loam; common medium distinct reddish yellow (7.5YR 6/6) mottles; moderate medium subangular blocky structure; friable; common fine and medium roots; common very fine and fine pores; common distinct clay films; about 2 percent,

by volume, fragments of sandstone as much as 0.75 inch across; strongly acid; clear smooth boundary.

Bt3—28 to 40 inches; red (2.5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; few fine and medium roots; common very fine and fine pores; common distinct clay films; about 5 percent, by volume, fragments of sandstone as much as 3 inches across; strongly acid; gradual smooth boundary.

Bt4—40 to 72 inches; red (2.5YR 4/8) clay loam; moderate medium subangular blocky structure; friable; few fine roots; common very fine and fine pores; many prominent clay films; about 5 percent, by volume, fragments of sandstone as much as 3 inches wide; strongly acid.

Thickness of the solum and depth to bedrock are more than 60 inches. Fragments mostly of sandstone comprise from 0 to 15 percent of the solum. These soils are very strongly acid or strongly acid, but in limed areas the surface layer is less acid.

The A or Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. Some pedons have an E horizon that has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. In most pedons the A and E horizons are loam, but in some pedons they are sandy loam.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 to 6, and chroma of 6 or 8. In the upper part it also has hue of 7.5YR. In some pedons it is loam, but in most pedons it is clay loam.

Beason Series

The Beason series consists of very deep, somewhat poorly drained soils. Permeability is moderately slow. These soils formed in clayey alluvium. They are on low terraces on the Highland Rim in the southwestern part of the county. Slopes are 0 to 2 percent.

Beason soils are near Agee and Wolftever soils. Agee soils are poorly drained. They have chroma of 2 or less throughout the B horizon, and also have an umbric epipedon. Wolftever soils are moderately well drained. They do not have mottles with chroma of 2 or less within the upper 10 inches of the B horizon.

Typical pedon of Beason silt loam, rarely flooded, northeast of Pelham, 450 feet west of the intersection of Highway 50 and Campground Road (Burrow Cove quadrangle):

Ap—0 to 5 inches; brown (10YR 5/3) silt loam; moderate medium granular structure; very friable; many very fine and fine roots; few fine brown and black accumulations; slightly acid; abrupt smooth boundary.

E—5 to 9 inches; pale brown (10YR 6/3) silt loam; common fine faint yellowish brown (10YR 5/4) mottles; moderate medium granular structure; very friable; common very fine and fine roots; common very fine and fine pores; medium acid; clear smooth boundary.

Bt1—9 to 20 inches; brown (10YR 5/3) silty clay loam; common fine faint yellowish brown (10YR 5/4) and few fine faint light brownish gray (10YR 6/2) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; common very fine and fine roots; common very fine and fine pores; common distinct clay films; few fine black accumulations; strongly acid; clear smooth boundary.

Bt2—20 to 34 inches; pale brown (10YR 6/3) silty clay loam; common fine faint brownish gray (10YR 6/2) and many medium faint yellowish brown (10YR 5/4) mottles; moderate medium and coarse prismatic structure parting to moderate medium subangular blocky; friable; few very fine and fine roots; common very fine and fine pores; common distinct clay films; few medium brown and black accumulations; strongly acid; clear irregular boundary.

Btg—34 to 55 inches; light gray (10YR 6/1) silty clay; few fine distinct yellowish brown (10YR 5/4) mottles; moderate medium and coarse prismatic structure parting to moderate medium subangular blocky; firm; few very fine and fine roots; common very fine and fine pores; few distinct clay films; many medium brown and black accumulations; few brownish stains on faces of peds; strongly acid; clear wavy boundary.

Cg—55 to 72 inches; gray (N 6/0) silty clay; common fine prominent yellowish brown (10YR 5/6) mottles; massive; firm; strongly acid.

The solum ranges from 34 to 60 inches in thickness. Bedrock is at a depth of more than 60 inches. These soils are very strongly acid or strongly acid, but in limed areas the surface layer is less acid.

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

In the upper part the Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 or 4. In the lower part it includes chroma of 1 or 2. In some pedons the Bt horizon is mottled, without a dominant matrix color, in shades of gray and brown. It is silty clay loam, silty clay, or clay.

The Cg horizon has hue 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2, or it is neutral. In some pedons it is mottled without a dominant matrix color. It is silty clay loam, silty clay, or clay.

Beersheba Series

The Beersheba series consists of moderately deep, well drained soils. Permeability is moderately rapid. These soils formed in loamy residuum derived from sandstone. They are on ridgetops and side slopes on the Cumberland Plateau. Slopes are 2 to 20 percent.

Beersheba soils are near Gilpin, Lonewood, Lily, Monteagle, and Ramsey soils. Gilpin soils contain more fragments. They are 20 to 40 inches deep over shale or siltstone. Lonewood and Monteagle soils are more than 40 inches deep over bedrock. Lily soils are 20 to 40 inches deep over hard sandstone. Ramsey soils are less than 20 inches over hard sandstone. They are less than 20 inches deep over bedrock.

Typical pedon of Beersheba loam, 2 to 6 percent slopes, 0.3 mile north on 55th Avenue from intersection with State Highway 108 at Gruetli-Laager, 0.4 mile west on Colony Road, 0.6 mile north on Nolan Road, 30 feet east of road (Collins quadrangle):

Oi—1 inch to 0; partly decomposed leaves.

A—0 to 1 inch; dark brown (10YR 3/3) loam; moderate medium granular structure; very friable; many fine and medium roots; many very fine and fine pores; extremely acid; abrupt smooth boundary.

E—1 to 5 inches; brown (10YR 5/3) loam; moderate medium granular and weak fine subangular blocky structure; very friable; many fine and medium roots; many very fine and common fine and medium pores; about 2 percent fragments of soft sandstone as much as 2 inches wide; very strongly acid; clear smooth boundary.

Bt1—5 to 14 inches; yellowish brown (10YR 5/6) loam; weak medium subangular blocky structure; friable; common fine and medium roots; many very fine, common fine and medium pores; few faint clay films in pores; about 5 percent fragments of soft sandstone as much as 3 inches wide; very strongly acid; gradual smooth boundary.

Bt2—14 to 26 inches; yellowish brown (10YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable; few fine roots; common very fine and fine pores; few distinct clay films on faces of peds and in pores; about 5 percent fragments of soft sandstone as much as 3 inches wide; very strongly acid; gradual smooth boundary.

Bt3—26 to 36 inches; yellowish brown (10YR 5/8) sandy clay loam interspersed with brownish yellow (10YR 6/8) sandy loam that shows rock structure; weak medium subangular blocky structure in some parts and massive in other parts; friable; common very fine and fine pores; few faint clay films on faces of peds and in pores; about 10 percent fragments of soft sandstone; extremely acid.

Cr—36 to 50 inches; brownish yellow (10YR 6/8) and yellow (10YR 8/6) soft, weathered sandstone; extremely acid.

Thickness of the solum and depth to soft sandstone range from 20 to 40 inches. Depth to hard sandstone generally ranges from 40 to 60 inches. Fragments of soft or hard sandstone range from 0 to 15 percent in the solum and to as much as 35 percent in the C horizon. These soils are extremely acid to strongly acid, but in limed areas the surface layer is less acid.

The A horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 1 to 3. Some pedons have an Ap horizon that has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 6. The E horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 4. In most pedons the A and E horizons are loam, but the range includes fine sandy loam and silt loam.

Some pedons have a transitional horizon between the A or E horizon and the Bt horizon.

The Bt horizon has hue of 10YR, 7.5YR, or 5YR, value of 4 to 6, and chroma of 4 to 8. In some pedons it is mottled in shades of brown, red, or yellow. It is loam, sandy clay loam, or clay loam.

Some pedons have a BC or C horizon that has hue of 10YR, 7.5YR, or 5YR, value of 5 or 6, and chroma of 4 to 8. In some pedons it is mottled in shades of brown, red, or yellow. It is loam or sandy loam.

Bethesda Series

The Bethesda series consists of very deep, well drained soils. Permeability is moderately slow. These soils formed in disturbed, mixed soil and rock material. They are in spoil piles of surface coal mines on the Cumberland Plateau. In some areas they have been smoothed and in others they remain unreclaimed after open surface mining. Slopes are 8 to 90 percent.

Bethesda soils are near Beersheba, Gilpin, Lonewood, and Lily soils. Beersheba and Lily soils are less than 40 inches deep over sandstone. Gilpin soils are less than 40 inches deep over shale or siltstone. Lonewood soils contain fewer rock fragments. They are 40 to 72 inches deep over bedrock.

Typical pedon of Bethesda channery loam, 8 to 25 percent slopes, 2.5 miles west of Coalmont, on Freemont Road (Tracy City quadrangle):

Ap—0 to 2 inches; dark grayish brown (10YR 4/2) channery loam; massive; friable; many fine and medium roots; about 30 percent fragments of shale and sandstone as much as 3 inches wide; very strongly acid; clear wavy boundary.
C1—2 to 10 inches; strong brown (7.5YR 5/8) extremely channery clay loam; massive; friable; common fine and medium, and few coarse roots; about 75 percent fragments of shale and sandstone as much as 5 inches wide; extremely acid; clear irregular boundary.
C2—10 to 63 inches; brownish yellow (10YR 6/6) extremely stony clay loam; massive; firm; about 80 percent fragments of shale and sandstone as much as 24 inches wide; extremely acid.

Bedrock is at a depth of more than 60 inches except on highwalls, where rock outcrops are common. Fragments of shale, sandstone, and coal range from 25 to 50 percent in the A horizon and from 35 to 80 percent in the C horizon. The fragments range in width from less than 1 inch to 6 feet. These soils are extremely acid or very strongly acid, but in limed areas the surface layer is less acid.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3, or it is mottled without a dominant matrix color. In the fine earth fraction it is loam or silt loam.

The C horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 2 to 8, or it is mottled without a dominant matrix color. In the fine earth fraction it is loam, silt loam, silty clay loam, or clay loam.

Bonair Series

The Bonair series consists of deep, poorly drained soils. Permeability is moderate. These soils formed in alluvium derived from sandstone and shale. They are on bottom lands on the Cumberland Plateau. Slopes are 0 to 2 percent.

Bonair soils are near Beersheba, Lily, Lonewood, and Sewanee soils. Beersheba, Lily, and Lonewood soils are on nearby uplands. They are well drained. They have an argillic horizon but not an umbric epipedon. Sewanee soils are moderately well drained. They do not have dominant chroma of 2 or less within the upper part of the B horizon.

Typical pedon of Bonair loam, occasionally flooded, 4.0 miles southwest of Altamont on Highway 50, about 1.1 miles northwest along pipeline, 160 feet southwest of pipeline (Cane Hollow quadrangle):

Oi—1 inch to 0; partly decomposed leaves.
A—0 to 8 inches; very dark gray (10YR 3/1) loam; moderate fine granular structure; very friable; common fine and medium roots; common very fine and fine pores; very strongly acid; clear smooth boundary.
Bg1—8 to 13 inches; dark gray (10YR 4/1) silt loam; moderate medium granular structure; very friable; common fine and medium roots; common very fine and fine pores; very strongly acid; clear wavy boundary.
Bg2—13 to 29 inches; gray (10YR 5/1) clay loam; moderate fine subangular blocky structure; friable; common fine and few medium roots; common very fine and fine pores; very strongly acid; gradual smooth boundary.
Bg3—29 to 46 inches; mottled gray (10YR 5/1) yellowish brown (10YR 5/6) and light gray (10YR 6/1) loam; weak medium subangular blocky structure; friable; strongly acid; clear smooth boundary.
Cg—46 to 52 inches; light gray (10YR 6/1) loam; massive; very friable; very strongly acid.
R—52 inches; hard sandstone.

The solum ranges from 30 to 50 inches in thickness. Depth to bedrock ranges from 40 to 70 inches. In most pedons the bedrock is sandstone. These soils are very strongly acid or strongly acid, but in limed areas the surface layer is less acid.

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

The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. In some pedons in the lower part it is mottled without a dominant matrix color. In most pedons it is mottled in shades of brown and gray. It is loam, silt loam, or clay loam.

The BC horizon, where it occurs, and the C horizon have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2, or they are neutral. In some pedons they are mottled without a dominant matrix color. In most pedons they are mottled in shades of brown and gray. They are silt loam, loam, or fine sandy loam.

Bouldin Series

The Bouldin series consists of very deep, well drained soils. Permeability is moderately rapid. These soils formed in stony colluvium derived mainly from sandstone (fig. 10). They are on mountainsides of the Cumberland Plateau Escarpment. Slopes are 30 to 75 percent.

Bouldin soils are near Carbo, Cobstone, and Talbott soils. Carbo and Talbott soils have a clayey subsoil. They are less than 40 inches deep to bedrock. In Cobstone soils the solum is less than 60 inches thick.

Typical pedon of Bouldin stony loam, 30 to 75

Figure 10.—Profile of Bouldin stony loam, 30 to 75 percent slopes, bouldery.

percent slopes, bouldery, 5.1 miles northwest of Barkertown, 500 feet north of Old Stage Road on Collins quad map (Collins quadrangle):

A—0 to 1 inch; very dark grayish brown (10YR 3/2) stony loam; moderate medium granular structure; very friable; many fine and medium and common coarse roots; many fine tubular pores; 30 percent fragments of sandstone from less than 1 to 24 inches wide; very strongly acid; gradual smooth boundary.

E—1 to 5 inches; brown (10YR 4/3) stony loam; moderate medium granular and weak fine subangular blocky structure; very friable; many fine and medium and common coarse roots; many fine and few medium tubular pores; 25 percent fragments of sandstone less than 1 to 24 inches wide; very strongly acid; gradual smooth boundary.

BE—5 to 12 inches; strong brown (7.5YR 5/6) cobbly loam; weak fine subangular blocky structure; very friable; many fine and medium and common coarse roots; many fine and few medium tubular pores; 30 percent fragments of sandstone from less than 1 to 10 inches wide; very strongly acid; gradually smooth boundary.

Bt1—12 to 30 inches; yellowish red (5YR 5/6) very stony loam; moderate medium subangular blocky structure; friable; common medium and few coarse roots; common fine and medium tubular pores; few clay films; 35 percent fragments of sandstone less than 1 to 15 inches wide; very strongly acid; gradual smooth boundary.

Bt2—30 to 56 inches; yellowish red (5YR 5/8)

extremely stony clay loam; moderate medium subangular blocky structure; friable; common fine and medium tubular pores; common clay films; 60 percent fragments of sandstone less than 1 to 20 inches wide; very strongly acid; gradual wavy boundary.

Bt3—56 to 90 inches; yellowish red (5YR 5/8) extremely stony clay loam; moderate medium subangular blocky structure; friable; common fine and medium tubular pores; common clay films; 65 percent fragments of sandstone less than 1 to 30 inches wide; very strongly acid.

Thickness of the solum and depth to bedrock are more than 60 inches. Fragments of sandstone less than 1 inch to 4 feet or more across range from 15 to 35 percent in the A horizon and in the upper part of the B horizon and from 35 to 65 percent in the Bt horizon. These soils are very strongly acid or strongly acid, but in limed areas the surface layer is less acid.

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

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

The Bt horizon has hue of 7.5YR to 2.5YR, value of 4 or 5, and chroma of 6 or 8. In the fine earth fraction it is loam or clay loam.

Carbo Series

The Carbo series consists of moderately deep, well drained soils. Permeability is slow. These soils formed in clayey residuum derived from limestone. They are on ridges and side slopes at lower elevations on the Cumberland Plateau Escarpment and on outlying ridges and side slopes on the Highland Rim. Slopes range from 15 to 60 percent.

Carbo soils are near Allen, Bouldin, and Talbott soils. Allen and Bouldin soils are more than 60 inches deep to bedrock. Talbott soils have less clay in the argillic horizon than Carbo soils. Talbott soils also have hue redder than 7.5YR in the argillic horizon.

Typical pedon of Carbo silt loam, in an area of Talbott-Carbo-Rock outcrop complex, 15 to 30 percent slopes, 1.3 miles east on Highway 50 from the intersection with Highway 41 at Pelham, 1.7 miles east on Payne Cove Road, 0.4 mile on a gravel road, 180 feet south of road (Burrow Cove quadrangle):

Oi—1 inch to 0; partly decomposed leaves.

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

BA—2 to 4 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine subangular blocky structure; friable; common fine and medium, and few coarse roots; common very fine and fine pores; medium acid; abrupt smooth boundary.

Bt1—4 to 17 inches; yellowish brown (10YR 5/6) clay; moderate coarse subangular blocky structure; very firm; common fine and medium, and few coarse roots; few very fine and fine pores; many prominent clay films; slightly acid; gradual smooth boundary.

Bt2—17 to 23 inches; yellowish brown (10YR 5/6) clay; common fine faint yellowish brown (10YR 5/4) and common fine distinct strong brown (7.5YR 5/6) mottles; moderate coarse subangular blocky structure; very firm; common fine and medium roots; few fine pores; many prominent clay films; common fine black accumulations; neutral; gradual smooth boundary.

C—23 to 34 inches; light olive brown (2.5Y 5/6) clay; common fine distinct yellowish brown (10YR 5/6) and common fine prominent strong brown (7.5YR 5/6) mottles; massive; very firm; few fine and medium roots; few fine black accumulations; mildly alkaline; abrupt smooth boundary.

R—34 inches; limestone.

Thickness of the solum and depth to bedrock range from 20 to 40 inches. Fragments of limestone range from 0 to 10 percent. These soils are medium acid to mildly alkaline.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is silt loam or silty clay loam.

The BA horizon, where it occurs, and the Bt horizon have hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 or 6. In most pedons the Bt horizon is mottled in shades of brown. The BA horizon is silt loam or silty clay loam. The Bt horizon is clay.

The BC horizon and the C horizon, where they occur, have hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 4 or 6, or they are mottled without a dominant matrix color. In most pedons they are mottled in shades of brown and gray. They are clay.

Clarkrange Series

The Clarkrange series consists of deep, moderately well drained soils that have a fragipan in the subsoil. Permeability is moderate. These soils formed in loamy residuum derived from sandstone and shale. They are on broad, smooth interfluves on the Cumberland Plateau. Slopes are 1 to 5 percent.

Clarkrange soils are near Beersheba, Lonewood, Lily, and Monteagle soils. These soils are well drained

and do not have a fragipan. Beersheba and Lily soils are also less than 40 inches deep to bedrock.

Typical pedon of Clarkrange silt loam, 1 to 5 percent slopes, 4.0 miles southwest on Highway 50 from the intersection with Highway 108 at Altamont, 100 feet east of highway (Cane Hollow quadrangle):

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

Bt1—6 to 13 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; few fine roots; few faint clay films; strongly acid; gradual smooth boundary.

Bt2—13 to 22 inches; yellowish brown (10YR 5/4) silt loam; common medium faint brown (10YR 5/3) mottles; moderate medium subangular blocky structure; friable; few fine roots; few faint clay films; strongly acid; clear smooth boundary.

Btx1—22 to 35 inches; mottled pale brown (10YR 6/3) and yellowish brown (10YR 5/4) silt loam; weak medium prismatic structure parting to weak fine and medium subangular blocky; firm; brittle; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.

Btx2—35 to 49 inches; yellowish brown (10YR 5/6) clay loam; many medium distinct light brownish gray (10YR 6/2) and common medium faint yellowish brown (10YR 5/4) mottles; moderate coarse prismatic structure parting to weak medium subangular blocky; firm; brittle; common distinct clay films; about 2 percent, by volume, fragments of sandstone less than 3 inches wide; strongly acid; gradual smooth boundary.

BC—49 to 54 inches; yellowish brown (10YR 5/4) clay loam; common medium prominent yellowish red (5YR 5/8) and common medium faint pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; firm; about 5 percent, by volume, fragments of sandstone less than 3 inches wide; strongly acid; abrupt smooth boundary.

Cr—54 to 61 inches; soft, weathered sandstone.

The solum ranges from 35 to more than 60 inches in thickness. Depth to sandstone or shale ranges from 40 to 60 inches. Fragments of soft or hard sandstone and shale range from 0 to 10 percent in the solum. These soils are very strongly acid or strongly acid, but in limed areas the surface layer is less acid.

The Ap and E horizons, where they occur, have hue of 10YR, value of 4 to 6, and chroma of 3 or 4.

Some pedons have a thin A horizon that has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is silt loam or loam.

Some pedons have a transitional horizon between the A or E horizon and the Bt horizon.

The Bt horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 8. In some pedons it is mottled in shades of brown. It is silt loam or silty clay loam.

The Btx horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma 3 to 6, or it has mottles without a dominant matrix color. In most pedons it is mottled in shades of gray and brown. It is silt loam, loam, silty clay loam, or clay loam.

The BC and C horizons, where they occur, have hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 2 to 6, or they are mottled without a dominant matrix color. In most pedons they are mottled in shades of gray, brown, and red. In the fine earth fraction they are loam, clay loam, or silty clay loam.

Cobstone Series

The Cobstone series consists of very deep, well drained soils. Permeability is moderately rapid. These soils formed in loamy alluvium that is high in content of sandstone cobbles and stones. They are on alluvial fans and low terraces in coves. They are near the base of the Cumberland Plateau Escarpment in the southwestern and northern parts of the county. Slopes are 1 to 5 percent.

Cobstone soils are near Bouldin and Sequatchie soils. Bouldin soils have a solum more than 60 inches thick. Sequatchie soils have an umbric epipedon and, in the upper part of the solum, have less than 15 percent rock fragments.

Typical pedon of Cobstone cobbly loam, 1 to 5 percent slopes, rarely flooded, 1.2 miles north on Stella Scruggs Road from the intersection with Highway 56 at Collins River Bridge, 75 feet north of road (Irving College quadrangle):

Ap—0 to 7 inches; dark brown (10YR 4/3) cobbly loam; weak medium granular structure; very friable; common fine and medium roots; many fine pores; about 20 percent, by volume, pebbles and cobbles of sandstone as much as 8 inches wide; slightly acid; abrupt smooth boundary.

BE—7 to 16 inches; strong brown (7.5YR 5/6) cobbly loam; weak fine subangular blocky structure; very friable; few fine and medium roots; many fine pores; about 25 percent, by volume, pebbles and cobbles of sandstone as much as 10 inches wide; strongly acid; clear wavy boundary.

Bt1—16 to 28 inches; strong brown (7.5YR 5/6); very cobbly sandy clay loam; weak medium subangular blocky structure; friable; few fine and medium roots; common fine pores; few distinct clay films;

about 35 percent, by volume, pebbles and cobbles of sandstone as much as 10 inches wide; strongly acid; clear wavy boundary.

Bt2—28 to 42 inches; strong brown (7.5YR 5/6) very cobbly sandy clay loam; weak medium subangular blocky structure; friable; common fine pores; few faint clay films; about 45 percent, by volume, pebbles, cobbles, and stones of sandstone as much as 15 inches wide; very strongly acid; gradual wavy boundary.

C—42 to 61 inches; yellowish brown (10YR 5/6) extremely cobbly sandy loam; massive; very friable; about 65 percent, by volume, pebbles, cobbles, and stones of sandstone as much as 24 inches wide; very strongly acid.

The solum ranges from 30 to 50 inches in thickness. Bedrock is at a depth of more than 60 inches. Rounded pebbles, cobbles, and stones of mostly sandstone range from 20 to 50 percent in the A and BE horizons and from 35 to 80 percent in the Bt and C horizons. These soils are very strongly acid or strongly acid, but in limed areas the surface layer is less acid.

The A horizon has hue of 10YR, value of 4, and chroma of 2 to 4. In some pedons it is less than 4 inches thick and has value of 3. The fine earth fraction is loam, but in some pedons it is sandy loam.

Some pedons have a transitional horizon between the A or E horizon and the Bt horizon.

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

The C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. In the fine earth fraction it is loam or sandy loam.

Emory Series

The Emory series consists of very deep, well drained soils. Permeability is moderate. These soils formed in loamy alluvium on toe slopes and in slight depressions. They are in the southwestern and northwestern parts of the county on the Highland Rim. Slopes are 0 to 3 percent.

Emory soils are near Etowah and Waynesboro soils. Etowah and Waynesboro soils do not have buried horizons.

Typical pedon of Emory silt loam, 1.8 miles southeast of the intersection of Highway 41 and Highway 50, about 0.2 mile west of Highway 41 on Mud Bog Lane, 25 feet south of lane (Burrow Cove quadrangle):

Ap—0 to 7 inches; dark reddish brown (5YR 3/3) silt loam; weak fine granular structure; very friable; common very fine and fine roots; medium acid; abrupt smooth boundary.

Bw—7 to 21 inches; dark reddish brown (5YR 3/4) silt loam; few fine faint yellowish red (5YR 4/6) mottles; weak fine subangular blocky structure; very friable; common very fine and fine roots; common very fine and fine pores; medium acid; abrupt smooth boundary.

Ab—21 to 25 inches; dark reddish brown (5YR 3/3) silt loam; moderate fine granular structure; friable; few very fine and fine roots; common very fine and fine pores; medium acid; abrupt smooth boundary.

Btb1—25 to 32 inches; reddish brown (5YR 4/4) silty clay loam; common fine faint reddish brown (5YR 4/3) mottles; moderate fine subangular blocky structure; friable; few very fine and fine roots; common very fine and fine pores; few faint clay films; medium acid; clear smooth boundary.

Btb2—32 to 61 inches; strong brown (7.5YR 4/6) silty clay loam; moderate fine subangular blocky structure; friable; few very fine and fine roots; many very fine and fine pores; common faint clay films; strongly acid.

The local alluvium is 20 to 36 inches thick over the buried solum. Bedrock is at a depth of more than 60 inches. These soils are strongly acid or medium acid, but in limed areas the surface layer is less acid.

The Ap horizon has hue of 7.5YR or 5YR, value of 3, and chroma of 2 or 3. It is silt loam.

The Bw horizon has hue of 7.5YR or 5YR, value of 3 to 5, and chroma of 4 or 6. In some pedons it is mottled in shades of red and brown. It is silt loam.

The Ab horizon has hue of 7.5YR or 5YR, value of 3, and chroma of 2 to 4. It is silt loam.

The Btb horizon has hue of 7.5YR to 2.5YR, value of 4 or 5, and chroma of 4 or 6. In some pedons it is mottled in shades of brown and red. It is silty clay loam or clay loam.

Etowah Series

The Etowah series consists of very deep, well drained soils. Permeability is moderate. These soils formed in old alluvium and colluvium. They are on high stream terraces and colluvial foot slopes on the Highland Rim. Slopes are 2 to 12 percent.

Etowah soils are near Emory, Sequatchie, and Waynesboro soils. Emory soils do not have an argillic horizon in the upper part of the subsoil. Sequatchie soils have a solum less than 60 inches thick. They have hue browner than 5YR. Waynesboro soils have a clayey particle-size control section.

Typical pedon of Etowah silt loam, 2 to 5 percent

slopes, 0.75 mile east of Philadelphia Church in an open field, 1,000 feet northeast of the Collins River on Highway 56 (Irving College quadrangle):

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

A—6 to 10 inches; dark brown (10YR 3/3) silt loam; weak medium granular structure; friable; common fine and medium roots; common fine and medium tubular pores; slightly acid; clear smooth boundary.

Bt1—10 to 21 inches; strong brown (7.5YR 4/6) silty clay loam; weak medium and fine subangular blocky structure; friable; common fine and medium roots; common fine and medium tubular pores; few distinct clay films; strongly acid; gradual smooth boundary.

Bt2—21 to 42 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium and fine subangular blocky structure; friable; few fine roots; common fine and medium tubular pores; common distinct clay films; strongly acid; gradual smooth boundary.

Bt3—42 to 63 inches; yellowish red (5YR 5/8) silty clay loam; moderate medium and fine subangular blocky structure; friable; common distinct clay films; about 2 percent, by volume, fragments of chert 0.10 to 0.25 inch wide; strongly acid.

Thickness of the solum and depth to bedrock are more than 60 inches. Fragments of chert or small pebbles as much as 1 inch wide range, by volume, from 0 to 15 percent. These soils are very strongly acid or strongly acid, but in recently limed areas the surface layer is less acid.

The A horizon has hue of 10YR or 7.5YR, value of 3, and chroma of 2 to 4. In some pedons in eroded areas, it also has value of 4. In most pedons it is silt loam, but in some pedons it is loam.

The Bt horizon has hue of 7.5YR to 2.5YR, value of 4 or 5, and chroma of 6 to 8. In some pedons it is mottled in shades of brown and red. It is silty clay loam or clay loam and, below a depth of about 40 inches, clay.

Gilpin Series

The Gilpin series consists of moderately deep, well drained soils. Permeability is moderate. These soils formed in loamy residuum derived from shale and siltstone. They are on upland ridges and side slopes of the Cumberland Plateau. Slopes range from 6 to 40 percent.

Gilpin soils are near Beersheba, Lily, Lonewood, and Ramsey soils. Beersheba and Lily soils are 20 to 40 inches deep to sandstone. Lonewood soils are 40 to 72 inches deep to bedrock. Ramsey soils are less than 20 inches deep to sandstone.

Typical pedon of Gilpin channery silt loam, 12 to 20 percent slopes, 6.2 miles west of Tracy City on Clouse Hill Road, 25 feet north of road (Burrow Cove quadrangle):

Oi—1 inch to 0; partly decomposed leaf litter.

Ap—0 to 4 inches; brown (10YR 5/3) channery silt loam; moderate medium granular structure; very friable; many fine and medium roots; about 20 percent, by volume, fragments of shale as much as 0.25 inch across; strongly acid; clear smooth boundary.

BE—4 to 7 inches; yellowish brown (10YR 5/4) channery silt loam; moderate medium granular structure; friable; common fine and medium roots; about 20 percent, by volume, fragments of shale as much as 2.5 inches wide; strongly acid; gradual smooth boundary.

Bt1—7 to 17 inches; yellowish brown (10YR 5/6) channery silt loam; moderate medium subangular blocky structure; friable; few fine roots; few distinct clay films; about 25 percent, by volume, fragments of shale 0.10 to 0.25 inch thick and 0.5 inch to 2 inches wide; strongly acid; gradual smooth boundary.

Bt2—17 to 28 inches; strong brown (7.5YR 5/8) channery silty clay loam; moderate medium subangular blocky structure; friable; few distinct clay films; about 25 percent, by volume, fragments of shale 0.10 to 0.25 inch thick and as much as 1.5 inches wide; strongly acid; gradual smooth boundary.

B/C—28 to 38 inches; strong brown (7.5YR 5/6) very channery silty clay loam; common medium prominent brown (10YR 5/3) mottles; weak fine subangular blocky structure and massive; friable; about 60 percent, by volume, fragments of shale 0.10 to 0.25 inch thick and as much as 3 inches wide; strongly acid; clear wavy boundary.

Cr—38 inches; weathered, acid shale.

Thickness of the solum and depth to rippable shale or siltstone range from 20 to 40 inches. Fragments of siltstone, shale, and sandstone as much as 6 inches wide range from 0 to 25 percent in the A horizon and from 5 to 30 percent in the B horizon. Fragments of shale and siltstone range from 30 to 90 percent in the BC and C horizon. These soils are very strongly acid or strongly acid, but in limed areas the surface layer is less acid.

The Ap and E horizons, where they occur, have hue of 10YR, value of 4 or 5, and chroma of 2 to 4. Some pedons have a thin A horizon that has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The fine earth fraction is silt loam or loam.

Some pedons have a 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 or 6. In the fine earth fraction it is loam, silt loam, clay loam, or silty clay loam.

The B/C horizon and the C horizon, where they occur, have hue of 10YR or 7.5YR, value of 5, and chroma of 4 to 8. In the fine earth fraction they are silt loam, loam, or silty clay loam.

Hamblen Series

The Hamblen series consists of very deep, moderately well drained soils. Permeability is moderate. These soils formed in loamy alluvium on bottom lands. They are on the Highland Rim in the southwestern and northwestern parts of the county. Slopes are 0 to 2 percent.

Hamblen soils are near Melvin, Newark, Sullivan, and Whitwell soils. Melvin soils are poorly drained. Newark soils are somewhat poorly drained. Newark and Melvin soils also have subhorizons with dominant chroma of 2 or less within 24 inches of the surface. Newark and Melvin soils also have a particle-size control section with less than 15 percent fine sand and coarser material. Sullivan soils are well drained and do not have mottles of chroma of 2 or less within 24 inches of the surface. Whitwell soils have an argillic horizon and occur on low terraces.

Typical pedon of Hamblen loam, occasionally flooded, 1.2 miles east of Pelham on Highway 50 to Payne Cove Road, 0.5 mile east on Payne Cove Road to Elk River bridge, 625 feet northeast of bridge, 60 feet south of riverbank (Burrow Cove quadrangle):

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

Bw1—5 to 15 inches; brown (10YR 4/3) loam; moderate medium granular and weak medium subangular blocky structure; friable; common very fine and fine roots; common very fine and fine pores; medium acid; clear smooth boundary.

Bw2—15 to 24 inches; yellowish brown (10YR 5/4) loam; common fine faint pale brown (10YR 6/3) and few fine distinct light brownish gray (10YR 6/2) mottles; weak fine subangular blocky structure; friable; common very fine and fine roots; common very fine and fine pores; few fine black and brown accumulations; strongly acid; clear smooth boundary.

C—24 to 45 inches; brown (10YR 5/3) loam; common fine faint light brownish gray (10YR 6/2) and few fine faint yellowish brown (10YR 5/4) mottles; massive; friable; few fine roots; common very fine and fine pores; few fine black and brown accumulations; strongly acid; clear smooth boundary.

Cg—45 to 61 inches; light brownish gray (2.5Y 6/2) silt loam; few fine prominent yellowish brown (10YR 5/6) mottles; massive; friable; few very fine and fine pores; few fine black and brown accumulations; strongly acid.

The solum ranges from about 20 to 55 inches in thickness. Bedrock is at a depth of more than 60 inches. These soils are strongly acid or medium acid, but in limed areas the surface layer is less acid.

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

The Bw horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. In some pedons in the lower part it also has chroma of 2. In most pedons it is mottled in shades of red, brown, and gray. It has mottles with chroma of 2 within 24 inches of the surface. It is loam, silt loam, or clay loam.

The C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 6, or it is mottled without a dominant matrix color. In most pedons it is mottled in shades of brown and gray. It is loam, silt loam, clay loam, or fine sandy loam.

Jefferson Series

The Jefferson series consists of very deep, well drained soils. Permeability is moderately rapid. These soils formed in loamy colluvium of soils formed in residuum derived from acid sandstone, shale, and siltstone. They are on side slopes and foot slopes on the Cumberland Plateau. Slopes are 5 to 40 percent.

Jefferson soils are near Beersheba, Gilpin, Ramsey, and Lily soils. Beersheba and Lily soils are 20 to 40 inches deep to sandstone. Gilpin soils are 20 to 40 inches deep to shale or siltstone. Ramsey soils are somewhat excessively drained and are less than 20 inches deep to sandstone.

Typical pedon of Jefferson loam, 20 to 40 percent slopes, 0.95 mile south on Ross Creek Road from the intersection with Torbert Road at Gruetli-Laager, 150 feet north of road (Palmer quadrangle):

Oi—1 inch to 0; partly decomposed leaves.

A—0 to 3 inches; very dark grayish brown (10YR 3/2) loam; moderate fine granular structure; very friable; many very fine and fine, and common medium roots; many very fine and fine pores; about 10 percent, by volume, fragments of sandstone as much as 3 inches wide; very strongly acid; abrupt smooth boundary.

E—3 to 12 inches; yellowish brown (10YR 5/4) loam; moderate fine granular structure; very friable; common fine and medium roots; many very fine and fine, and common medium pores; about 10 percent, by volume, fragments of sandstone as much as 3 inches wide; strongly acid; clear smooth boundary.

BE—12 to 20 inches; yellowish brown (10YR 5/8) gravelly loam; moderate fine subangular blocky structure; friable; common fine and medium, and few coarse roots; many very fine and fine pores; about 20 percent, by volume, fragments of sandstone as much as 3 inches wide; strongly acid; gradual smooth boundary.

Bt1—20 to 26 inches; strong brown (7.5YR 5/8) gravelly loam; moderate fine subangular blocky structure; friable; common fine and medium, and few coarse roots; common very fine and fine pores; few distinct clay films; about 20 percent, by volume, fragments of sandstone as much as 3 inches wide; strongly acid; gradual smooth boundary.

Bt2—26 to 47 inches; strong brown (7.5YR 5/8) gravelly clay loam; common fine distinct yellowish red (5YR 5/8) and few fine distinct brownish yellow (10YR 6/6) mottles; moderate fine and medium subangular blocky structure; friable; few fine, medium, and coarse roots; common fine pores; common distinct clay films; about 20 percent, by volume, fragments of sandstone as much as 3 inches wide; very strongly acid; gradual smooth boundary.

BC—47 to 52 inches; strong brown (7.5YR 5/8) gravelly loam; few fine distinct yellowish red (5YR 5/8) mottles; weak fine subangular blocky structure; friable; few fine and medium roots; common fine pores; about 20 percent, by volume, fragments of sandstone as much as 3 inches wide; very strongly acid; clear smooth boundary.

C—52 to 63 inches; yellowish brown (10YR 5/6) gravelly sandy loam; few fine prominent yellowish red (5YR 5/8) mottles; massive; friable; few fine and medium roots; few fine pores; about 25 percent, by volume, fragments of sandstone as much as 3 inches wide; very strongly acid.

The solum ranges from 40 to 60 inches in thickness. Bedrock is at a depth of more than 60 inches. Fragments of mostly sandstone range from 5 to 35 percent in the solum. These soils are very strongly acid or strongly acid, but in limed areas the surface layer is less acid.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. The E horizon and the Ap horizon, where it occurs, have hue of 10YR, value of 4 or 5, and chroma of 3 or 4. Texture is most commonly loam, but some pedons have fine sandy loam, gravelly loam, or gravelly fine sandy loam textures.

Some pedons have a transitional horizon between the A or E horizon and the Bt horizon.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. In some pedons it is mottled in shades of red, yellow, and brown. In the fine earth fraction it is loam or clay loam.

The BC horizon, where it occurs, and the C horizon have hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 or 8, or they are mottled without a dominant matrix color. In most pedons they are mottled in shades of red, yellow, and brown. In the fine earth fraction they are loam or sandy loam.

Lily Series

The Lily series consists of moderately deep, well drained soils. Permeability is moderately rapid. These soils formed in loamy residuum derived from sandstone. They are on ridgetops and side slopes on the Cumberland Plateau. Slopes are 2 to 20 percent.

Lily soils are near Beersheba, Gilpin, Lonewood, Monteagle, and Ramsey soils. Beersheba soils are 20 to 40 inches deep to soft sandstone. Gilpin soils are 20 to 40 inches deep to shale or siltstone. Lonewood and Monteagle soils are more than 40 inches deep to bedrock. Ramsey soils are somewhat excessively drained and less than 20 inches deep to bedrock.

Typical pedon of Lily loam, 2 to 6 percent slopes, 1,500 feet north on Summerfield Road from the intersection with Highway 41 at Summerfield, 575 feet west along East Tennessee Gas line, 60 feet north of gas line (Burrow Cove quadrangle):

Oi—1 inch to 0; partly decomposed leaves.

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

E—1 to 6 inches; yellowish brown (10YR 5/4) loam; few fine faint brown (10YR 4/3) mottles; moderate medium granular structure; friable; many fine, and

common medium and coarse roots; many very fine and fine pores; strongly acid; gradual smooth boundary.
Bt1—6 to 14 inches; yellowish brown (10YR 5/6) loam; moderate fine subangular blocky structure; friable; common fine, medium, and coarse roots; many very fine and fine pores; few faint clay films; very strongly acid; gradual smooth boundary.
Bt2—14 to 27 inches; yellowish brown (10YR 5/6) loam; moderate fine and medium subangular blocky structure; friable; common fine, medium, and coarse roots; many very fine and fine pores; few distinct clay films; very strongly acid; clear smooth boundary.
C—27 to 31 inches; yellowish brown (10YR 5/8) sandy loam; massive; firm; few fine and medium roots; about 10 percent, by volume, soft sandstone fragments as much as 2 inches wide; very strongly acid; abrupt smooth boundary.
R—31 inches; hard sandstone.

Thickness of the solum and depth to hard sandstone range from 20 to 40 inches. Fragments of soft or hard sandstone range from 0 to 15 percent in the solum and to as much as 35 percent in the C horizon. These soils are extremely acid to strongly acid, but in limed areas the surface layer is less acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. Some pedons have an Ap horizon that has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The E horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. The A and E horizons are most commonly loam, but in some pedons they are fine sandy loam or silt loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. In some pedons it is mottled in shades of brown, red, or yellow. It is loam, sandy clay loam, or clay loam.

The BC and C horizons, where they occur, have hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 8. They are loam or sandy loam.

Lonewood Series

The Lonewood series consists of deep, well drained soils. Permeability is moderate. These soils formed in residuum weathered mainly from sandstone and shale. They are on broad plateaus and ridgetops of the Cumberland Plateau. Slopes are 2 to 12 percent.

Lonewood soils are near Beersheba, Lily, Monteagle, and Ramsey soils. Beersheba and Lily soils are less than 40 inches deep to sandstone. Monteagle soils are redder in the subsoil than Lonewood soils and have a solum more than 60 inches thick. Ramsey soils are somewhat excessively drained and less than 20 inches deep to sandstone.

Typical pedon of Lonewood silt loam, 2 to 5 percent slopes, 1 mile southwest of Summerfield near Monteagle, on a logging road (Monteagle quadrangle):

Oi—1 inch to 0; partly decomposed leaves.
A—0 to 1 inch; very dark grayish brown (10YR 3/2) silt loam; weak medium granular structure; very friable; many fine and medium roots; strongly acid; abrupt smooth boundary.
E—1 to 7 inches; brown (10YR 5/3) silt loam; weak medium granular structure; very friable; common fine and medium roots; common very fine tubular pores; strongly acid; clear smooth boundary.
Bt1—7 to 13 inches; yellowish brown (10YR 5/6) silt loam; weak and moderate medium subangular blocky structure; friable; common fine and medium roots; common fine and few medium tubular pores; few faint clay films on horizontal faces of peds; strongly acid; gradual smooth boundary.
Bt2—13 to 29 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; many medium and fine roots; common fine and few medium tubular pores; few faint clay films on horizontal faces of peds and in pores; strongly acid; gradual smooth boundary.
Bt3—29 to 38 inches; strong brown (7.5YR 5/6) clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few medium and fine roots; common fine tubular pores; common distinct clay films on horizontal faces of peds and in pores; strongly acid; gradual smooth boundary.
Bt4—38 to 58 inches; yellowish red (5YR 5/6) clay loam; few medium prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; few fine tubular pores; few distinct clay films on horizontal faces of peds; strongly acid; gradual smooth boundary.
C—58 to 62 inches; yellowish red (5YR 5/6) sandy loam; single grain; loose; friable; about 10 percent, by volume, fragments of sandstone as much as 0.5 inches wide; strongly acid.
Cr—62 to 67 inches; soft, weathered sandstone.

The solum ranges from 40 to 65 inches in thickness. Depth to bedrock ranges from 40 to 72 inches. Fragments of sandstone and shale range from 0 to 5 percent throughout the solum and from 10 to 25 percent in the C horizon. These soils are very strongly

acid or strongly acid, but in limed areas the surface layer is less acid.

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

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

The Bt horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 to 8. In the lower part the Bt horizon also has hue of 5YR. In some pedons the horizon is mottled in shades of red, yellow, and brown. It is silt loam, loam, clay loam, or silty clay loam.

The C horizon has hue of 5YR to 10YR, value of 5 or 6, and chroma of 6 or 8, or it mottled without a dominant matrix color. In some pedons it is mottled in shades of red, yellow, and brown. In the fine earth fraction it is sandy loam or loam.

Melvin Series

The Melvin series consists of very deep, poorly drained soils. Permeability is moderate. These soils formed in loamy alluvium. They are in slight depressions on bottom lands on the Highland Rim in the southwestern and northwestern parts of the county. Slopes are 0 to 2 percent.

Melvin soils are near Agee, Hamblen, and Newark soils. Agee soils have a mollic epipedon and are clayey. Hamblen soils are moderately well drained and do not have horizons with dominant chroma of 2 or less within 24 inches of the surface. Hamblen soils have a particle-size control section with more than 15 percent fine sand and coarser material. Newark soils are somewhat poorly drained and have subhorizons with dominant chroma of more than 2 between the depths of 10 and 20 inches.

Typical pedon of Melvin silt loam, depressional, 0.8 mile east on Payne Cove Road from the intersection with Highway 50 east of Pelham, 160 feet south of road (Burrow Cove quadrangle):

Oi—1 inch to 0; partly decomposed leaves.

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

Bg1—3 to 13 inches; light brownish gray (10YR 6/2) silt loam; few fine distinct yellowish brown (10YR 5/4) mottles; moderate medium granular structure; very friable; common fine and few medium roots; common very fine and fine pores; strongly acid; clear smooth boundary.

Bg2—13 to 44 inches; light brownish gray (2.5Y 6/2) silt loam; few fine prominent yellowish brown (10YR 5/4) mottles; weak medium prismatic structure parting to weak fine subangular blocky; friable; few fine and medium roots; common very fine and fine pores; few fine and medium brown accumulations; common brownish stains on faces of peds; strongly acid; clear smooth boundary.

Cg—44 to 61 inches; light brownish gray (2.5Y 6/2) silt loam; few fine prominent yellowish brown (10YR 5/4) mottles; massive; friable; few fine pores; few brownish stains in pores; strongly acid.

The solum ranges from 20 to 50 inches in thickness. Bedrock is at a depth of more than 72 inches. These soils are strongly acid or medium acid, but in limed areas the surface layer is less acid.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. In some pedons it is mottled in shades of brown and gray. Texture is silt loam.

The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. In most pedons it is mottled in shades of brown and gray. It is silt loam or silty clay loam.

The Cg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2, or it is neutral. In most pedons it is mottled in shades of brown and gray. It is silt loam or silty clay loam.

Melvin soils in Grundy County range in reaction to strongly acid, which is outside the range defined for the series. This difference does not significantly affect the use or behavior of the soils.

Monteagle Series

The Monteagle series consists of very deep, well drained soils. Permeability is moderate. These soils formed in loamy residuum derived from sandstone. They are on ridgetops on the Cumberland Plateau. Slopes are 2 to 12 percent.

Monteagle soils are near Beersheba, Lily, Lonewood, and Ramsey soils. Beersheba and Lily soils are less than 40 inches deep to sandstone. Lonewood soils have hue browner than 5YR in the upper and middle parts of the subsoil. Lonewood soils also have bedrock at a depth of 40 to 72 inches. Ramsey soils are somewhat excessively drained and are less than 20 inches deep to bedrock.

Typical pedon of Monteagle loam, 2 to 5 percent slopes, 0.6 mile north on Summerfield Road from the intersection with Highway 56 at Summerfield, 100 feet east of the road (Burrow Cove quadrangle):

Oi—1 inch to 0; partly decomposed leaves.

A—0 to 1 inch; very dark grayish brown (10YR 3/2) loam; moderate medium granular structure; very

friable; many very fine and fine, and common medium roots; many very fine and fine, and common medium pores; strongly acid; abrupt smooth boundary.

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

Bt1—4 to 12 inches; strong brown (7.5YR 5/6) clay loam; few medium distinct brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; friable; common very fine, fine, and medium, and few coarse roots; many very fine, and common fine and medium pores; few faint clay films in pores; very strongly acid; gradual smooth boundary.

Bt2—12 to 21 inches; yellowish red (5YR 4/8) clay loam; moderate medium subangular blocky structure; friable; common very fine, fine, and medium, and few coarse roots; common very fine, fine, and medium pores; common distinct clay films on faces of peds and in pores; very strongly acid; gradual smooth boundary.

Bt3—21 to 32 inches; red (2.5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; common very fine, fine, and medium roots; common very fine and fine, and few medium pores; common distinct clay films on faces of peds and in pores; very strongly acid; gradual wavy boundary.

Bt4—32 to 58 inches; yellowish red (5YR 5/8) clay loam; few medium prominent yellow (10YR 7/8) mottles; moderate medium subangular blocky structure; friable; few very fine and fine roots; common very fine and fine pores; common distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt5—58 to 72 inches; yellowish red (5YR 5/8) clay loam; weak fine and medium subangular blocky structure; friable; common very fine and fine pores; few distinct clay films on faces of peds; about 5 percent fragments of sandstone as much as 3 inches wide; very strongly acid; gradual wavy boundary.

BC—72 to 79 inches; yellowish red (5YR 5/8) sandy clay loam; massive; friable; about 10 percent fragments of sandstone as much as 3 inches wide; very strongly acid.

Cr—79 to 85 inches; soft sandstone.

The solum is more than 60 inches in thickness. Depth to soft bedrock is more than 60 inches. Fragments of sandstone as much as 3 inches wide range from 0 to 15 percent in the solum and up to 35 percent in the C horizon. These soils are strongly acid or very strongly acid, but in limed areas the surface layer is less acid.

The A horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 1 to 3. The Ap horizon, where it occurs, has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 6. The E horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 4. The A and E horizons are loam or silt loam.

In the upper part the Bt horizon has hue of 7.5YR or 5YR, value of 5, and chroma of 6 to 8. In the middle and lower parts it has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 4 to 8. In some pedons it is mottled in shades of brown and red. In a few places it is sandy clay loam, but in most places it is clay loam, sandy clay, or clay. The BC horizon, where it occurs, has colors similar to those of the Bt horizon. In some pedons it is clay loam, but in most pedons it is loam or sandy clay loam.

The C horizon has hue of 7.5YR to 2.5YR, value of 4 or 5, and chroma of 4 to 8. In some pedons it is mottled in shades of brown and red. In the fine earth fraction it is loam, sandy loam, sandy clay loam, or clay loam.

Newark Series

The Newark series consists of very deep, somewhat poorly drained soils. Permeability is moderate. These soils formed in loamy alluvium on bottom lands. They are on the Highland Rim in the southwestern and northwestern parts of the county. Slopes are 0 to 2 percent.

Newark soils are near Agee, Hamblen, and Melvin soils. Agee soils have a mollic epipedon and are clayey. Hamblen soils are moderately well drained. They do not have horizons with dominant chroma of 2 or less within 24 inches of the surface. They have a particle-size control section with more than 15 percent fine sand and coarser material. Melvin soils are poorly drained. They have dominant chroma of 2 or less in all horizons below a depth of 10 inches.

Typical pedon of Newark silt loam, occasionally flooded, 0.5 mile east on Payne Cove Road from the intersection with Highway 50 east of Pelham, 700 feet southeast of Elk River Bridge (Burrow Cove quadrangle):

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; few fine distinct dark yellowish brown (10YR 4/6) mottles; weak fine granular structure; very friable; many very fine and fine roots; few very fine

and fine pores; medium acid; abrupt smooth boundary.

Bw—7 to 14 inches; brown (10YR 5/3) silt loam; common fine faint yellowish brown (10YR 5/4) and common fine faint light brownish gray (10YR 6/2) mottles; moderate medium granular structure; friable; common very fine and fine roots; common very fine and fine pores; few fine brown and black accumulations; strongly acid; clear smooth boundary.

Bg1—14 to 24 inches; light brownish gray (2.5Y 6/2) silt loam; common fine prominent yellowish brown (10YR 5/4) mottles; moderate fine subangular blocky structure; friable; common very fine and fine roots; common very fine and fine pores; few fine and medium black and brown accumulations; strongly acid; gradual smooth boundary.

Bg2—24 to 46 inches; light brownish gray (2.5Y 6/2) silt loam; few fine prominent yellowish brown (10YR 5/4) mottles; weak medium prismatic structure parting to moderate fine subangular blocky; friable; few very fine and fine roots; few fine and medium black and brown accumulations; strongly acid; gradual smooth boundary.

Cg—46 to 61 inches; gray (N 5/0) silty clay loam; massive; friable; common medium black and brown accumulations; strongly acid.

The solum ranges from about 25 to 50 inches in thickness. Bedrock is at a depth of more than 60 inches. These soils are strongly acid or medium acid, but in limed areas the surface layer is less acid.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma 2 or 3. In some pedons it is mottled in shades of brown and gray. In most pedons it is silt loam, but in some pedons it is loam.

The Bw horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3. In most pedons it is mottled in shades of brown and gray. It is silt loam.

The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. In most pedons it is mottled in shades of brown and gray. It is silt loam or silty clay loam.

The Cg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2, or it is neutral. In some pedons it is mottled in shades of brown and gray. In some pedons it is loam, but in most pedons it is silt loam or silty clay loam.

Newark soils in Grundy County range to strongly acid, which is outside the range defined for the series. This difference does not significantly affect the use or behavior of the soils.

Ramsey Series

The Ramsey series consists of shallow, somewhat excessively drained soils. Permeability is rapid. These soils formed in loamy residuum derived from sandstone. They are on ridges and side slopes of the Cumberland Plateau. Slopes are 5 to 40 percent.

Ramsey soils are near Beersheba, Gilpin, Lily, and Lonewood soils. These soils have an argillic horizon and are more than 20 inches deep to bedrock.

Typical pedon of Ramsey sandy loam, 5 to 15 percent slopes, 0.5 mile southwest of Summerfield, 0.2 mile past housing project (Monteagle quadrangle):

A—0 to 1 inch; very dark gray (10YR 3/1) sandy loam; moderate medium granular structure; very friable; many fine and medium roots; about 5 percent, by volume, fragments of sandstone as much as 0.5 inch wide; very strongly acid; clear smooth boundary.

E—1 to 4 inches; brown (10YR 5/3) loam; moderate medium granular structure; friable; many fine and medium, and few coarse roots; common very fine and fine pores; about 5 percent, by volume, fragments of sandstone as much as 0.5 inch wide; very strongly acid; clear smooth boundary.

Bw1—4 to 8 inches; yellowish brown (10YR 5/6) loam; weak medium subangular blocky structure; friable; common fine and medium roots; common very fine and fine pores; about 10 percent, by volume, fragments of sandstone as much as 2.5 inches wide; very strongly acid; gradual smooth boundary.

Bw2—8 to 15 inches; yellowish brown (10YR 5/8) loam; weak medium subangular blocky structure; friable; common fine and medium roots; common very fine and fine pores; 10 to 15 percent, by volume, fragments of sandstone as much as 3 inches wide; very strongly acid; gradual smooth boundary.

BC—15 to 19 inches; yellowish brown (10YR 5/4) loam; weak medium subangular blocky structure; very friable; few fine pores; very strongly acid; 10 to 15 percent, by volume, fragments of sandstone as much as 3 inches wide; abrupt smooth boundary.

R—19 inches; hard, acid sandstone.

Thickness of the solum and depth to bedrock range from 7 to 20 inches. Fragments of sandstone range from 0 to 35 percent. These soils are very strongly acid or strongly acid, but in limed areas the surface layer is less acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The Ap and E horizons, where they occur, have hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The fine earth fraction is loam, fine sandy loam, or sandy loam.

The Bw horizon and BC horizon, where they occur, have hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 8. In the fine earth fraction they are loam, sandy loam, or fine sandy loam.

Sequatchie Series

The Sequatchie series consists of very deep, well drained soils. Permeability is moderate. These soils formed in loamy alluvium. They are on low stream terraces and alluvial fans on the Highland Rim. Slopes are 0 to 6 percent.

Sequatchie soils are near Cobstone, Sullivan, and Etowah soils. Cobstone soils are loamy-skeletal. Etowah soils have a solum more than 60 inches thick. Sullivan soils do not have an argillic horizon and are on bottom lands.

Typical pedon of Sequatchie loam, 0 to 2 percent slopes, rarely flooded, 250 yards east of Tarlton Church, near the Collins River (Altamont quadrangle):

Ap—0 to 8 inches; dark brown (10YR 3/3) loam; moderate medium granular structure; very friable; few fine roots; common very fine and fine pores; neutral; strong smooth boundary.

Bt1—8 to 16 inches; strong brown (7.5YR 4/6) loam; weak medium subangular blocky structure; friable; common very fine and fine pores; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—16 to 36 inches; strong brown (7.5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; common very fine and fine pores; few faint clay films on faces of peds and some bridging of sand grains; strongly acid; gradual smooth boundary.

BC—36 to 45 inches; brown (7.5YR 4/4) loam; weak fine and moderate medium subangular blocky structure; friable; few very fine and fine pores; strongly acid; gradual smooth boundary.

C—45 to 64 inches; strong brown (7.5YR 5/6) sandy loam; massive; very friable; strongly acid.

The solum ranges from 32 to 55 inches in thickness. Bedrock is at a depth of more than 72 inches. Content of sandstone pebbles and cobbles ranges, by volume, from 0 to 15 percent in the A and B horizons and from 0 to 50 percent in the C horizon. These soils are very strongly acid or strongly acid, but in limed areas the surface layer is less acid.

The Ap horizon has hue of 7.5YR or 10YR, value of 3, and chroma of 3. In most pedons it is loam, but in some pedons it is silt loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 or 6. In some pedons it has a few mottles in shades of brown or red. 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 8. In some pedons it is mottled in shades of brown, gray, and red. It is loam, clay loam, or sandy loam.

The C horizon has hue of 7.5YR and 10YR, value of 5, and chroma of 3 to 6. In some pedons it is mottled in shades of brown and gray. In the fine earth fraction it is sandy loam, fine sandy loam, or loam.

Sewanee Series

The Sewanee series consists of deep, moderately well drained soils. Permeability is moderate. These soils formed in loamy alluvium. They are on bottom lands on the Cumberland Plateau. Slopes are 0 to 2 percent.

Sewanee soils are near Beersheba, Bonair, Lily, and Lonewood soils. Beersheba, Lily, and Lonewood soils are on nearby uplands. They are well drained and have an argillic horizon. Bonair soils are poorly drained. They have chroma of 2 or less throughout the B horizon and an umbric epipedon.

Typical pedon of Sewanee loam, occasionally flooded, 0.65 mile east on Flat Branch Road from the intersection with Roddy Springs Road, south of Coalmont, 75 feet southeast of road (Tracy City quadrangle):

Oi—1 inch to 0; partly decomposed leaves.

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

A2—3 to 6 inches; brown (10YR 4/3) loam; weak fine and medium granular structure; very friable; common fine and few medium roots; common very fine and fine pores; strongly acid; clear smooth boundary.

Bw1—6 to 19 inches; yellowish brown (10YR 5/4) loam; weak fine subangular blocky structure; very friable; common fine and few medium roots; common very fine and fine pores; very strongly acid; gradual smooth boundary.

Bw2—19 to 26 inches; yellowish brown (10YR 5/4) loam; common fine distinct strong brown (7.5YR 5/6) and common medium distinct light gray

(10YR 7/2) mottles; weak fine subangular blocky structure; very friable; few very fine and fine pores; very strongly acid; clear smooth boundary.

Bw3—26 to 34 inches; yellowish brown (10YR 5/4) loam; common medium distinct yellowish brown (10YR 5/8), common medium distinct light gray (10YR 7/2), and few fine distinct strong brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; very friable; very strongly acid; clear smooth boundary.

Cg—34 to 54 inches; light brownish gray (2.5Y 6/2) sandy loam; common medium prominent yellowish brown (10YR 5/4) and few fine prominent yellowish brown (10YR 5/8) mottles; massive; very friable; very strongly acid.

R—54 inches; sandstone that is soft in the upper few inches.

The solum ranges from 25 to 40 inches in thickness. Depth to bedrock ranges from 40 to 60 inches or more. These soils are very strongly acid or strongly acid, but in limed areas the surface layer is less acid.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. If it has value of 3, the A or Ap horizon is less than 7 inches thick. In most pedons the A or Ap horizon is loam, but in some pedons it is silt loam.

The Bw horizon has hue of 10YR, value of 4 to 6, and chroma of 3 or 4. In most pedons it is mottled in shades of brown, yellow, and gray. It has gray mottles within 24 inches of the surface. In most pedons it is loam, but in some pedons it is silt loam.

The C horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2, or it is mottled without a dominant matrix color. In most pedons it is mottled in shades of brown and gray. It is loam or sandy loam.

Sullivan Series

The Sullivan series consists of very deep, well drained soils. Permeability is moderate. These soils formed in loamy alluvium. They are on flood plains of rivers and tributary streams on the Highland Rim. Slopes are 0 to 2 percent.

Sullivan soils are near Hamblen and Sequatchie soils. Hamblen soils are moderately well drained. They have mottles of chroma of 2 or less within 24 inches of the surface. Sequatchie soils have an argillic horizon and an umbric epipedon.

Typical pedon of Sullivan loam, occasionally flooded, 0.7 mile south of Mount Olive Church, in an idle field 150 yards southwest of Collins River bridge on Highway 56 (Irving College quadrangle):

Ap—0 to 8 inches; dark brown (10YR 4/3) loam; moderate medium granular structure; friable; many fine roots; common very fine and fine pores; slightly acid; gradual smooth boundary.

Bw1—8 to 18 inches; dark yellowish brown (10YR 4/4) loam; weak fine subangular blocky structure; friable; few fine roots; common very fine and fine pores; slightly acid; gradual smooth boundary.

Bw2—18 to 28 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; common very fine and fine pores; slightly acid; clear smooth boundary.

Ab—28 to 38 inches; dark grayish brown (10YR 4/2) silt loam; weak medium subangular blocky structure; friable; common very fine and fine pores; slightly acid; clear wavy boundary.

Bwb—38 to 61 inches; brown (10YR 4/3) loam; weak medium and fine subangular blocky structure; friable; common very fine and fine pores; slightly acid.

Bedrock is at a depth of more than 60 inches. Pebbles 0.1 to 1 inch wide range, by volume, from 0 to 5 percent in each horizon. These soils are strongly acid to slightly acid, but in limed areas the surface layer is less acid.

The Ap horizon has hue of 10YR, value of 4, and chroma of 2 or 3. Some pedons have a buried A horizon that has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is silt loam or loam.

The Bw horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is loam or silt loam. The Bwb horizon, where it occurs, has the same range in color and texture as the Bw horizon.

The C horizon, where it occurs, has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is loam, sandy loam, or fine sandy loam.

Swafford Series

The Swafford series consists of very deep, moderately well drained soils. Permeability is moderately slow. These soils formed in loamy alluvium. A fragipan is at a depth of about 24 inches. These soils are on terraces on the Highland Rim in the southwestern and northwestern parts of the county. Slopes are 2 to 5 percent.

Swafford soils are near Etowah, Sequatchie, Waynesboro, and Whitwell soils. These soils do not have a fragipan. Etowah and Waynesboro soils are well drained. In the subsoil they have hue redder than 7.5YR. Sequatchie soils are well drained. They have a darker surface layer and a solum less than 60 inches in thickness. Whitwell soils have a solum less than 60 inches in thickness.

Typical pedon of Swafford loam, 2 to 5 percent slopes, 2.5 miles northeast on Highway 50 from the intersection with Highway 41 at Pelham, 85 feet east of road (Burrow Cove quadrangle):

Ap—0 to 9 inches; brown (10YR 4/3) loam; weak fine granular structure; very friable; few very fine and fine roots; few very fine and fine pores; neutral; abrupt smooth boundary.

BA—9 to 16 inches; yellowish brown (10YR 5/6) loam; weak fine subangular blocky and moderate medium granular structure; very friable; few very fine and fine roots; many very fine and fine pores; medium acid; clear smooth boundary.

Bt—16 to 23 inches; yellowish brown (10YR 5/6) loam; few fine distinct brown (10YR 5/3) mottles; moderate medium subangular blocky structure; friable; few fine roots; many very fine and fine pores; few faint clay films; common medium black accumulations; about 2 percent, by volume, gravel less than 0.75 inch wide; strongly acid; clear smooth boundary.

Btx—23 to 38 inches; brownish yellow (10YR 6/6) loam; common fine distinct pale brown (10YR 6/3) and common fine distinct light brownish gray (10YR 6/2) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; common very fine and fine pores; common distinct clay films; common medium and coarse black and brown accumulations; brittle in about 50 percent of the horizon; strongly acid; clear wavy boundary.

B´t—38 to 62 inches; brownish yellow (10YR 6/6) clay loam; common fine distinct light brownish gray (10YR 6/2) and few fine faint yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; firm; few fine roots; common very fine and fine pores; common distinct clay films; common medium and coarse black and brown accumulations; common brownish strains on faces of peds; strongly acid.

Thickness of the solum and depth to bedrock are more than 60 inches. Depth to the fragipan ranges from 18 to 36 inches. These soils are very strongly acid to medium acid, but in limed areas the surface layer is less acid.

The Ap horizon has hue of 10YR, value of 4, and chroma of 3 or 4. It is loam or silt loam. Many pedons have a 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 or 5, and chroma of 4 to 8. It has mottles of chroma of 2 or less within a depth of 30 inches from the surface. In most pedons it is mottled in shades of brown or yellow. It is most commonly loam or clay loam, but the range includes silt loam in the upper part of the Bt horizon.

The Btx horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 8. In most pedons it is mottled in shades of brown, yellow, and gray. It is loam or clay loam. The B´t horizon, where it occurs, has colors and textures similar to those of the Btx horizon.

Talbott Series

The Talbott series consists of moderately deep, well drained soils. Permeability is moderately slow. These soils formed in clayey residuum derived from limestone. They are on ridges and side slopes at lower elevations on the Cumberland Plateau Escarpment and on outlying ridges and side slopes of the Highland Rim. Slopes are 5 to 60 percent.

Talbott soils are near Allen, Bouldin, Carbo, and Etowah soils. Allen, Bouldin, and Etowah soils are more than 60 inches deep to bedrock. Carbo soils have more clay in the argillic horizon than Talbott soils and have hue browner than 5YR in the argillic horizon.

Typical pedon of Talbott silt loam, in an area of Talbott-Carbo-Rock outcrop complex, 15 to 30 percent slopes, 1.3 miles east on Highway 50 from the intersection with Highway 41 at Pelham, 1.7 miles east on Payne Cove Road, 0.3 mile on a gravel road, 150 feet south of road (Burrow Cove quadrangle):

Oi—1 inch to 0; partly decomposed leaves.

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

E—1 to 3 inches; light yellowish brown (10YR 6/4) silt loam; moderate fine granular structure; very friable; many very fine and fine roots; many very fine and fine pores; strongly acid; abrupt smooth boundary.

BE—3 to 6 inches; strong brown (7.5YR 5/6) silty clay loam; moderate fine subangular blocky and moderate medium granular structure; friable; common fine and medium roots; common very fine and fine pores; strongly acid; common smooth boundary.

Bt1—6 to 11 inches; yellowish red (5YR 4/6) clay; strong fine subangular blocky structure; firm; common fine and medium, and few coarse roots; common very fine and fine pores; common prominent clay films; medium acid; common smooth boundary.

Bt2—11 to 18 inches; red (2.5YR 4/6) clay; strong fine subangular blocky structure; firm; common fine

and medium roots; few fine pores; many prominent clay films; medium acid; common smooth boundary.

Bt3—18 to 24 inches; strong brown (7.5YR 5/6) clay; common fine distinct yellowish red (5YR 4/6) and few fine distinct yellowish brown (10YR 5/4) mottles; firm; few fine and medium roots; common prominent clay films; slightly acid; common smooth boundary.

C—24 to 32 inches; light olive brown (2.5Y 5/4) clay; common fine faint grayish brown (2.5YR 5/2) mottles; massive; very firm; few fine and medium roots; mildly alkaline; abrupt smooth boundary.

R—32 inches; limestone.

Thickness of the solum and depth to bedrock range from 20 to 40 inches. The content of fragments of limestone ranges from 0 to 10 percent. These soils are strongly acid to slightly acid, but near bedrock they range to mildly alkaline.

The A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 or 3. In eroded areas the Ap horizon, where it occurs, also has hue of 5YR and value of 5.

The E horizon, where it occurs, has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2 to 4. The A and E horizons are silt loam, but in eroded areas the range includes silty clay loam and clay.

Some pedons have a transitional horizon between the A or E horizon and the Bt horizon.

The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 4 or 6. In some pedons it is mottled in shades of brown, yellow, and red. It is silty clay or clay and, in the upper part, includes silty clay loam.

The BC horizon, where it occurs, and the C horizon have hue of 2.5Y to 5YR, value of 4 to 6, and chroma of 4 or 6, or they are mottled without a dominant matrix color. In most pedons they are mottled in shades of brown, yellow, red, and gray. They are silty clay or clay.

Waynesboro Series

The Waynesboro series consists of very deep, well drained soils. Permeability is moderate. These soils formed in old alluvium on ridges and side slopes. They are on the Highland Rim in the southwestern and northwestern parts of the county. Slopes range from 2 to 25 percent.

Waynesboro soils are near Emory and Etowah soils. Emory soils have a buried A horizon. Etowah soils have a lower average clay content in the particle-size control section.

Typical pedon of Waynesboro loam, 2 to 7 percent slopes, 0.2 mile northeast of Highway 41 and 0.75 mile southeast of the intersection of Highway 41 and Highway 50, at Pelham (Alto quadrangle):

Ap—0 to 9 inches; dark reddish brown (5YR 3/4) loam; weak fine granular structure; very friable; many very fine and fine roots; common very fine and fine pores; medium acid; abrupt smooth boundary.

BA—9 to 16 inches; reddish brown (2.5YR 4/4) loam; weak fine subangular blocky structure; friable; common very fine and fine roots; common very fine and fine pores; few fine black accumulations; medium acid; clear smooth boundary.

Bt1—16 to 24 inches; red (2.5YR 4/6) clay loam; moderate fine subangular blocky structure; friable; common very fine and fine roots; common very fine and fine pores; common distinct clay films; common fine black accumulations; strongly acid; gradual smooth boundary.

Bt2—24 to 68 inches; dark red (2.5YR 3/6) clay; moderate fine and medium angular blocky structure; friable; few very fine and fine roots; common very fine and fine pores; many prominent clay films; common fine black accumulations; strongly acid.

Thickness of the solum and depth to bedrock are more than 60 inches. Generally, these soils are very strongly acid or strongly acid. However, in limed areas the surface layer and the upper part of the subsoil are less acid.

The Ap horizon has hue of 5YR or 7.5YR, value of 3 or 4, and chroma of 3 or 4. In most pedons it is loam, but in some it is silt loam. In eroded and severely eroded areas it includes hue of 2.5YR, value of 5, and chroma of 6. In severely eroded areas the A horizon includes clay loam and clay.

The BA horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 4 or 6. It is silt loam, clay loam, or silty clay loam, but in most pedons it is loam.

The Bt horizon has hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 6. In some pedons in the lower part it is mottled in shades of brown, yellow, and red. It is clay loam or clay.

Whitwell Series

The Whitwell series consists of very deep, moderately well drained soils. Permeability is moderate. These soils formed in loamy alluvium on low terraces. They are on the Highland Rim in the southwestern and northwestern parts of the county. Slopes are 0 to 2 percent.

Whitwell soils are near Sequatchie and Swafford soils. Sequatchie soils are well drained and have an umbric epipedon. Swafford soils have a fragipan at a depth of about 2 feet.

Typical pedon of Whitwell loam, rarely flooded, 0.7 mile northeast of Payne Cove Road from the intersection with Highway 41 at Mt. View, 500 feet north of barn, 200 feet east of fence (Burrow Cove quadrangle):

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

BA—7 to 11 inches; dark yellowish brown (10YR 4/4) loam; common fine faint brown (10YR 4/3) mottles; moderate fine subangular block structure; very friable; many very fine and fine roots; many very fine and fine pores; strongly acid; clear smooth boundary.

Bt1—11 to 20 inches; strong brown (7.5YR 4/6) loam; moderate fine subangular blocky structure; friable; common very fine and fine roots; common very fine and fine pores; common faint clay films; strongly acid; gradual smooth boundary.

Bt2—20 to 25 inches; yellowish brown (10YR 5/6) loam; common fine distinct pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; common very fine and fine roots; common very fine and fine pores; common faint clay films; strongly acid; clear smooth boundary.

BC—25 to 30 inches; light yellowish brown (10YR 6/4) loam; few fine prominent light brownish gray (2.5Y 6/2) and few fine faint yellowish brown (10YR 5/4) mottles; weak fine subangular blocky structure; friable; few very fine and fine roots; few very fine and fine pores; about 2 percent, by volume, quartzite gravel less than 0.75 inch wide; strongly acid; clear smooth boundary.

C1—30 to 36 inches; pale brown (10YR 6/3) loam; common medium distinct light brownish gray (2.5Y 6/2) mottles; weak fine subangular blocky structure; friable; few very fine and fine roots; few very fine and fine pores; about 5 percent, by volume, quartzite gravel less than 0.75 inch wide; very strongly acid; clear smooth boundary.

C2—36 to 61 inches; pale brown (10YR 6/3) loam; common medium distinct light brownish gray (2.5Y 6/2) and common fine faint yellowish brown (10YR 5/4) mottles; massive; friable; common faint yellowish brown mottles; massive; friable; common fine brown accumulations; about 8 percent gravel, by volume, as much as 3 inches wide, very strongly acid.

The solum ranges from 30 to 40 inches in yhickness. Bedrock is at a depth of more than 60 inches. Content of cobbles and pebbles ranges from 0 to 15 percent. These soils are very strongly acid or strongly acid, but in limed areas the surface layer is less acid.

The Ap horizon has hue of 10YR, value of 4, and chroma of 3 or 4. It is loam.

In many pedons a transitional horizon separates the A or E horizon and the Bt horizon.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 or 6. In the lower part it is mottled in shades of brown, yellow, and gray. In some pedons in the upper part it is mottled in shades of brown. It is loam or clay loam.

The BC horizon has hue of 10YR, value of 5 or 6, and chroma of 3 to 6, or it is mottled without a dominant matrix color. It has mottles in shades of brown, yellow, and gray. It is loam or sandy loam.

The C horizon has hue of 10YR, value of 5 or 6, and chroma of 2 to 6, or it is mottled without a dominant matrix color. It has mottles in shades of brown, yellow and gray. It is loam or sandy loam.

Wolftever Series

The Wolftever series consists of very deep, moderately well drained soils. Permeability is moderately slow. These soils formed in clayey alluvium on low terraces and toe slopes. They are on the Highland Rim in the southwestern and northwestern parts of the county. Slopes are 0 to 3 percent.

Wolftever soils are near Agee and Beason soils. Agree soils are poorly drained. They have chroma of 2 or less throughout the B horizon. Beason soils are somewhat poorly drained. They have mottles of chroma of 2 or less in the upper 10 inches of the B horizon.

Typical pedon of Wolftever silt loam, rarely flooded, 1.7 miles northeast of Homer White Road from the intersection with Highway 50, east of Pelham, 100 feet north of road (Burrow Cove quadrangle):

Ap—0 to 9 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; common very fine and fine roots; common very fine and fine pores; slightly acid; abrupt smooth boundary.

Bt1—9 to 14 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine faint yellowish brown (10YR 5/4) mottles; moderate fine subangular blocky structure; friable; common very fine and fine roots; common very fine and fine pores; few faint clay films; slightly acid; clear smooth boundary.

Bt2—14 to 20 inches; yellowish brown (10YR 5/4) silty clay; few fine faint dark yellowish brown (10YR 4/4) and brown (10YR 5/3) mottles; moderate medium subangular blocky structure; firm; few very fine and fine roots; few very fine and fine pores; common distinct clay films; strongly acid; clear smooth boundary.

Bt3—20 to 32 inches; brown (10YR 5/3) clay; common fine faint dark yellowish brown (10YR 4/4) and few fine distinct light brownish gray (2.5Y 6/2) mottles; moderate fine subangular blocky structure; firm; few very fine and fine pores; common distinct clay films; common fine black and brown accumulations; strongly acid; common smooth boundary.

Bt4—32 to 50 inches; dark grayish brown (10YR 4/2) clay; common medium distinct dark yellowish brown (10YR 4/4) and few fine distinct light brownish gray (2.5Y 6/2) mottles; moderate fine subangular blocky structure; firm; common distinct clay films; common fine and medium black and brown accumulations; common brownish stains on faces of peds; strongly acid; clear smooth boundary.

C—50 to 61 inches; mottled dark grayish brown (2.5Y 4/2), dark yellowish brown (10YR 4/4), and light brownish gray (10YR 6/2) clay loam; massive; firm; common fine and medium black accumulations; about 10 percent, by volume, gravel less than 3 inches wide and about 2 percent, by volume, cobbles 3 to 5 inches wide; strongly acid.

The solum ranges from 40 to 60 inches in thickness. Bedrock is at a depth of more than 60 inches. Gravel makes up, by volume, less than 5 percent of the solum and ranges from 0 to 15 percent in the C horizon. These soils are strongly acid, but in limed areas the surface layer and the upper part of the subsoil are less acid.

The Ap horizon has hue of 10YR, value of 4, and chroma of 3 or 4. It is loam.

The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. The range includes chroma of 2 in the lower part. In the middle and lower parts the horizon is mottled in shades of brown, yellow, and gray. In some pedons it is mottled in shades of brown in the upper part. It is silty clay loam, silty clay, or clay.

The C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2, or it is mottled without a dominant matrix color. In most pedons it is mottled in shades of brown, yellow, and gray. It is clay loam or silty clay loam.

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Glossary

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

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

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

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

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.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

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

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

Back slope. The geomorphic component that forms the steepest inclined surface and principal element of many hillsides. Back slopes in profile are commonly steep, are linear, and may or may not include cliff segments.

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.

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

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

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

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

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

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

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

Channery soil material. Soil material that is, 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.

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

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 is 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 slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil 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.

Duff. A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

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

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

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.

Fast intake (in tables). The rapid movement of water into the soil.

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

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

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

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

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

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

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

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

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

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

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the soil profile and in gray colors.

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 is 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.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

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

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

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

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

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

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.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

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

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

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

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

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

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

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

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

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

Mottling, soil. Irregular spots of different colors that vary in number and size. 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.

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

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water or air to move downward through the soil 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.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid 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.

Potential native plant community. See Climax plant community.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of 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
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

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

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Rippable bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar hoarsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral

fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Saprolite. Unconsolidated residual material underlying the soil and grading to hard bedrock below.

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.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

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.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell (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.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

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:

Nearly level	0 to 3 percent
Gently sloping	2 to 7 percent
Moderately sloping	5 to 12 percent
Moderately steep	12 to 25 percent
Steep	20 to 45 percent
Very steep	45 percent and higher

Classes for complex slopes are as follows:

Nearly level	0 to 3 percent
Undulating	2 to 7 percent
Rolling	5 to 12 percent
Hilly	12 to 25 percent
Steep	20 to 45 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.

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.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to 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 grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

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

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

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.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

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.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

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

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

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.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The uprooting and tipping over of trees by the wind.

Tables

Table 1.--Temperature and Precipitation

(Recorded in the period 1951-84 at Monteagle, Tennessee)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average daily	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January	44.9	27.3	36.1	66	-5	30	6.12	3.51	8.43	9	4.0
February	49.8	30.3	40.1	71	2	35	5.63	3.51	7.52	9	3.6
March	57.3	37.1	47.2	78	14	100	6.70	3.97	9.14	10	1.9
April	68.6	47.0	57.8	83	26	254	5.57	3.26	7.62	8	.0
May	75.4	54.5	65.0	87	33	465	5.45	3.01	7.59	8	.0
June	82.3	61.8	72.1	92	47	663	4.06	2.27	5.63	7	.0
July	84.5	64.9	74.7	93	54	766	5.29	3.02	7.31	9	.0
August	84.0	64.1	74.1	92	53	747	3.91	2.16	5.44	6	.0
September	78.7	58.7	68.7	92	41	561	4.28	1.76	6.39	6	.0
October	68.9	47.9	58.4	83	28	278	3.74	1.77	5.46	6	.0
November	57.2	37.8	47.5	76	14	56	5.39	3.02	7.48	7	.7
December	48.3	31.0	39.7	68	3	32	5.85	3.22	8.16	8	1.8
Yearly:											
Average	66.7	46.9	56.8	---	---	---	---	---	---	---	---
Extreme	---	---	---	94	-8	---	---	---	---	---	---
Total	---	---	---	---	---	3,987	61.99	53.81	70.45	93	12.0

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

Table 2.--Freeze Dates in Spring and Fall

(Recorded in the period 1951-84 at Monteagle, 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. 7	Apr. 14	Apr. 26
2 years in 10 later than--	Mar. 31	Apr 9	Apr. 21
5 years in 10 later than--	Mar. 18	Mar. 30	Apr. 11
First freezing temperature in fall:			
1 year in 10 earlier than--	Nov. 1	Oct. 26	Oct. 16
2 years in 10 earlier than--	Nov. 6	Oct. 30	Oct. 21
5 years in 10 earlier than--	Nov. 15	Nov. 8	Oct. 29

Table 3.--Growing Season

(Recorded in the period 1951-84 at Monteagle, 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	220	201	183
8 years in 10	227	208	189
5 years in 10	241	222	201
2 years in 10	255	236	213
1 year in 10	262	243	219

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
Ae	Agee silty clay loam, rarely flooded	339	0.1
Ag	Agee silty clay loam, occasionally flooded	237	0.1
AnC	Allen loam, 5 to 12 percent slopes	358	0.2
AnD	Allen loam, 12 to 25 percent slopes	1,009	0.4
Ba	Beason silt loam, rarely flooded	411	0.2
BbB	Beersheba loam, 2 to 6 percent slopes	11,875	5.1
BbC	Beersheba loam, 6 to 12 percent slopes	38,671	16.6
BbD	Beersheba loam, 12 to 20 percent slopes	8,180	3.5
BdD	Bethesda channery loam, 8 to 25 percent slopes	1,371	0.6
BhF	Bethesda-Pits complex, 20 to 90 percent slopes	3,644	1.6
Bn	Bonair loam, occasionally flooded	710	0.3
BoF	Bouldin stony loam, 30 to 75 percent slopes, bouldery	32,405	14.0
CaB	Clarkrange silt loam, 1 to 5 percent slopes	368	0.2
CoB	Cobstone cobbly loam, 1 to 5 percent slopes, rarely flooded	1,879	0.8
Em	Emory silt loam	351	0.2
EtB	Etowah silt loam, 2 to 5 percent slopes	1,145	0.5
EtC2	Etowah silt loam, 5 to 12 percent slopes, eroded	386	0.2
GpC	Gilpin channery silt loam, 6 to 12 percent slopes	1,274	0.6
GpD	Gilpin channery silt loam, 12 to 20 percent slopes	724	0.3
GpE	Gilpin channery silt loam, 20 to 45 percent slopes	1,778	0.8
GrE	Gilpin-Ramsey-Rock outcrop complex, 20 to 60 percent slopes	2,441	1.1
Ha	Hamblen loam, occasionally flooded	1,413	0.6
JeC	Jefferson loam, 5 to 12 percent slopes	194	0.1
JeD	Jefferson loam, 12 to 20 percent slopes	1,519	0.7
JeE	Jefferson loam, 20 to 40 percent slopes	3,729	1.6
LaB	Lily loam, 2 to 6 percent slopes	5,471	2.4
LaC	Lily loam, 6 to 12 percent slopes	20,086	8.7
LaD	Lily loam, 12 to 20 percent slopes	9,565	4.1
LoB	Lonewood silt loam, 2 to 5 percent slopes	22,435	9.7
LoC	Lonewood silt loam, 5 to 12 percent slopes	8,275	3.6
Me	Melvin silt loam, depressional	1,018	0.4
MoB	Monteagle loam, 2 to 5 percent slopes	712	0.3
MoC	Monteagle loam, 5 to 12 percent slopes	407	0.2
Ne	Newark silt loam, occasionally flooded	1,142	0.5
RaC	Ramsey sandy loam, 5 to 15 percent slopes	7,396	3.2
RaE	Ramsey sandy loam, 15 to 35 percent slopes	4,206	1.8
RrE	Ramsey-Rock outcrop complex, 15 to 40 percent slopes	5,734	2.5
SeA	Sequatchie loam, 0 to 2 percent slopes, rarely flooded	2,447	1.1
SeB	Sequatchie loam, 2 to 6 percent slopes	1,135	0.5
Sn	Sewanee loam, occasionally flooded	1,587	0.7
Su	Sullivan loam, occasionally flooded	1,472	0.6
SwB	Swafford loam, 2 to 5 percent slopes	810	0.4
TaC2	Talbott silt loam, 5 to 12 percent slopes, eroded	286	0.1
TcE	Talbott-Carbo-Rock outcrop complex, 15 to 30 percent slopes	3,262	1.4
TcF	Talbott-Carbo-Rock outcrop complex, 30 to 60 percent slopes	11,535	5.0
WaB	Waynesboro loam, 2 to 7 percent slopes	1,918	0.8
WaC2	Waynesboro loam, 7 to 12 percent slopes, eroded	1,757	0.8
WaD3	Waynesboro clay loam, 12 to 25 percent slopes, severely eroded	897	0.4
Wh	Whitwell loam, rarely flooded	807	0.3
Wo	Wolftever silt loam, rarely flooded	229	0.1
	Total	231,000	100.0

Table 5.--Prime Farmland

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
Ae	Agee silty clay loam, rarely flooded (where drained)
Ag	Agee silty clay loam, occasionally flooded (where drained)
Ba	Beason silt loam, rarely flooded
BbB	Beersheba loam, 2 to 6 percent slopes
CaB	Clarkrange silt loam, 1 to 5 percent slopes
Em	Emory silt loam
EtB	Etowah silt loam, 2 to 5 percent slopes
Ha	Hamblen loam, occasionally flooded
LaB	Lily loam, 2 to 6 percent slopes
LoB	Lonewood silt loam, 2 to 5 percent slopes
MoB	Monteagle loam, 2 to 5 percent slopes
Ne	Newark silt loam, occasionally flooded
SeA	Sequatchie loam, 0 to 2 percent slopes, rarely flooded
SeB	Sequatchie loam, 2 to 6 percent slopes
Sn	Sewanee loam, occasionally flooded
Su	Sullivan loam, occasionally flooded
SwB	Swafford loam, 2 to 5 percent slopes
WaB	Waynesboro loam, 2 to 7 percent slopes
Wh	Whitwell loam, rarely flooded
Wo	Wolftever silt loam, rarely flooded

Table 6.--Land Capability and Yields per Acre of Crops and Pasture

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Wheat	Alfalfa hay	Tall fescue-ladino
		Bu	Bu	Bu	Tons	AUM*
Ae, Ag Agee	IIIw	65	30	---	---	7.0
Ae, Ag Agee, drained	IIw	100	40	50	---	8.0
AnC Allen	IIIe	85	32	52	3.5	6.5
AnD Allen	IVe	70	28	48	3.0	6.0
Ba Beason	IIw	80	35	40	---	7.0
BbB Beersheba	IIe	90	30	50	---	6.5
BbC Beersheba	IIIe	80	25	45	---	6.0
BbD Beersheba	IVe	65	20	40	---	5.0
BdD Bethesda	VIs	---	---	---	---	---
BhF** Bethesda-Pits	VIIs	---	---	---	---	---
Bn Bonair	IIIw	---	---	---	---	6.5
BoF Bouldin	VIIs	---	---	---	---	---
CaB Clarkrange	IIe	95	35	45	---	7.0
CoB Cobstone	VIs	---	---	---	---	3.5
Em Emory	I	125	45	55	4.0	8.0
EtB Etowah	IIe	110	40	55	4.2	7.5
EtC2 Etowah	IIIe	100	35	50	4.0	7.0
GpC Gilpin	IIIe	80	25	40	---	6.0
GpD Gilpin	IVe	65	---	35	---	5.5

See footnotes at end of table.

Table 6.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Wheat	Alfalfa hay	Tall fescue-ladino
		Bu	Bu	Bu	Tons	AUM*
GpE---------- Gilpin	VIIe	---	---	---	---	4.5
GrE**---------- Gilpin-Ramsey-Rock outcrop	VIIs	---	---	---	---	---
Ha---------- Hamblen	IIw	115	42	50	---	8.0
JeC---------- Jefferson	IIIe	85	30	45	3.8	6.5
JeD---------- Jefferson	IVe	75	25	40	3.5	6.0
JeE---------- Jefferson	VIIe	---	---	---	---	5.0
LaB---------- Lily	IIe	90	30	45	---	6.5
LaC---------- Lily	IIIe	80	25	40	---	6.0
LaD---------- Lily	IVe	65	---	35	---	5.0
LoB---------- Lonewood	IIe	95	35	50	3.5	7.0
LoC---------- Lonewood	IIIe	85	30	45	3.2	6.5
Me---------- Melvin	Vw	---	---	---	---	5.5
MoB---------- Monteagle	IIe	95	35	50	3.5	7.0
MoC---------- Monteagle	IIIe	85	30	45	3.2	6.5
Ne---------- Newark	IIw	110	40	45	---	7.5
RaC---------- Ramsey	VIe	---	---	---	---	3.5
RaE---------- Ramsey	VIIe	---	---	---	---	---
RrE**---------- Ramsey-Rock outcrop	VIIs	---	---	---	---	---
SeA---------- Sequatchie	I	120	45	55	4.5	8.0
SeB---------- Sequatchie	IIe	115	45	55	4.5	8.0

See footnotes at end of table.

Table 6.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Wheat	Alfalfa hay	Tall fescue-ladino
		Bu	Bu	Bu	Tons	AUM*
Sn Sewanee	IIw	90	40	---	---	7.5
Su Sullivan	IIw	120	42	55	4.0	8.0
SwB Swafford	IIe	105	38	50	3.0	7.5
TaC2 Talbott	IVe	---	---	35	---	4.5
TcE** Talbott-Carbo-Rock outcrop	VIs	---	---	---	---	3.5
TcF** Talbott-Carbo-Rock outcrop	VIIs	---	---	---	---	---
WaB Waynesboro	IIe	105	40	55	4.0	7.0
WaC2 Waynesboro	IIIe	90	35	50	3.6	6.5
WaD3 Waynesboro	VIe	---	---	---	2.8	5.5
Wh Whitwell	IIw	105	38	50	3.0	7.5
Wo Wolftever	IIw	95	35	48	3.0	7.0

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

Table 7.--Woodland Management and Productivity

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index	Volume*	
Ae, Ag	Slight	Moderate	Moderate	Moderate	Severe	Eastern cottonwood	100	129	Eastern cottonwood, sweetgum, water oak, American sycamore, cherrybark oak.
Agee						Sweetgum	90	100	
						Water oak	90	86	
						American sycamore	---	---	
AnC	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar	87	86	Yellow-poplar, loblolly pine, shortleaf pine.
Allen						Shortleaf pine	72	114	
						Southern red oak	70	57	
AnD	Moderate	Moderate	Slight	Slight	Moderate	Yellow-poplar	87	86	Yellow-poplar, loblolly pine, shortleaf pine.
Allen						Shortleaf pine	72	114	
						Southern red oak	70	57	
Ba	Slight	Slight	Moderate	Slight	Moderate	Sweetgum	80	86	Loblolly pine, sweetgum, yellow-poplar.
Beason						White oak	70	57	
						Southern red oak	70	57	
						Loblolly pine	80	114	
BbB, BbC	Slight	Slight	Slight	Slight	Moderate	Southern red oak	65	43	Shortleaf pine, Virginia pine, loblolly pine.
Beersheba						Virginia pine	65	100	
						Shortleaf pine	65	100	
						Yellow-poplar	85	86	
						Hickory	---	---	
BbD	Moderate	Moderate	Slight	Slight	Moderate	Southern red oak	65	43	Shortleaf pine, Virginia pine, loblolly pine.
Beersheba						Virginia pine	65	100	
						Shortleaf pine	65	100	
						Yellow-poplar	85	86	
						Hickory	---	---	
BdD	Slight	Moderate	Severe	Slight	Slight	---	---	---	Eastern white pine, red pine, black locust.
Bethesda									
BhF**:									
Bethesda	Moderate	Severe	Severe	Slight	Slight	---	---	---	Eastern white pine, red pine, black locust.
Pits.									
Bn	Slight	Moderate	Moderate	Slight	Severe	Loblolly pine	90	129	Loblolly pine, willow oak.
Bonair						Willow oak	90	86	
						Sweetgum	90	100	
BoF	Moderate	Severe	Slight	Slight	Moderate	Yellow-poplar	90	86	Yellow-poplar, shortleaf pine.
Bouldin						Northern red oak	75	57	
						Shortleaf pine	70	114	

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
CaB---------- Clarkrange	Slight	Slight	Slight	Moderate	Moderate	Northern red oak----	70	57	Eastern white pine, Virginia pine, loblolly pine, shortleaf pine, loblolly pine.
						Virginia pine-------	70	114	
						Loblolly pine-------	76	100	
						Shortleaf pine------	70	114	
CoB---------- Cobstone	Slight	Slight	Moderate	Slight	Moderate	Southern red oak----	70	57	Loblolly pine, shortleaf pine.
						Shortleaf pine------	70	114	
						Virginia pine-------	70	114	
Em---------- Emory	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar-------	104	114	Yellow-poplar, black walnut, loblolly pine.
						Northern red oak----	80	57	
						Loblolly pine-------	90	129	
						Black walnut--------	---	---	
						White ash-----------	---	---	
						Black cherry--------	---	---	
EtB, EtC2------- Etowah	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar-------	90	86	Yellow-poplar, loblolly pine.
						Southern red oak----	80	57	
						Loblolly pine-------	90	129	
						Shortleaf pine------	80	129	
GpC---------- Gilpin	Slight	Slight	Slight	Slight	Moderate	Northern red oak----	80	57	Virginia pine, shortleaf pine eastern white pine, black cherry, yellow poplar.
						Virginia pine-------	65	100	
						Shortleaf pine	65	100	
GpD, GpE-------- Gilpin	Moderate	Moderate	Slight	Slight	Moderate	Northern red oak----	80	57	Virginia pine, shortleaf pine, eastern white pine.
						Virginia pine-------	65	100	
						Shortleaf pine------	65	100	
GrE**: Gilpin---------	Moderate	Moderate	Slight	Slight	Moderate	Northern red oak----	80	57	Virginia pine, shortleaf pine, eastern white pine.
						Virginia pine-------	65	100	
						Shortleaf pine------	65	100	
Ramsey---------	Moderate	Moderate	Moderate	Severe	Slight	Northern red oak----	60	43	Eastern white pine, shortleaf pine, Virginia pine, loblolly pine.
						Shortleaf pine------	59	86	
						White oak-----------	61	43	
						Eastern white pine--	70	114	
						Virginia pine-------	61	43	
Rock outcrop.									
Ha---------- Hamblen	Slight	Slight	Moderate	Slight	Moderate	Yellow-poplar-------	100	114	Loblolly pine, yellow-poplar.
						Northern red oak----	80	57	
						Loblolly pine-------	90	129	
JeC---------- Jefferson	Slight	Slight	Slight	Slight	Moderate	Shortleaf pine------	65	100	Eastern white pine, yellow poplar, white oak, shortleaf pine, black walnut.
						Yellow-poplar-------	98	100	
						Virginia pine-------	70	114	
						White oak-----------	---	---	

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
JeD, JeE-------- Jefferson	Moderate	Moderate	Slight	Slight	Moderate	Northern red oak---- Yellow-poplar------- Shortleaf pine------ White oak-----------	85 108 --- ---	57 114 --- ---	Yellow-poplar, eastern white pine, shortleaf pine.
LaB, LaC-------- Lily	Slight	Moderate	Slight	Slight	Moderate	Shortleaf pine------ Virginia pine------- Black oak---------- White oak---------- Chestnut oak-------- Yellow-poplar------- Northern red oak---- Scarlet oak---------	63 80 78 73 73 95 78 77	100 114 57 57 57 100 57 43	Shortleaf pine, Virginia pine.
LaD------------- Lily	Moderate	Moderate	Slight	Slight	Moderate	Shortleaf pine------ Virginia pine------- Black oak---------- White oak---------- Chestnut oak-------- Yellow-poplar------- Northern red oak---- Scarlet oak---------	63 80 78 73 73 95 78 77	100 114 57 57 57 100 57 43	Shortleaf pine, Virginia pine.
LoB, LoC-------- Lonewood	Slight	Slight	Slight	Slight	Moderate	Loblolly pine------- Shortleaf pine------ Virginia pine------- White oak---------- Eastern white pine--	80 70 70 70 80	114 114 114 57 143	Loblolly pine, shortleaf pine, Virginia pine, eastern white pine.
Me-------------- Melvin	Slight	Severe	Severe	Severe	Severe	Pin oak------------- Red maple---------- Eastern cottonwood-- American sycamore--- Black willow-------- Sweetgum---------- Water oak----------	90 --- --- --- --- --- ---	57 --- --- --- --- --- ---	Baldcypress, sweetgum, pin oak.
MoB, MoC-------- Monteagle	Slight	Slight	Slight	Slight	Moderate	Southern red oak---- Virginia pine------- Shortleaf pine------ Yellow-poplar-------	70 70 70 90	57 114 114 86	Shortleaf pine, Virginia pine, loblolly pine, yellow-poplar.
Ne-------------- Newark	Slight	Moderate	Slight	Moderate	Severe	Pin oak------------- Eastern cottonwood-- Sweetgum---------- Green ash---------- Willow oak---------- Water oak----------	96 89 85 --- --- ---	72 100 86 --- --- ---	Eastern cottonwood, sweetgum, American sycamore.
RaC------------- Ramsey	Slight	Slight	Moderate	Severe	Slight	Northern red oak---- Shortleaf pine------ White oak---------- Virginia pine-------	60 59 61 59	43 86 43 86	Eastern white pine, shortleaf pine, Virginia pine, loblolly pine.

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
RaE---------- Ramsey	Moderate	Moderate	Moderate	Severe	Slight	Northern red oak----	60	43	Eastern white pine, shortleaf pine, Virginia pine, loblolly pine.
						Shortleaf pine------	59	86	
						White oak----------	61	43	
						Virginia pine-------	59	86	
RrE**:									
Ramsey---------	Moderate	Moderate	Moderate	Severe	Slight	Northern red oak----	60	43	Eastern white pine, shortleaf pine, Virginia pine, loblolly pine.
						Shortleaf pine------	59	86	
						White oak----------	61	43	
						Virginia pine-------	59	86	
Rock outcrop.									
SeA, SeB-------- Sequatchie	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar-------	100	114	Yellow-poplar, black walnut, loblolly pine.
						White oak----------	80	57	
						Loblolly pine-------	90	129	
Sn---------- Sewanee	Slight	Slight	Moderate	Slight	Severe	Yellow-poplar-------	100	114	Loblolly pine, yellow-poplar, eastern white pine.
						Loblolly pine-------	85	114	
						Southern red oak----	80	57	
						Shortleaf pine------	80	129	
						Sweetgum-----------	90	100	
Su---------- Sullivan	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar-------	100	114	Yellow-poplar, black walnut, loblolly pine.
						Northern red oak----	70	57	
						Shortleaf pine------	70	114	
						Virginia pine-------	70	114	
SwB---------- Swafford	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar-------	95	100	Yellow-poplar, loblolly pine, sweetgum.
						Northern red oak----	75	57	
						Sweetgum-----------	90	100	
TaC2---------- Talbott	Slight	Slight	Slight	Slight	Moderate	Northern red oak----	65	43	Loblolly pine, shortleaf pine, Virginia pine, eastern redcedar.
						Loblolly pine-------	80	114	
						Shortleaf pine------	64	100	
						Eastern redcedar----	46	57	
TcE**:									
Talbott--------	Moderate	Moderate	Slight	Slight	Moderate	Northern red oak----	65	43	Loblolly pine, shortleaf pine, Virginia pine, eastern redcedar.
						Loblolly pine-------	80	114	
						Shortleaf pine------	64	100	
						Eastern redcedar----	46	57	
Carbo----------	Moderate	Moderate	Slight	Moderate	Moderate	Virginia pine-------	55	86	Virginia pine.
						Eastern redcedar----	45	57	
Rock outcrop.									

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
TcF**:									
Talbott	Severe	Severe	Slight	Slight	Moderate	Northern red oak	65	43	Loblolly pine,
						Loblolly pine	80	114	shortleaf
						Shortleaf pine	64	100	pine, Virginia
						Eastern redcedar	46	57	pine, eastern
									redcedar.
Carbo	Severe	Severe	Slight	Moderate	Moderate	Virginia pine	55	86	Virginia pine.
						Eastern redcedar	45	57	
Rock outcrop.									
WaB, WaC2	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar	90	86	Yellow-poplar,
Waynesboro						Southern red oak	70	57	shortleaf
						White oak	70	57	pine, loblolly
						Loblolly pine	80	114	pine, black
									walnut.
WaD3	Moderate	Slight	Slight	Slight	Moderate	Southern red oak	70	57	Shortleaf
Waynesboro						White oat	70	57	pine, loblolly
						Loblolly pine	80	114	pine.
Wh	Slight	Slight	Slight	Slight	Severe	Yellow-poplar	95	100	Loblolly pine,
Whitwell						Northern red oak	75	57	sweetgum,
						Sweetgum	90	100	yellow-poplar.
						Loblolly pine	90	129	
Wo	Slight	Slight	Moderate	Slight	Moderate	Yellow-poplar	90	86	Yellow-poplar,
Wolftever						White oak	70	57	loblolly pine,
						Southern red oak	70	57	shortleaf
						Willow oak	80	72	pine,
						Sweetgum	80	86	sweetgum.
						Loblolly pine	80	114	

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

Table 8.--Recreational Development

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ae, Ag Agee	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
AnC Allen	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
AnD Allen	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Ba Beason	Severe: flooding, wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
BbB Beersheba	Slight	Slight	Moderate: slope, small stones, depth to rock.	Slight	Moderate: depth to rock.
BbC Beersheba	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, depth to rock.
BbD Beersheba	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
BdD Bethesda	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: droughty, slope.
BhF*: Bethesda	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: droughty, slope.
Pits.					
Bn Bonair	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
BoF Bouldin	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
CaB Clarkrange	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Moderate: wetness.	Moderate: wetness.
CoB Cobstone	Severe: flooding.	Moderate: large stones, small stones.	Severe: large stones, small stones.	Moderate: large stones.	Severe: large stones.
Em Emory	Slight	Slight	Slight	Slight	Slight.

See footnote at end of table.

Table 8.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
EtB Etowah	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
EtC2 Etowah	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
GpC Gilpin	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: small stones, slope.	Moderate: large stones.	Moderate: slope, small stones.
GpD Gilpin	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Moderate: slope, large stones.	Severe: slope.
GpE Gilpin	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.	Severe: slope.
GrE*: Gilpin	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.	Severe: slope.
Ramsey	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.	Severe: slope, depth to rock.
Rock outcrop.					
Ha Hamblen	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Slight	Moderate: flooding.
JeC Jefferson	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
JeD Jefferson	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
JeE Jefferson	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
LaB Lily	Slight	Slight	Moderate: slope, depth to rock.	Slight	Moderate: depth to rock.
LaC Lily	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, depth to rock.
LaD Lily	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
LoB Lonewood	Slight	Slight	Moderate: slope.	Slight	Slight.

See footnote at end of table.

Table 8.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
LoC Lonewood	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Me Melvin	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
MoB Monteagle	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
MoC Monteagle	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Ne Newark	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, erodes easily.	Severe: wetness.
RaC Ramsey	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight	Severe: depth to rock.
RaE Ramsey	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
RrE*: Ramsey Rock outcrop.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
SeA Sequatchie	Severe: flooding.	Slight	Moderate: small stones.	Slight	Moderate: large stones.
SeB Sequatchie	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: large stones.
Sn Sewanee	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
Su Sullivan	Severe: flooding.	Slight	Moderate: small stones, flooding.	Slight	Moderate: flooding.
SwB Swafford	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Slight	Slight.
TaC2 Talbott	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope, depth to rock.
TcE*: Talbott	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.

See footnote at end of table.

Table 8.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
TcE*:					
Carbo	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Rock outcrop.					
TcF*:					
Talbott	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope. erodes easily.	Severe: slope.
Carbo	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Rock outcrop.					
WaB	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
Waynesboro					
WaC2	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Waynesboro					
WaD3	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Waynesboro					
Wh	Severe: flooding.	Moderate: wetness.	Moderate: small stones, wetness.	Slight	Slight.
Whitwell					
Wo	Severe: flooding.	Moderate: percs slowly.	Moderate: percs slowly.	Slight	Slight.
Wolftever					

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 9.--Wildlife Habitat

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Ae, Ag Agee	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Good	Good.
AnC Allen	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
AnD Allen	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Ba Beason	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
BbB Beersheba	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BbC Beersheba	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BbD Beersheba	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
BdD Bethesda	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
BhF*: Bethesda	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Pits.										
Bn Bonair	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
BoF Bouldin	Very poor.	Very poor.	Fair	Good	Good	Very poor	Very poor.	Poor	Fair	Very poor.
CaB Clarkrange	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CoB Cobstone	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Em Emory	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EtB Etowah	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EtC2 Etowah	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	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.

See footnote at end of table.

Table 9.--Wildlife Habitat--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
GpE---------- Gilpin	Very poor.	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
GrE*:										
Gilpin----------	Very poor.	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Ramsey----------	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Rock outcrop.										
Ha---------- Hamblen	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
JeC---------- Jefferson	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
JeD---------- Jefferson	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
JeE---------- Jefferson	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
LaB---------- Lily	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LaC---------- Lily	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LaD---------- Lily	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
LoB---------- Lonewood	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LoC---------- Lonewood	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Me---------- Melvin	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
MoB---------- Monteagle	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MoC---------- Monteagle	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Ne---------- Newark	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
RaC, RaE---------- Ramsey	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.
RrE*:										
Ramsey----------	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Rock outcrop.										

See footnote at end of table.

Table 9.--Wildlife Habitat--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
SeA, SeB---------- Sequatchie	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Sn---------- Sewanee	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Su---------- Sullivan	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
SwB---------- Swafford	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
TaC2---------- Talbott	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
TcE*:										
Talbott----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Carbo----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rock outcrop.										
TcF*:										
Talbott----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Carbo----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rock outcrop.										
WaB---------- Waynesboro	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WaC2---------- 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.
Wh---------- Whitwell	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Wo---------- Wolftever	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 10.--Building Site Development

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Ae, Ag Agee	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness.
AnC Allen	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
AnD Allen	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ba Beason	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength.	Moderate: wetness.
BbB Beersheba	Moderate: depth to rock.	Slight	Moderate: depth to rock.	Moderate: slope.	Slight	Moderate: depth to rock.
BbC Beersheba	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope.	Moderate: slope, depth to rock.
BbD Beersheba	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BdD Bethesda	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: droughty, slope.
BhF*: Bethesda	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: droughty, slope.
Pits.						
Bn Bonair	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness.
BoF Bouldin	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope.
CaB Clarkrange	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: low strength, wetness.	Moderate: wetness.
CoB Cobstone	Moderate: large stones.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, large stones.	Severe: large stones.

See footnote at end of table.

Table 10.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Em Emory	Slight	Slight	Moderate: wetness.	Slight	Severe: low strength.	Slight.
EtB Etowah	Moderate: too clayey.	Slight	Slight	Slight	Moderate: low strength.	Slight.
EtC2 Etowah	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
GpC Gilpin	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, small stones.
GpD, GpE Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
GrE*: Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ramsey	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
Rock outcrop.						
Ha Hamblen	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
JeC Jefferson	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: small stones, slope.
JeD, JeE Jefferson	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
LaB Lily	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.	Moderate: depth to rock.
LaC Lily	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.	Moderate: slope, depth to rock.
LaD Lily	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
LoB Lonewood	Moderate: depth to rock.	Slight	Moderate: depth to rock.	Slight	Severe: low strength.	Slight.
LoC Lonewood	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Severe: low strength.	Moderate: slope.

See footnote at end of table.

Table 10.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Me Melvin	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding, low strength.	Severe: ponding, flooding.
MoB Monteagle	Slight	Slight	Slight	Slight	Moderate: low strength.	Slight.
MoC Monteagle	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
Ne Newark	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
RaC Ramsey	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.
RaE Ramsey	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
RrE*: Ramsey	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
Rock outcrop.						
SeA Sequatchie	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: large stones.
SeB Sequatchie	Slight	Slight	Slight	Moderate: slope.	Slight	Moderate: large stones.
Sn Sewanee	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.
Su Sullivan	Moderate: flooding, wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
SwB Swafford	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: low strength, wetness.	Slight.
TaC2 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.
TcE*, TcF*: Talbott	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.

See footnote at end of table.

Table 10.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
TcE*, TcF*:						
Carbo	Severe: slope, depth to rock.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.	Severe: slope.
Rock outcrop.						
WaB Waynesboro	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
WaC2 Waynesboro	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
WaD3 Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wh Whitwell	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.	Slight.
Wo Wolftever	Moderate: too clayey, wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.	Slight.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 11.--Sanitary Facilities

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ae Agee	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Ag Agee	Severe: flooding, wetness, percs slowly.	Slight	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
AnC Allen	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
AnD Allen	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Ba Beason	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, wetness.
BbB Beersheba	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock.
BbC Beersheba	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock.
BbD Beersheba	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.
BdD Bethesda	Severe: percs slowly, slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Poor: small stones, slope.
BhF*: Bethesda	Severe: percs slowly, slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Poor: small stones, slope.
Pits.					
Bn Bonair	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, depth to rock, wetness.	Severe: flooding, wetness.	Poor: wetness.

See footnote at end of table.

Table 11.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
BoF Bouldin	Severe: slope, slippage.	Severe: seepage, slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: large stones, slope.
CaB Clarkrange	Severe: wetness, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock, wetness.	Moderate: wetness, depth to rock.	Fair: wetness, depth to rock.
CoB Cobstone	Moderate: flooding, large stones.	Severe: seepage, large stones.	Severe: seepage, large stones.	Severe: seepage.	Poor: small stones.
Em Emory	Moderate: percs slowly, wetness.	Moderate: seepage.	Severe: wetness.	Slight	Fair: too clayey.
EtB Etowah	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
EtC2 Etowah	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey.
GpC Gilpin	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
GpD, GpE Gilpin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Poor: slope, area reclaim, thin layer.
GrE*: Gilpin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Poor: slope, area reclaim, thin layer.
Ramsey	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.
Rock outcrop.					
Ha Hamblen	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
JeC Jefferson	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey, small stones, slope.
JeD, JeE Jefferson	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.

See footnote at end of table.

Table 11.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
LaB Lily	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock.
LaC Lily	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock.
LaD Lily	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.
LoB Lonewood	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Fair: depth to rock, too clayey.
LoC Lonewood	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Fair: depth to rock, too clayey, slope.
Me Melvin	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
MoB Monteagle	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
MoC Monteagle	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
Ne Newark	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
RaC Ramsey	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock.
RaE Ramsey	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.
RrE*: Ramsey	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.
Rock outcrop.					
SeA Sequatchie	Moderate: flooding, percs slowly.	Severe: seepage.	Severe: seepage.	Moderate: flooding.	Fair: too clayey, small stones.

See footnote at end of table.

Table 11.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
SeB Sequatchie	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Slight	Fair: too clayey, small stones.
Sn Sewanee	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, depth to rock, wetness.	Severe: flooding, wetness.	Poor: wetness.
Su Sullivan	Severe: flooding.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Good.
SwB Swafford	Severe: wetness, percs slowly.	Moderate: slope.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
TaC2 Talbott	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
TcE*, TcF*: Talbott	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
Carbo	Severe: depth to rock, percs slowly, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
Rock outcrop.					
WaB Waynesboro	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
WaC2 Waynesboro	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
WaD3 Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Wh Whitwell	Severe: wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
Wo Wolftever	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 12.--Construction Materials

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Ae, Ag Agee	Poor: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
AnC Allen	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
AnD Allen	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Ba Beason	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
BbB Beersheba	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, too clayey.
BbC Beersheba	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, too clayey, slope.
BbD Beersheba	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
BdD Bethesda	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
BhF*: Bethesda Pits.	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Bn Bonair	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
BoF Bouldin	Poor: slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
CaB Clarkrange	Fair: depth to rock, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim.

See footnote at end of table.

Table 12.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
CoB Cobstone	Fair: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, area reclaim.
Em Emory	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
EtB Etowah	Fair: low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
EtC2 Etowah	Fair: low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey, slope.
GpC Gilpin	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
GpD Gilpin	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
GpE Gilpin	Poor: thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
GrE*: Gilpin	Poor: thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Ramsey	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Rock outcrop.				
Ha Hamblen	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
JeC Jefferson	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
JeD Jefferson	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
JeE Jefferson	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
LaB, LaC Lily	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.

See footnote at end of table.

Table 12.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
LaD---------- Lily	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
LoB---------- Lonewood	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
LoC---------- Lonewood	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
Me---------- Melvin	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
MoB, MoC---------- Monteagle	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Ne---------- Newark	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
RaC---------- Ramsey	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
RaE---------- Ramsey	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
RrE*:				
Ramsey----------	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Rock outcrop.				
SeA, SeB---------- Sequatchie	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Sn---------- Sewanee	Fair: area reclaim, thin layer, wetness.	Improbable: excess fines.	Improbable: excess fines.	Moderate: small stones.
Su---------- Sullivan	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
SwB---------- Swafford	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
TaC2---------- Talbott	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

See footnote at end of table.

Table 12.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
TcE*:				
Talbott	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Carbo	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Rock outcrop.				
TcF*:				
Talbott	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Carbo	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Rock outcrop.				
WaB, WaC2 Waynesboro	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
WaD3 Waynesboro	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Wh Whitwell	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
Wo Wolftever	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 13.--Water Management

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
Ae Agee	Slight	Severe: hard to pack, wetness.	Percs slowly	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Ag Agee	Slight	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, percs slowly, flooding.	Wetness, percs slowly.	Wetness, percs slowly.
AnC, AnD Allen	Moderate: seepage.	Severe: piping.	Deep to water	Slope	Slope	Slope.
Ba Beason	Slight	Severe: wetness.	Favorable	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
BbB Beersheba	Severe: seepage.	Severe: piping.	Deep to water	Slope, depth to rock.	Depth to rock	Depth to rock.
BbC, BbD Beersheba	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
BdD Bethesda	Severe: slope.	Severe: seepage, piping.	Deep to water	Slope, large stones, droughty.	Slope, large stones, slippage.	Large stones, slope, droughty.
BhF*: Bethesda	Severe: slope.	Severe: seepage, piping.	Deep to water	Slope, large stones, droughty.	Slope, large stones, slippage.	Large stones, slope, droughty.
Pits.						
Bn Bonair	Moderate: seepage, depth to rock.	Severe: piping, wetness.	Flooding	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
BoF Bouldin	Severe: seepage, slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
CaB Clarkrange	Moderate: seepage, slope.	Severe: piping.	Percs slowly, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness.	Erodes easily, rooting depth.
CoB Cobstone	Severe: seepage.	Severe: seepage, large stones.	Deep to water	Slope, large stones, droughty.	Large stones	Large stones, droughty.
Em Emory	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
EtB Etowah	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.

See footnote at end of table.

Table 13.--Water Management--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Drainage	Features affecting-- Irrigation	Terraces and diversions	Grassed waterways
EtC2---------- Etowah	Moderate: seepage.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
GpC, GpD, GpE----- Gilpin	Severe: slope.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock, large stones.	Slope, depth to rock, large stones.
GrE*: Gilpin----------	Severe: slope.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock, large stones.	Slope, depth to rock, large stones.
Ramsey----------	Severe: depth to rock, slope.	Severe: piping.	Deep to water	Slope, droughty, depth to rock.	Slope, depth to rock.	Slope, droughty.
Rock outcrop.						
Ha---------- Hamblen	Moderate: seepage.	Severe: piping.	Flooding-------	Wetness, flooding.	Wetness--------	Favorable.
JeC, JeD---------- Jefferson	Severe: seepage.	Severe: piping.	Deep to water	Slope----------	Slope----------	Slope.
JeE---------- Jefferson	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope----------	Slope----------	Slope.
LaB---------- Lily	Severe: seepage.	Severe: piping.	Deep to water	Depth to rock, slope.	Depth to rock	Depth to rock.
LaC, LaD---------- Lily	Severe: seepage.	Severe: piping.	Deep to water	Depth to rock, slope.	Slope, depth to rock.	Slope, depth to rock.
LoB---------- Lonewood	Moderate: seepage, depth to rock.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
LoC---------- Lonewood	Moderate: seepage, depth to rock.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Me---------- Melvin	Moderate: seepage.	Severe: piping, ponding.	Ponding, flooding.	Ponding, erodes easily, flooding.	Erodes easily, ponding.	Wetness, erodes easily.
MoB---------- Monteagle	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope----------	Favorable------	Favorable.
MoC---------- Monteagle	Moderate: seepage.	Moderate: piping.	Deep to water	Slope----------	Slope----------	Slope.
Ne---------- Newark	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action.	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
RaC, RaE---------- Ramsey	Severe: depth to rock, slope.	Severe: piping.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope, droughty, depth to rock.

See footnote at end of table.

Table 13.--Water Management--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
RrE*:						
Ramsey	Severe: depth to rock, slope.	Severe: piping.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope, droughty, depth to rock.
Rock outcrop.						
SeA--Sequatchie	Severe: seepage.	Severe: piping.	Deep to water	Favorable	Favorable	Favorable.
SeB--Sequatchie	Severe: seepage.	Severe: piping.	Deep to water	Slope	Favorable	Favorable.
Sn--Sewanee	Moderate: seepage, depth to rock.	Severe: piping, wetness.	Flooding	Wetness, flooding.	Wetness	Wetness.
Su--Sullivan	Moderate: seepage.	Severe: piping.	Deep to water	Flooding	Favorable	Favorable.
SwB--Swafford	Moderate: seepage, slope.	Severe: piping.	Slope	Slope, wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
TaC2--Talbott	Moderate: depth to rock.	Severe: hard to pack.	Deep to water	Depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
TcE*, TcF*:						
Talbott	Severe: slope.	Severe: hard to pack.	Deep to water	Depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Carbo	Severe: slope.	Severe: hard to pack.	Deep to water	Percs slowly, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Rock outcrop.						
WaB--Waynesboro	Moderate: seepage.	Severe: piping, hard to pack.	Deep to water	Slope	Favorable	Favorable.
WaC2, WaD3--Waynesboro	Moderate: seepage.	Severe: piping, hard to pack.	Deep to water	Slope	Slope	Slope.
Wh--Whitwell	Moderate: seepage.	Severe: piping.	Favorable	Wetness	Wetness	Favorable.
Wo--Wolftever	Slight	Severe: hard to pack.	Favorable	Wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 14.--Engineering Index Properties

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
Ae Agee	0-5 5-61	Silty clay loam Silty clay, clay	CL, CH CH	A-6, A-7 A-7	0 0	95-100 95-100	95-100 95-100	95-100 95-100	85-95 85-95	35-55 50-75	20-35 30-50
Ag Agee	0-8 8-61	Silty clay loam Silty clay, clay	CL, CH CH	A-6, A-7 A-7	0 0	95-100 95-100	95-100 95-100	95-100 95-100	85-95 85-95	35-55 50-75	20-35 30-50
AnC Allen	0-11 11-61	Loam Clay loam, sandy clay loam, loam.	ML, CL-ML, SM, SC-SM CL-ML, CL, SC	A-4 A-4, A-6, A-7-6	0-5 0-10	90-100 85-100	75-100 75-100	65-98 65-98	40-80 40-80	<26 20-43	NP-10 4-19
AnD Allen	0-19 19-72	Loam Clay loam, sandy clay loam, loam.	ML, CL-ML, SM, SC-SM CL-ML, CL, SC	A-4 A-4, A-6, A-7-6	0-5 0-10	90-100 85-100	75-100 75-100	65-98 65-98	40-80 40-80	<26 20-43	NP-10 4-19
Ba Beason	0-9 9-20 20-72	Silt loam Silty clay loam, silt loam. Silty clay loam, silty clay, clay.	ML, CL, CL-ML CL CL	A-4, A-6 A-6 A-6, A-7	0 0 0	100 100 100	95-100 95-100 95-100	90-100 90-100 90-95	75-90 80-95 80-95	25-40 25-40 30-49	5-15 11-20 11-25
BbB, BbC, BbD Beersheba	0-5 5-36 36-50	Loam Loam, clay loam, sandy clay loam. Weathered bedrock	ML, CL-ML ML, CL, SM, SC ---	A-4 A-4, A-6 ---	0-2 0-2 ---	90-100 85-100 ---	85-100 85-100 ---	75-95 75-100 ---	51-85 40-75 ---	<35 20-40 ---	NP-10 3-18 ---
BdD Bethesda	0-2 2-63	Channery loam Extremely channery clay loam, extremely stony clay loam.	ML, GM, GM-GC, CL-ML GM, GC, ML, CL	A-4, A-6 A-4, A-6, A-7, A-2	0-15 10-30	65-90 40-80	55-80 25-65	50-80 20-65	35-75 18-60	25-40 24-50	4-14 3-23
BhF*: Bethesda	0-4 4-61	Channery loam Extremely channery loam, very channery clay loam.	ML, GM, GM-GC, CL-ML GM, GC, ML, CL	A-4, A-6 A-4, A-6, A-7, A-2	0-15 10-30	65-90 40-80	55-80 25-65	50-80 20-65	35-75 18-60	25-40 24-50	4-14 3-23
Pits.											
Bn Bonair	0-8 8-46 46-52 52	Loam Silt loam, clay loam, loam. Fine sandy loam, loam, silt loam. Unweathered bedrock.	ML, CL-ML, CL CL-ML, CL CL-ML, CL, SC-SM, SC ---	A-4 A-4, A-6 A-4, A-6 ---	0 0 0-5 ---	95-100 95-100 90-100 ---	90-100 90-100 85-100 ---	70-95 70-95 70-90 ---	55-85 55-80 40-80 ---	16-25 20-32 17-32 ---	2-8 5-12 4-12 ---

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
BoF--- Bouldin	0-12	Stony loam---	SM, ML, SC-SM, GM	A-2, A-4	10-30	65-85	55-85	40-65	30-55	15-25	2-7
	12-90	Very stony loam, extremely stony clay loam.	GC, SC	A-2, A-4, A-6	30-55	55-75	45-65	35-60	25-50	25-39	8-16
CaB--- Clarkrange	0-6	Silt loam---	CL, CL-ML, ML	A-4, A-6	0	85-100	80-100	70-100	60-90	21-32	3-12
	6-22	Silt loam, silty clay loam.	CL, CL-ML, ML	A-4, A-6	0	85-100	80-100	75-95	70-90	23-39	3-16
	22-49	Silt loam, clay loam, silty clay loam.	CL, CL-ML, ML	A-4, A-6	0	85-100	80-100	75-95	65-90	23-39	3-16
	49-54	Clay loam, shaly clay loam, silty clay loam.	CL, CL-ML, SC, GC	A-4, A-6, A-2, A-1	0-10	45-90	25-85	25-80	20-75	23-40	5-18
	54-61	Weathered bedrock	---	---	---	---	---	---	---	---	---
CoB--- Cobstone	0-16	Cobbly loam---	SM, SC-SM	A-4, A-2	20-35	75-85	65-80	50-70	30-50	<25	NP-6
	16-42	Very cobbly loam, extremely cobbly sandy clay loam, very cobbly clay loam.	GM-GC, SC-SM, SM, GM	A-4, A-2	35-50	55-85	40-80	35-70	25-55	18-30	3-10
	42-61	Extremely cobbly loam, extremely cobbly sandy loam, very cobbly sandy loam.	SM, SC-SM, GM, GM-GC	A-4, A-2, A-1	40-55	50-75	35-70	25-60	15-45	<25	NP-6
Em--- Emory	0-7	Silt loam---	CL, ML, CL-ML	A-4, A-6	0-2	95-100	90-100	85-100	80-95	25-40	4-15
	7-25	Silt loam, silty clay loam.	CL, ML, CL-ML	A-4, A-6	0-2	95-100	90-100	85-100	80-95	25-40	4-15
	25-61	Silty clay loam, clay loam.	CL	A-4, A-6, A-7	0-2	90-100	75-100	70-100	65-95	25-45	9-20
EtB--- Etowah	0-10	Silt loam---	ML, CL, SC-SM, CL-ML	A-4	0	80-100	75-100	70-95	45-70	20-30	3-10
	10-42	Silty clay loam, clay loam, silt loam.	CL	A-6	0	80-100	75-100	70-95	65-85	25-35	10-15
	42-63	Silty clay loam, clay loam, clay.	CL, ML, MH	A-6, A-7	0	80-100	75-100	70-95	65-85	39-60	15-25
EtC2--- Etowah	0-8	Silt loam---	ML, CL, SC-SM, CL-ML	A-4	0	80-100	75-100	70-95	45-70	20-30	3-10
	8-20	Silty clay loam, clay loam, silt loam.	CL	A-6	0	80-100	75-100	70-95	65-85	25-35	10-15
	20-61	Silty clay loam, clay loam, clay.	CL, ML, MH	A-6, A-7	0	80-100	75-100	70-95	65-85	39-60	15-25

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
GpC--- Gilpin	0-5	Channery silt loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-90	45-85	35-75	30-70	20-40	4-15
	5-24	Channery loam, channery silt loam, channery clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	24-31	Channery loam, very channery silt loam, channery silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-6	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	31	Weathered bedrock.	---	---	---	---	---	---	---	---	---
GpD--- Gilpin	0-7	Channery silt loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-90	45-85	35-75	30-70	20-40	4-15
	7-28	Channery loam, channery silt loam, channery silty clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	28-38	Channery loam, very channery silt loam, channery silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-6	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	38	Weathered bedrock.	---	---	---	---	---	---	---	---	---
GpE--- Gilpin	0-6	Channery loam----	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-90	45-85	35-75	30-70	20-40	4-15
	6-25	Channery loam, channery silt loam, channery silty clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	25	Weathered bedrock.	---	---	---	---	---	---	---	---	---
GrE*:											
Gilpin---	0-4	Channery loam----	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-90	45-85	35-75	30-70	20-40	4-15
	4-26	Channery loam, channery silt loam, channery silty clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	26-33	Channery loam, very channery silt loam, very shaly silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-6	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	33	Weathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
GrE*:											
Ramsey	0-4	Stony loam	SM, CL-ML, ML, SC-SM	A-4, A-2	5-15	75-90	65-85	50-75	30-65	<25	NP-7
	4-13	Stony loam, stony sandy loam, stony fine sandy loam.	SM, CL-ML, ML, SC-SM	A-4, A-2	5-15	75-90	65-85	50-75	34-65	<25	NP-7
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
Ha	0-5	Loam	CL, CL-ML, ML	A-4, A-6	0-2	90-100	80-100	65-95	55-85	22-38	3-14
Hamblen	5-24	Silt loam, loam, clay loam.	CL, CL-ML, ML	A-4, A-6	0-2	80-100	75-100	60-95	55-85	22-40	3-17
	24-61	Silt loam, loam, clay loam.	CL, CL-ML, ML, GC	A-4, A-6, A-2	0-5	55-100	45-95	35-90	30-80	22-40	3-17
JeC	0-8	Loam	SM, SC, ML, CL	A-2, A-4	0-5	85-95	80-90	40-80	25-65	20-35	2-10
Jefferson	8-53	Gravelly loam, gravelly clay loam, gravelly sandy clay loam.	SM, SC, ML, CL	A-4, A-2, A-6	0-5	75-90	50-90	50-80	30-70	15-35	2-15
	53-61	Gravelly sandy loam, very gravelly clay loam, very gravelly sandy clay loam.	GM, SM, ML, GM-GC	A-2, A-4, A-1	0-5	55-75	25-75	20-70	10-60	20-35	2-10
JeD	0-12	Loam	SM, SC, ML, CL	A-2, A-4	0-5	85-95	80-90	40-80	25-65	20-35	2-10
Jefferson	12-56	Gravelly loam, gravelly clay loam, gravelly sandy clay loam.	SM, SC, ML, CL	A-4, A-2, A-6	0-5	75-90	50-90	50-80	30-70	15-35	2-15
	56-84	Gravelly loam, very gravelly clay loam, very gravelly sandy clay loam.	GM, SM, ML, GM-GC	A-2, A-4, A-1	0-5	55-75	25-75	20-70	10-60	20-35	2-10
JeE	0-12	Loam	SM, SC, ML, CL	A-2, A-4	0-5	85-95	80-90	40-80	25-65	20-35	2-10
Jefferson	12-47	Gravelly loam, gravelly clay loam, gravelly sandy clay loam.	SM, SC, ML, CL	A-4, A-2, A-6	0-5	75-90	50-90	50-80	30-70	15-35	2-15
	47-63	Gravelly loam, very gravelly clay loam, gravelly sandy loam.	GM, SM, ML, GM-GC	A-2, A-4, A-1	0-5	55-75	25-75	20-70	10-60	20-35	2-10

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
LaB---------- Lily	0-6	Loam----------	ML, CL-ML	A-4	0-5	90-100	85-100	70-95	55-80	<35	NP-10
	6-27	Clay loam, sandy clay loam, loam.	SM, SC, ML, CL	A-4, A-6	0-5	90-100	85-100	75-100	40-80	<35	3-15
	27-31	Sandy loam, clay loam, gravelly sandy clay loam.	SM, SC, ML, CL	A-4, A-2, A-6, A-1-B	0-10	65-100	50-100	40-95	20-75	<35	3-15
	31	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
LaC---------- Lily	0-7	Loam----------	ML, CL-ML	A-4	0-5	90-100	85-100	70-95	55-80	<35	NP-10
	7-27	Clay loam, sandy clay loam, loam.	SM, SC, ML, CL	A-4, A-6	0-5	90-100	85-100	75-100	40-80	<35	3-15
	27	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
LaD---------- Lily	0-2	Loam----------	ML, CL-ML	A-4	0-5	90-100	85-100	70-95	55-80	<35	NP-10
	2-24	Clay loam, sandy clay loam, loam.	SM, SC, ML, CL	A-4, A-6	0-5	90-100	85-100	75-100	40-80	<35	3-15
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
LoB---------- Lonewood	0-7	Silt loam--------	ML, CL-ML, CL	A-4	0	100	90-100	85-100	75-90	18-26	3-9
	7-29	Silt loam, silty clay loam, loam.	CL	A-4, A-6	0	100	90-100	85-95	70-90	25-39	9-18
	29-58	Silty clay loam, clay loam.	CL	A-6, A-7	0	95-100	85-100	75-90	65-85	29-48	10-23
	58-62	Channery clay loam, sandy loam, loam.	CL, GC, SC	A-2, A-4, A-6, A-7	5-25	45-90	25-85	25-80	25-75	25-48	9-23
	62-67	Weathered bedrock.	---	---	---	---	---	---	---	---	---
LoC---------- Lonewood	0-8	Silt loam--------	ML, CL-ML, CL	A-4	0	100	90-100	85-100	75-90	18-26	3-9
	8-23	Silt loam, silty clay loam, loam.	CL	A-4, A-6	0	100	90-100	85-95	70-90	25-39	9-18
	23-50	Silty clay loam, clay loam.	CL	A-6, A-7	0	95-100	85-100	75-90	65-85	29-48	10-23
	50-55	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Me---------- Melvin	0-3	Silt loam--------	CL, CL-ML, ML	A-4	0	95-100	90-100	80-100	80-95	25-35	4-10
	3-44	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	80-95	25-40	5-20
	44-61	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6	0	85-100	80-100	70-100	60-95	25-40	5-20
MoB---------- Monteagle	0-4	Loam----------	ML, CL-ML	A-4	0	90-100	85-100	75-100	51-85	<35	NP-10
	4-12	Loam, clay loam, silt loam.	ML, CL-ML, CL	A-4, A-6	0	90-100	85-100	75-100	51-85	<35	2-13
	12-72	Clay loam, sandy clay, clay.	CL	A-6, A-7	0	90-100	85-100	75-100	60-90	30-49	10-26
	72-79	Loam, sandy clay loam, gravelly sandy loam.	ML, CL, SM, SC	A-4, A-6, A-2	0-5	80-100	75-100	50-95	30-75	20-40	NP-18
	79-85	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
MoC---	0-9	Loam---	ML, CL-ML	A-4	0	90-100	85-100	75-100	51-85	<35	NP-10
Monteagle	9-16	Loam, clay loam, silt loam.	ML, CL-ML, CL	A-4, A-6	0	90-100	85-100	75-100	51-85	<35	2-13
	16-69	Clay loam, sandy clay, clay.	CL	A-6, A-7	0	90-100	85-100	75-100	60-90	30-49	10-26
	69-75	Weathered bedrock	---	---	---	---	---	---	---	---	---
Ne---	0-7	Silt loam---	ML, CL, CL-ML	A-4	0	95-100	90-100	80-100	55-95	<32	NP-10
Newark	7-46	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	95-100	90-100	85-100	70-100	22-42	3-20
	46-61	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-3	75-100	70-100	65-100	55-95	22-42	3-20
RaC---	0-4	Loam---	SM, CL-ML, ML, SC-SM	A-4, A-2	0-10	85-100	75-95	60-75	30-70	<25	NP-7
Ramsey	4-19	Loam, sandy loam, fine sandy loam.	SM, CL-ML, ML, SC-SM	A-4, A-2	0-10	85-100	75-95	60-77	30-70	<25	NP-7
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
RaE---	0-4	Loam---	SM, CL-ML, ML, SC-SM	A-4, A-2	0-10	85-100	75-95	60-75	30-70	<25	NP-7
Ramsey	4-14	Loam, sandy loam, fine sandy loam.	SM, CL-ML, ML, SC-SM	A-4, A-2	0-10	85-100	75-95	60-77	30-70	<25	NP-7
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
RrE*:											
Ramsey---	0-5	Loam---	SM, CL-ML, ML, SC-SM	A-4, A-2	0-10	85-100	75-95	60-75	30-70	<25	NP-7
	5-18	Loam, sandy loam, fine sandy loam.	SM, CL-ML, ML, SC-SM	A-4, A-2	0-10	85-100	75-95	60-77	30-70	<25	NP-7
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
SeA---	0-8	Loam---	ML, CL-ML, CL, SM	A-2, A-4	0-10	85-100	75-100	65-95	30-70	15-27	2-10
Sequatchie	8-45	Clay loam, loam, silt loam.	CL-ML, CL	A-4, A-6	0-10	85-100	75-100	65-95	55-85	20-32	5-15
	45-64	Sandy loam, loam, fine sandy loam.	ML, CL-ML, CL, SM	A-2, A-4	0-15	75-100	65-100	45-85	25-65	15-25	2-10
SeB---	0-8	Loam---	ML, CL-ML, CL, SM	A-2, A-4	0-10	85-100	75-100	65-95	30-70	15-27	2-10
Sequatchie	8-43	Clay loam, loam, silt loam.	CL-ML, CL	A-4, A-6	0-10	85-100	75-100	65-95	55-85	20-32	5-15
	43-61	Sandy loam, loam, fine sandy loam.	ML, CL-ML, CL, SM	A-2, A-4	0-15	75-100	65-100	45-85	25-65	15-25	2-10
Sn---	0-6	Loam---	ML, CL-ML, SM, SC-SM	A-4	0-2	80-100	75-100	55-90	35-65	<30	NP-7
Sewanee	6-34	Loam, silt loam, fine sandy loam.	ML, CL-ML, CL, SM	A-4	0-3	80-100	75-100	65-95	36-65	<35	NP-10
	34-54	Loam, gravelly loam, fine sandy loam.	ML, CL, SM, SC	A-4, A-2	0-5	60-100	55-100	45-95	25-70	<30	NP-10
	54	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
Su Sullivan	0-60	Loam, silt loam	ML, CL, CL-ML, SM	A-4	0	80-100	75-100	60-100	36-90	20-31	3-10
SwB Swafford	0-9	Loam	ML, CL-ML, CL	A-4	0	90-100	85-100	75-100	55-85	20-35	2-10
	9-23	Loam, clay loam, silt loam.	CL, ML, CL-ML	A-4, A-6	0	90-100	85-100	75-95	51-80	25-40	6-16
	23-38	Loam, clay loam, silt loam.	CL, ML, CL-ML	A-4, A-6	0	90-100	85-100	75-95	51-80	25-40	6-16
	38-62	Loam, clay loam, silt loam.	CL, ML, CL-ML	A-4, A-6	0	90-100	85-100	75-95	51-80	25-40	6-16
TaC2 Talbott	0-7	Silt loam	CL	A-4, A-6	0-5	95-100	90-100	85-95	75-95	25-40	8-16
	7-37	Clay, silty clay	CL, MH, CH	A-7	0-10	95-100	90-100	85-95	80-95	41-80	20-45
	37	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
TcE*: Talbott	0-3	Silt loam	CL	A-4, A-6	0-5	95-100	90-100	85-95	75-95	25-40	8-16
	3-32	Clay, silty clay, silty clay loam.	CL, MH, CH	A-7	0-10	95-100	90-100	85-95	80-95	41-80	20-45
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Carbo	0-2	Silt loam	CL	A-6, A-7	0-2	95-100	90-100	85-95	75-85	30-50	10-25
	2-34	Clay, silty clay loam.	CH	A-7	0-5	95-100	85-100	80-95	70-90	60-80	35-55
	34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
TcF*: Talbott	0-4	Silt loam	CL	A-4, A-6	0-5	95-100	90-100	85-95	75-95	25-40	8-16
	4-33	Clay, silty clay, silty clay loam.	CL, MH, CH	A-7	0-10	95-100	90-100	85-95	80-95	41-80	20-45
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Carbo	0-2	Silt loam	CL	A-6, A-7	0-2	95-100	90-100	85-95	75-85	30-50	10-25
	2-32	Clay, silty clay loam.	CH	A-7	0-5	95-100	85-100	80-95	70-90	60-80	35-55
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
WaB Waynesboro	0-9	Loam	ML, CL-ML, CL, SM	A-4	0-5	85-100	80-100	70-95	43-70	18-30	2-9
	9-16	Clay loam, loam, sandy clay loam.	CL, SC	A-4, A-6, A-7	0-5	90-100	85-100	75-95	45-75	30-41	9-17
	16-68	Clay loam, sandy clay, clay.	MH, CL, ML	A-4, A-6, A-7	0-5	90-100	80-100	70-98	55-75	35-68	9-32

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
WaC2---------- Waynesboro	0-6	Loam----------	ML, CL-ML, CL, SM	A-4	0-5	85-100	80-100	70-95	43-70	18-30	2-9
	6-17	Clay loam, loam, sandy clay loam.	CL, SC	A-4, A-6, A-7	0-5	90-100	85-100	75-95	45-75	30-41	9-17
	17-61	Clay loam, sandy clay, clay.	MH, CL, ML	A-4, A-6, A-7	0-5	90-100	80-100	70-98	55-75	35-68	9-32
WaD3---------- Waynesboro	0-4	Clay loam--------	ML, CL-ML, CL, SM	A-4	0-5	85-100	80-100	70-95	43-70	18-30	2-9
	4-61	Clay loam, sandy clay, clay.	MH, CL, ML	A-4, A-6, A-7	0-5	90-100	80-100	70-98	55-75	35-68	9-32
Wh---------- Whitwell	0-7	Loam----------	ML, CL-ML, CL	A-4	0-3	80-100	75-100	70-100	55-95	18-28	3-10
	7-61	Clay loam, loam, silt loam.	CL, CL-ML, ML, SC	A-4, A-6	0-3	80-100	75-100	60-90	40-80	18-35	3-15
Wo---------- Wolftever	0-9	Silt loam--------	CL-ML, CL, ML	A-4, A-6	0	100	95-100	90-100	80-95	25-35	3-12
	9-14	Silty clay, silty clay loam, silt loam.	ML, CL	A-4, A-6	0	100	95-100	90-100	80-95	30-40	7-15
	14-50	Silty clay, silty clay loam, clay.	ML, MH	A-7	0	100	95-100	90-100	75-95	41-55	11-20
	50-61	Loam, clay loam, silty clay loam.	CL-ML, CL	A-6, A-7, A-4	0	100	95-100	90-100	51-90	25-45	5-20

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 15.--Physical and Chemical Properties of the Soils

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
Ae	0-5	27-40	1.30-1.50	0.2-0.6	0.17-0.21	5.6-7.8	High	0.32	5	2-4
Agee	5-61	40-60	1.25-1.45	<0.06	0.12-0.16	5.6-7.8	High	0.32		
Ag	0-8	27-40	1.30-1.50	0.2-0.6	0.17-0.21	5.6-7.8	High	0.32	5	2-4
Agee	8-61	40-60	1.25-1.45	<0.06	0.12-0.16	5.6-7.8	High	0.32		
AnC	0-11	6-25	1.30-1.50	0.6-2.0	0.14-0.19	4.5-5.5	Low	0.28	5	.5-2
Allen	11-61	18-35	1.40-1.60	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.20		
AnD	0-19	6-25	1.30-1.50	0.6-2.0	0.14-0.19	4.5-5.5	Low	0.28	5	.5-2
Allen	19-72	18-35	1.40-1.60	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.20		
Ba	0-9	22-35	1.35-1.55	0.6-2.0	0.17-0.20	4.5-6.0	Low	0.37	5	1-3
Beason	9-20	26-40	1.40-1.60	0.6-2.0	0.17-0.20	4.5-5.5	Low	0.32		
	20-72	35-45	1.45-1.65	0.2-0.6	0.14-0.18	4.5-5.5	Low	0.32		
BbB, BbC, BbD	0-5	10-25	1.30-1.50	2.0-6.0	0.14-0.20	3.6-5.5	Low	0.28	3	.5-2
Beersheba	5-36	18-35	1.35-1.55	2.0-6.0	0.12-0.18	3.6-5.5	Low	0.24		
	36-50	---	---	---	---	---		---		
BdD	0-2	18-27	1.40-1.55	0.6-2.0	0.10-0.16	3.6-5.5	Low	0.28	5	<.5
Bethesda	2-63	18-35	1.60-1.90	0.2-0.6	0.04-0.10	3.6-5.5	Low	0.32		
BhF*:										
Bethesda	0-4	18-27	1.40-1.55	0.6-2.0	0.10-0.16	3.6-5.5	Low	0.28	5	<.5
	4-61	18-35	1.60-1.90	0.2-0.6	0.04-0.10	3.6-5.5	Low	0.32		
Pits.										
Bn	0-8	10-25	1.30-1.45	0.6-2.0	0.17-0.20	4.5-5.5	Low	0.37	4	2-4
Bonair	8-46	18-35	1.30-1.45	0.6-2.0	0.17-0.20	4.5-5.5	Low	0.37		
	46-52	10-25	1.30-1.45	0.6-2.0	0.12-0.20	4.5-5.5	Low	0.37		
BoF	0-12	10-20	1.35-1.50	2.0-6.0	0.06-0.10	4.5-5.5	Low	0.20	5	1-3
Bouldin	12-90	17-35	1.40-1.55	2.0-6.0	0.06-0.10	4.5-5.5	Low	0.20		
CaB	0-6	15-25	1.30-1.50	0.6-2.0	0.18-0.22	4.5-5.5	Low	0.43	3	.5-2
Clarkrange	6-22	20-32	1.35-1.55	0.6-2.0	0.16-0.20	4.5-5.5	Low	0.43		
	22-49	20-32	1.55-1.70	0.06-0.2	0.08-0.12	4.5-5.5	Low	0.43		
	49-54	25-45	1.35-1.55	0.6-2.0	0.08-0.12	4.5-5.5	Low	0.37		
	54-61	---	---	---	---	---		---		
CoB	0-16	8-20	1.40-1.60	2.0-6.0	0.08-0.13	4.5-5.5	Low	0.17	5	1-3
Cobstone	16-42	15-30	1.40-1.60	2.0-6.0	0.05-0.10	4.5-5.5	Low	0.17		
	42-61	5-20	1.45-1.65	2.0-6.0	0.04-0.09	4.5-5.5	Low	0.17		
Em	0-7	20-35	1.20-1.40	0.6-2.0	0.17-0.21	5.1-6.0	Low	0.37	5	1-4
Emory	7-25	20-35	1.25-1.45	0.6-2.0	0.17-0.21	5.1-6.0	Low	0.37		
	25-61	32-45	1.35-1.55	0.6-2.0	0.16-0.20	5.1-6.0	Low	0.37		
EtB	0-10	15-27	1.30-1.45	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.37	5	1-3
Etowah	10-42	23-35	1.35-1.50	0.6-2.0	0.16-0.20	4.5-5.5	Low	0.32		
	42-63	32-45	1.40-1.55	0.6-2.0	0.16-0.20	4.5-5.5	Low	0.32		

See footnote at end of table.

Table 15.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cc	In/hr	In/in	pH				Pct
EtC2	0-8	15-27	1.30-1.45	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.37	5	1-3
Etowah	8-20	23-35	1.35-1.50	0.6-2.0	0.16-0.20	4.5-5.5	Low	0.32		
	20-61	32-45	1.40-1.55	0.6-2.0	0.16-0.20	4.5-5.5	Low	0.32		
GpC	0-5	15-27	1.20-1.40	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.24	3	.5-2
Gilpin	5-24	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.24		
	24-31	15-35	1.20-1.50	0.6-2.0	0.08-0.12	3.6-5.5	Low	0.24		
	31	---	---	---	---	---	---	----		
GpD	0-7	15-27	1.20-1.40	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.24	3	.5-2
Gilpin	7-28	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.24		
	28-38	15-35	1.20-1.50	0.6-2.0	0.08-0.12	3.6-5.5	Low	0.24		
	38	---	---	---	---	---	---	----		
GpE	0-6	15-27	1.20-1.40	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.24	3	.5-2
Gilpin	6-25	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.24		
	25	---	---	---	---	---	---	----		
GrE*:										
Gilpin	0-4	15-27	1.20-1.40	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.24	3	.5-2
	4-26	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.24		
	26-33	15-35	1.20-1.50	0.6-2.0	0.08-0.12	3.6-5.5	Low	0.24		
	33	---	---	---	---	---	---	----		
Ramsey	0-4	8-25	1.25-1.50	6.0-20	0.06-0.10	4.5-5.5	Low	0.17	1	.5-2
	4-13	8-25	1.20-1.40	6.0-20	0.06-0.10	4.5-5.5	Low	0.17		
	13	---	---	---	---	---	---	----		
Rock outcrop.										
Ha	0-5	15-25	1.30-1.45	0.6-2.0	0.18-0.20	5.1-7.3	Low	0.32	5	1-3
Hamblen	5-24	18-32	1.30-1.45	0.6-2.0	0.17-0.20	5.1-7.3	Low	0.32		
	24-61	18-32	1.30-1.45	0.6-2.0	0.17-0.20	5.1-7.3	Low	0.32		
JeC	0-8	10-20	1.30-1.50	2.0-6.0	0.10-0.18	4.5-5.5	Low	0.24	4	.5-2
Jefferson	8-53	18-34	1.30-1.65	2.0-6.0	0.10-0.16	4.5-5.5	Low	0.28		
	53-61	15-30	1.30-1.65	2.0-6.0	0.08-0.14	4.5-5.5	Low	0.17		
JeD	0-12	10-20	1.30-1.50	2.0-6.0	0.10-0.18	4.5-5.5	Low	0.24	4	.5-2
Jefferson	12-56	18-34	1.30-1.65	2.0-6.0	0.10-0.16	4.5-5.5	Low	0.28		
	56-84	15-30	1.30-1.65	2.0-6.0	0.08-0.14	4.5-5.5	Low	0.17		
JeE	0-12	10-20	1.30-1.50	2.0-6.0	0.10-0.18	4.5-5.5	Low	0.24	4	.5-2
Jefferson	12-47	18-34	1.30-1.65	2.0-6.0	0.10-0.16	4.5-5.5	Low	0.28		
	47-63	15-30	1.30-1.65	2.0-6.0	0.08-0.14	4.5-5.5	Low	0.17		
LaB	0-6	7-27	1.20-1.40	0.6-6.0	0.13-0.18	3.6-5.5	Low	0.28	2	.5-2
Lily	6-27	18-35	1.25-1.35	2.0-6.0	0.12-0.18	3.6-5.5	Low	0.28		
	27-31	20-35	1.25-1.35	2.0-6.0	0.08-0.17	3.6-5.5	Low	0.17		
	31	---	---	---	---	---	---	----		
LaC	0-7	7-27	1.20-1.40	0.6-6.0	0.13-0.18	3.6-5.5	Low	0.28	2	.5-2
Lily	7-27	18-35	1.25-1.35	2.0-6.0	0.12-0.18	3.6-5.5	Low	0.28		
	27	---	---	---	---	---	---	----		
LaD	0-2	7-27	1.20-1.40	0.6-6.0	0.13-0.18	3.6-5.5	Low	0.28	2	.5-2
Lily	2-24	18-35	1.25-1.35	2.0-6.0	0.12-0.18	3.6-5.5	Low	0.28		
	24	---	---	---	---	---	---	----		

See footnote at end of table.

Table 15.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
LoB	0-7	15-25	1.30-1.40	0.6-2.0	0.18-0.20	4.5-5.5	Low	0.37	4	1-2
Lonewood	7-29	20-39	1.30-1.45	0.6-2.0	0.16-0.18	4.5-5.5	Low	0.37		
	29-58	25-45	1.40-1.55	0.6-2.0	0.14-0.17	4.5-5.5	Low	0.32		
	58-62	25-45	1.40-1.55	0.6-2.0	0.05-0.11	4.5-5.5	Low	0.32		
	62-67	---	---	---	---	---	---	---		
LoC	0-8	15-25	1.30-1.40	0.6-2.0	0.18-0.20	4.5-5.5	Low	0.37	4	1-2
Lonewood	8-23	20-39	1.30-1.45	0.6-2.0	0.16-0.18	4.5-5.5	Low	0.37		
	23-50	25-45	1.40-1.55	0.6-2.0	0.14-0.17	4.5-5.5	Low	0.32		
	50-55	---	---	---	---	---	---	---		
Me	0-3	12-17	1.20-1.60	0.6-2.0	0.18-0.23	5.1-7.3	Low	0.43	5	.5-2
Melvin	3-44	12-35	1.30-1.60	0.6-2.0	0.18-0.23	5.1-6.0	Low	0.43		
	44-61	7-35	1.40-1.70	0.6-2.0	0.16-0.23	5.1-6.0	Low	0.43		
MoB	0-4	10-25	1.30-1.50	2.0-6.0	0.14-0.20	4.5-5.5	Low	0.32	5	.5-2
Monteagle	4-12	20-35	1.35-1.55	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.32		
	12-72	30-50	1.35-1.55	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.32		
	72-79	15-35	1.40-1.60	0.6-2.0	0.10-0.16	4.5-5.5	Low	0.28		
	79-85	---	---	---	---	---	---	---		
MoC	0-9	10-25	1.30-1.50	2.0-6.0	0.14-0.20	4.5-5.5	Low	0.32	5	.5-2
Monteagle	9-16	20-35	1.35-1.55	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.32		
	16-69	30-50	1.35-1.55	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.32		
	69-75	---	---	---	---	---	---	---		
Ne	0-7	7-27	1.20-1.40	0.6-2.0	0.15-0.23	5.1-7.3	Low	0.43	5	1-2
Newark	7-46	18-35	1.20-1.45	0.6-2.0	0.18-0.23	5.1-6.0	Low	0.43		
	46-61	12-40	1.30-1.50	0.6-2.0	0.15-0.22	5.1-6.0	Low	0.43		
RaC	0-4	8-25	1.25-1.50	6.0-20	0.09-0.12	4.5-5.5	Low	0.20	1	.5-2
Ramsey	4-19	8-25	1.20-1.40	6.0-20	0.09-0.12	4.5-5.5	Low	0.17		
	19	---	---	---	---	---	---	---		
RaE	0-4	8-25	1.25-1.50	6.0-20	0.09-0.12	4.5-5.5	Low	0.20	1	.5-2
Ramsey	4-14	8-25	1.20-1.40	6.0-20	0.09-0.12	4.5-5.5	Low	0.17		
	14	---	---	---	---	---	---	---		
RrE*:										
Ramsey	0-5	8-25	1.25-1.50	6.0-20	0.09-0.12	4.5-5.5	Low	0.20	1	.5-2
	5-18	8-25	1.20-1.40	6.0-20	0.09-0.12	4.5-5.5	Low	0.17		
	18	---	---	---	---	---	---	---		
Rock outcrop.										
SeA	0-8	10-25	1.50-1.65	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.32	5	1-3
Sequatchie	8-45	18-30	1.55-1.70	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.24		
	45-64	12-25	1.55-1.70	0.6-6.0	0.09-0.14	4.5-5.5	Low	0.24		
SeB	0-8	10-25	1.50-1.65	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.32	5	1-3
Sequatchie	8-43	18-30	1.55-1.70	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.24		
	43-61	12-25	1.55-1.70	0.6-6.0	0.09-0.14	4.5-5.5	Low	0.24		
Sn	0-6	10-18	1.35-1.55	0.6-2.0	0.12-0.18	4.5-6.0	Low	0.28	3	1-3
Sewanee	6-34	10-18	1.35-1.55	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.28		
	34-54	10-18	1.35-1.55	0.6-2.0	0.10-0.18	4.5-5.5	Low	0.24		
	54	---	---	---	---	---	---	---		

See footnote at end of table.

Table 15.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
Su	0-61	18-25	1.30-1.45	0.6-2.0	0.12-0.20	5.1-7.3	Low	0.32	5	1-3
Sullivan										
SwB	0-9	12-25	1.35-1.50	0.6-2.0	0.16-0.20	4.5-6.0	Low	0.37	5	1-3
Swafford	9-23	18-32	1.40-1.50	0.6-2.0	0.14-0.20	4.5-6.0	Low	0.32		
	23-38	18-32	1.45-1.60	0.2-0.6	0.13-0.17	4.5-6.0	Low	0.32		
	38-62	18-32	1.40-1.55	0.6-2.0	0.13-0.17	4.5-6.0	Low	0.32		
TaC2	0-7	15-27	1.35-1.50	0.6-2.0	0.10-0.18	5.1-6.0	Moderate	0.37	2	.5-2
Talbott	7-37	40-60	1.40-1.60	0.2-0.6	0.10-0.14	5.1-6.0	Moderate	0.24		
	37	---	---	---	---	---	---	---		
TcE*:										
Talbott	0-3	15-27	1.35-1.50	0.6-2.0	0.10-0.18	5.1-6.0	Moderate	0.37	2	.5-2
	3-32	40-60	1.40-1.60	0.2-0.6	0.10-0.14	5.1-6.0	Moderate	0.24		
	32	---	---	---	---	---	---	---		
Carbo	0-2	20-40	1.20-1.40	0.6-2.0	0.16-0.19	4.5-7.3	Moderate	0.37	2	.5-2
	2-34	60-80	1.30-1.45	0.06-0.2	0.10-0.14	5.6-7.8	High	0.24		
	34	---	---	---	---	---	---	---		
Rock outcrop.										
TcF*:										
Talbott	0-4	15-27	1.35-1.50	0.6-2.0	0.10-0.18	5.1-6.0	Moderate	0.37	2	.5-2
	4-33	40-60	1.40-1.60	0.2-0.6	0.10-0.14	5.1-6.0	Moderate	0.24		
	33	---	---	---	---	---	---	---		
Carbo	0-2	20-40	1.20-1.40	0.6-2.0	0.16-0.19	4.5-7.3	Moderate	0.37	2	.5-2
	2-32	60-80	1.30-1.45	0.06-0.2	0.10-0.14	5.6-7.8	High	0.24		
	32	---	---	---	---	---	---	---		
Rock outcrop.										
WaB	0-9	10-30	1.40-1.55	0.6-2.0	0.15-0.21	4.5-5.5	Low	0.28	5	.5-2
Waynesboro	9-16	23-35	1.40-1.55	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.28		
	16-68	35-50	1.40-1.55	0.6-2.0	0.13-0.18	4.5-5.5	Low	0.28		
WaC2	0-6	10-30	1.40-1.55	0.6-2.0	0.15-0.21	4.5-5.5	Low	0.28	5	.5-2
Waynesboro	6-17	23-35	1.40-1.55	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.28		
	17-61	35-50	1.40-1.55	0.6-2.0	0.13-0.18	4.5-5.5	Low	0.28		
WaD3	0-4	10-30	1.40-1.55	0.6-2.0	0.15-0.21	4.5-5.5	Low	0.28	5	.5-2
Waynesboro	4-61	35-50	1.40-1.55	0.6-2.0	0.13-0.18	4.5-5.5	Low	0.28		
Wh	0-7	10-25	1.35-1.55	0.6-2.0	0.15-0.20	4.5-6.0	Low	0.32	5	1-3
Whitwell	7-61	18-32	1.40-1.70	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.32		
Wo	0-9	22-40	1.35-1.45	0.6-2.0	0.17-0.20	4.5-5.5	Low	0.37	5	1-3
Wolftever	9-14	22-45	1.35-1.50	0.2-0.6	0.15-0.18	4.5-5.5	Low	0.32		
	14-50	35-55	1.40-1.60	0.2-0.6	0.13-0.17	4.5-5.5	Moderate	0.32		
	50-61	20-40	1.40-1.60	0.2-0.6	0.13-0.17	4.5-5.5	Low	0.32		

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 16.--Soil and Water Features

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
Ae Agee	D	Rare	---	---	0-1.0	Apparent	Jan-Apr	>60	---	High	Low.
Ag Agee	D	Occasional	Brief	Jan-Apr	0-1.0	Apparent	Jan-Apr	>60	---	High	Low.
AnC, AnD Allen	B	None	---	---	>6.0	---	---	>60	---	Low	Moderate.
Ba Beason	C	Rare	---	---	1.0-2.0	Apparent	Dec-Apr	>60	---	High	High.
BbB, BbC, BbD Beersheba	B	None	---	---	>6.0	---	---	20-40	Soft	Moderate	High.
BdD Bethesda	C	None	---	---	>6.0	---	---	>60	---	Moderate	High.
BhF*:											
Bethesda	C	None	---	---	>6.0	---	---	>60	---	Moderate	High.
Pits.											
Bn Bonair	D	Occasional	Very brief	Jan-Apr	0-1.0	Apparent	Jan-Apr	40-60	Hard	High	High.
BoF Bouldin	B	None	---	---	>6.0	---	---	>60	---	Low	Moderate.
CaB Clarkrange	C	None	---	---	1.5-2.5	Perched	Jan-Apr	40-60	---	Moderate	High.
CoB Cobstone	B	Rare	---	---	>6.0	---	---	>60	---	Low	Moderate.
Em Emory	B	None	---	---	5.0-6.0	Apparent	Dec-Mar	>60	---	Moderate	Moderate.
EtB, EtC2 Etowah	B	None	---	---	>6.0	---	---	>60	---	Low	Moderate.
GpC, GpD, GpE Gilpin	C	None	---	---	>6.0	---	---	20-40	Soft	Low	High.
GrE*:											
Gilpin	C	None	---	---	>6.0	---	---	20-40	Soft	Low	High.
Ramsey	D	None	---	---	>6.0	---	---	10-20	Hard	Low	Moderate.
Rock outcrop.											
Ha Hamblen	C	Occasional	Very brief	Jan-Apr	2.0-3.0	Apparent	Dec-Mar	>60	---	Moderate	Moderate.

See footnote at end of table.

Table 16.--Soil and Water Features--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
JeC, JeD, JeE----- Jefferson	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
LaB, LaC, LaD----- Lily	B	None	---	---	>6.0	---	---	20-40	Hard	Moderate	High.
LoB, LoC---------- Lonewood	B	None	---	---	>6.0	---	---	40-72	Soft	Low------	Moderate.
Me---------- Melvin	D	Frequent	Long------	Dec-Apr	+2-0.5	Apparent	Jan-Dec	>60	---	High-----	Low.
MoB, MoC---------- Monteagle	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
Ne---------- Newark	C	Occasional	Brief-----	Jan-Apr	0.5-1.5	Apparent	Dec-May	>60	---	High-----	Low.
RaC, RaE---------- Ramsey	D	None	---	---	>6.0	---	---	7-20	Hard	Low------	Moderate.
RrE*:											
Ramsey----------	D	None	---	---	>6.0	---	---	7-20	Hard	Low------	Moderate.
Rock outcrop.											
SeA---------- Sequatchie	B	Rare	---	---	>6.0	---	---	>60	---	Low------	Moderate.
SeB---------- Sequatchie	B	None	---	---	>6.0	---	---	>60	---	Low------	Moderate.
Sn---------- Sewanee	B	Occasional	Very brief	Jan-Apr	1.0-2.0	Apparent	Dec-Mar	40-60	Hard	Moderate	Moderate.
Su---------- Sullivan	B	Occasional	Very brief	Jan-Apr	4.0-6.0	Apparent	Dec-Mar	>60	---	Low------	Low.
SwB---------- Swafford	C	None	---	---	2.0-3.0	Perched	Jan-Mar	>60	---	Moderate	Moderate.
TaC2---------- Talbott	C	None	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
TcE*, TcF*:											
Talbott----------	C	None	---	---	>6.0	---	---	20-40	Hard	High-----	Moderate.
Carbo----------	C	None	---	---	>6.0	---	---	20-40	Hard	High-----	Low.
Rock outcrop.											
WaB, WaC2, WaD3--- Waynesboro	B	None	---	---	>6.0	---	---	>60	---	High-----	High.
Wh---------- Whitwell	C	Rare	---	---	2.0-3.0	Apparent	Dec-Mar	>60	---	Moderate	Moderate.
Wo---------- Wolftever	C	Rare	---	---	2.5-3.5	Apparent	Dec-Mar	>60	---	High-----	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 17.--Classification of the Soils

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Agee	Fine, montmorillonitic, thermic Typic Haplaquolls
Allen	Fine-loamy, siliceous, thermic Typic Paleudults
Beason	Clayey, mixed, thermic Aquic Hapludults
Beersheba	Fine-loamy, siliceous, mesic Typic Hapludults
Bethesda	Loamy-skeletal, mixed, acid, mesic Typic Udorthents
Bonair	Fine-loamy, siliceous, mesic Humic Haplaquepts
Bouldin	Loamy-skeletal, siliceous, mesic Typic Paleudults
Carbo	Very-fine, mixed, mesic Typic Hapludalfs
Clarkrange	Fine-silty, siliceous, mesic Typic Fragiudults
Cobstone	Loamy-skeletal, siliceous, thermic Typic Hapludults
Emory	Fine-silty, siliceous, thermic Fluventic Umbric Dystrochrepts
Etowah	Fine-loamy, siliceous, thermic Typic Paleudults
Gilpin	Fine-loamy, mixed, mesic Typic Hapludults
Hamblen	Fine-loamy, siliceous, thermic Fluvaquentic Eutrochrepts
Jefferson	Fine-loamy, siliceous, mesic Typic Hapludults
Lily	Fine-loamy, siliceous, mesic Typic Hapludults
Lonewood	Fine-loamy, siliceous, mesic Typic Hapludults
*Melvin	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
Monteagle	Clayey, mixed, mesic Typic Paleudults
*Newark	Fine-silty, mixed, nonacid, mesic Aeric Fluvaquents
Ramsey	Loamy, siliceous, mesic Lithic Dystrochrepts
Sequatchie	Fine-loamy, siliceous, thermic Humic Hapludults
Sewanee	Coarse-loamy, siliceous, mesic Fluvaquentic Dystrochrepts
Sullivan	Fine-loamy, siliceous, thermic Dystric Fluventic Eutrochrepts
Swafford	Fine-loamy, siliceous, thermic Fragiaquic Paleudults
Talbott	Fine, mixed, thermic Typic Hapludalfs
Waynesboro	Clayey, kaolinitic, thermic Typic Paleudults
Whitwell	Fine-loamy, siliceous, thermic Aquic Hapludults
Wolftever	Clayey, mixed, thermic Aquic Hapludults

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