United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
Tennessee Agricultural
Experiment Station;
Tennessee Department of
Agriculture; United States
Department of
Agriculture, Forest
Service; and Sullivan
County Board of
Commissioners

Soil Survey of Sullivan County, Tennessee

How To Use This Soil Survey

General Soil Map

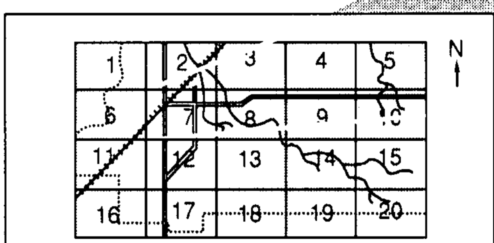
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

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

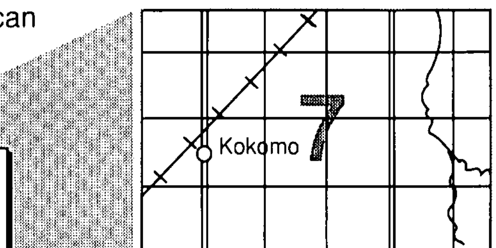
Detailed Soil Maps

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

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

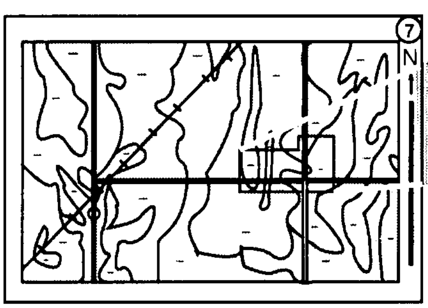


INDEX TO MAP SHEETS

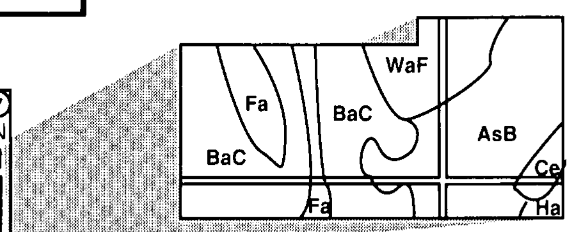


MAP SHEET

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



MAP SHEET



AREA OF INTEREST

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

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

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

Major fieldwork for this soil survey was completed in 1987. Soil names and descriptions were approved in 1990. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1987. This soil survey was made cooperatively by the Soil Conservation Service and the Tennessee Agricultural Experiment Station. Assistance in making the survey was provided by the Sullivan County Board of Commissioners, the Tennessee Department of Agriculture, and the United States Department of Agriculture, Forest Service. The survey is part of the technical assistance furnished to the Sullivan County Soil Conservation District.

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

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

Cover: A cleared area of Collegedale-Etowah complex, 5 to 12 percent slopes, eroded. The forested mountains in the background are steep to extremely steep areas of the Keener-Ditney-Cataska general soil map unit.

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Issued July 1994

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Summary of Tables

Foreword

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

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

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

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

Jerry S. Lee
State Conservationist
Soil Conservation Service

Soil Survey of Sullivan County, Tennessee

By Harry C. Davis, Soil Conservation Service

Soils surveyed by Harry C. Davis and Nathan T. Hartgrove, Soil Conservation Service

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

SULLIVAN COUNTY is in the northeastern part of Tennessee (fig. 1). It is bordered on the north by Virginia, on the south by Washington and Carter Counties, on the west by Hawkins County, and on the east by Carter and Johnson Counties. Blountville, the county seat, is in the central part of the county, between the cities of Kingsport and Bristol. According to census figures the population of the county was 146,100 in 1985. It has increased at a steady rate over the past few years.

The county is irregular in shape, measuring about 21 miles from east to west and 14 miles from north to south. It has an area of 275,100 acres, or 430 square miles. About 265,700 acres is land, and 9,400 acres is water.

The county is divided from east to west by the Holston River and the South Holston, Boone, and Fort Patrick Henry Reservoirs.

The county is in two major land resource areas—the Southern Appalachian Ridges and Valleys and the Blue Ridge. The soils in both of these areas formed under forest vegetation and are dominantly light in color. The soils in the Blue Ridge area are shallow to very deep over sandstone or phyllite bedrock. The soils in the Southern Appalachian Ridges and Valleys area are shallow to very deep over limestone or shale bedrock or over sandstone or shale bedrock on Bays Mountain.

This soil survey updates the survey of Sullivan County published in 1953 *(3)*. It provides additional information and has maps on a photographic background.

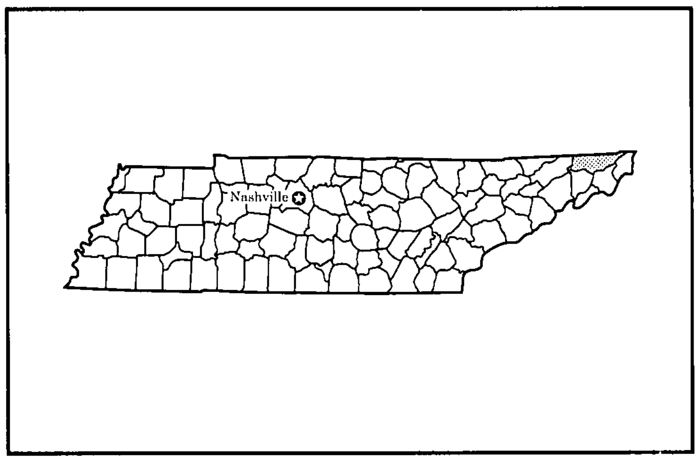

Figure 1.—Location of Sullivan County in Tennessee.

General Nature of the County

This section gives general information about the county. It describes history and development, industry, transportation facilities, natural resources, and climate.

History and Development

The area now known as Sullivan County was inhabited by the Cherokee Indians before permanent settlements were established. The first permanent settlement was made by John Sharp, Thomas Sharp, and Thomas Henderson in Holston Valley in 1765.

Other early settlements were made in 1771 by Isaac Shelby at what is now Bristol and by Thomas Martin on Long Island, at the present site of Kingsport. The county was organized as a part of North Carolina in 1779. The site for Blountville, the county seat, was granted in 1792, and the first courthouse was built in 1795.

Many of the early settlers came from Pennsylvania, Virginia, and North Carolina. A few were veterans of the Revolutionary War who had been given grants of land. Some were immigrants who had come directly from Europe. The early settlers were chiefly Scotch-Irish and English, although some were Scotch, Welsh, and French.

Kingsport, in the western part of the county, was a center for river shipping in earlier days, but its importance declined when two railroads met in Bristol, in the eastern part of the county, in 1857. Kingsport is now an industrial center and serves as a trading center for the western half of the county and for adjoining counties. Blountville was important as a trading center in its earliest days, but it became less important as a commercial center when river and rail traffic developed. It remains a trading center for the central part of the county. Other trading centers in the county are Bluff City, Piney Flats, Indian Springs, and Sullivan Gardens.

Industry

The industrial enterprises in Sullivan County include manufacturers of textiles, paper products, chemicals, fiber, and plastic and defense industries. More than 200 firms operate in the county. They employ most of the nonagricultural population.

The housing industry has expanded greatly in recent years to keep pace with population growth. Residential areas have developed throughout the county. Most of the residential units are single-family houses. In recent years a number of multiple-family dwellings have been built.

Transportation Facilities

Interstate Highways 81 and 181 merge in Sullivan County near Kingsport. The county has an excellent network of state and local highways. Nearly all of the roads are paved with bituminous material.

The county is served by one railroad, a number of motor freight companies, and the Tri-City Regional Airport, which is 5 miles south of Blountville. Bus service also is available.

Natural Resources

Sullivan County has an abundant supply of limestone, timber, and farmland. Tree production is a major enterprise in the mountainous areas and in areas in the valleys where the soils are not suited to agricultural uses. The primary trees are oak, hickory, poplar, and beech. Numerous limestone quarries provide gravel and lime throughout the county.

The county has a good supply of fresh water. Streams that flow throughout the year are common. Most of the impounded water in the county is in the South Holston, Boone, and Fort Patrick Henry Reservoirs.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Kingsport, 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 29 degrees. The lowest temperature on record, which occurred at Kingsport on January 31, 1966, is -14 degrees. In summer, the average temperature is 74 degrees and the average daily maximum temperature is 86 degrees. The highest recorded temperature, which occurred at Kingsport on July 28, 1952, is 102 degrees.

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

The total annual precipitation is about 46 inches. Of this, 23 inches, or 50 percent, usually falls in April through September. The growing season for most crops falls within this period. The heaviest 1-day rainfall during the period of record was 4.12 inches at Kingsport on August 8, 1972. Thunderstorms occur on about 47 days each year, and most occur in spring.

The average seasonal snowfall is about 16 inches. The greatest snow depth at any one time during the period of record was 11 inches. On an average of 7 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 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 northeast. Average windspeed is highest, 9 miles per hour, in spring.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material from which the soil formed. The unconsolidated material is generally devoid of roots and other living organisms and has been little changed by other biological activity.

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

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

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

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

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

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

Map Unit Composition

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

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

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

General Soil Map Units

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

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

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

In some areas the soil names and boundaries on the general soil map of this county do not match those on the maps of adjacent counties. Differences are the result of variations in soil patterns and map scales and recent advances in soil classification.

1. Collegedale-Etowah

Moderately sloping to steep, well drained soils that have a clayey and loamy subsoil; on limestone uplands and high terraces in the Southern Appalachian Ridges and Valleys area

This map unit is on broad, moderately sloping uplands, high terraces, and the steep side slopes of hills underlain by limestone bedrock. Slopes are broad and are dissected by intermittent drainageways. The drainageways join and become small creeks that flow through narrow flood plains. Slopes range from 5 to 35 percent.

This unit makes up about 41 percent of the county. It is about 45 percent Collegedale soils, 30 percent Etowah soils, and 25 percent soils of minor extent.

The moderately sloping to steep, very deep Collegedale soils are on convex slopes. The moderately sloping to steep, very deep Etowah soils are on concave slopes.

Of minor extent in this unit are the moderately deep, well drained Talbott soils near areas of limestone outcrops; the very deep, well drained Waynesboro and Holston soils on high terraces; the very deep, moderately well drained Steadman soils on flood plains; and the shallow, well drained Montevallo soils on shale ridges.

Most of this unit has been cleared and is used as pasture or hayland. Some areas are used for row crops, mainly corn. In most areas the unit is suited to pasture and woodland. The slope and the hazard of erosion are the major management concerns.

Generally, this unit is poorly suited to most urban uses because of the slope and the clayey subsoil. The concave areas, however, are suited to these uses.

2. Montevallo-Collegedale

Moderately steep to extremely steep, well drained soils that have a loamy and clayey subsoil; on shale ridges and the adjacent limestone uplands in the Southern Appalachian Ridges and Valleys area

This map unit is on the prominent, moderately steep to extremely steep chains of ridges in the county. It is characterized by shallow soils that formed in shale residuum on the ridgetops and the upper side slopes and by deep soils that formed in clayey limestone residuum on the lower side slopes. The ridges cross the county but are not continuous. Slopes range from 12 to 80 percent.

This unit makes up about 26 percent of the county. It is about 70 percent Montevallo soils, 15 percent Collegedale soils, and 15 percent soils of minor extent.

The moderately steep to extremely steep, shallow Montevallo soils are on ridgetops and the upper side slopes. The moderately steep and steep, very deep Collegedale soils are on the lower side slopes. They make up a small percentage of the areas of the unit adjacent to Holston Mountain and a larger percentage of the areas to the west of the mountain.

Of minor extent in this unit are the very deep Shelocta soils in colluvial areas adjacent to Holston and Bays Mountains; the very deep, moderately well drained Steadman soils on flood plains; and the very deep, well drained Etowah soils in concave areas on the lower terraces.

Most of this unit is wooded, primarily with mixed hardwoods. A few areas on the lower side slopes have been cleared and are used as pasture. The unit is suited to woodland. The slope, the depth to bedrock, and the hazard of erosion are the major management concerns.

This unit is generally unsuited to agricultural and urban uses. The slope, the clayey subsoil, and the depth to bedrock are the major limitations.

3. Talbott-Bradyville

Moderately steep and steep, well drained soils that have a clayey subsoil and are intermingled with outcrops of limestone bedrock; on limestone hills and uplands in the Southern Appalachian Ridges and Valleys area

This map unit is on moderately steep uplands and steep hills that are underlain by limestone bedrock and have outcrops of limestone bedrock. Slopes are smooth and convex. They range from 12 to 35 percent.

This unit makes up about 12 percent of the county. It is about 60 percent Talbott soils, 18 percent Bradyville soils, and 22 percent rock outcrops and soils of minor extent.

The moderately steep and steep, moderately deep Talbott soils are on convex slopes. The moderately steep and steep, deep Bradyville soils are on the convex slopes that generally are downslope from the outcrops of limestone bedrock.

Areas of rock outcrop are throughout this unit. They consist of limestone bedrock that protrudes a few inches to as much as 3 feet above the surface. They occur as ledges or bluffs or as individual outcrops throughout the unit.

Of minor extent in this unit are the shallow, well drained Montevallo soils on shale uplands; the very deep, well drained Collegedale soils on limestone uplands; and the deep, well drained Bradyville soils in landscape positions similar to those of the major soils.

Most of this unit is wooded, primarily with upland oaks and redcedar. The unit is suited to woodland. The slope, the hazard of erosion, and the rock outcrops are the major management concerns.

This unit is generally unsuited to agricultural and urban uses. The slope, the clayey subsoil, the depth to bedrock, and the rock outcrops are the main limitations.

4. Montevallo-Wallen

Steep to extremely steep, well drained and somewhat excessively drained soils that have a loamy subsoil and are underlain by acid sandstone and shale; on the side slopes of Bays Mountain

This map unit is on the steep to extremely steep side slopes of Bays Mountain, in the western part of the county. The mountaintop and the upper side slopes are underlain by sandstone. The lower side slopes are underlain by shale. Slopes are long and convex. They range from 30 to 65 percent.

This unit makes up about 1 percent of the county. It is about 48 percent Montevallo soils, 33 percent Wallen soils, and 19 percent soils of minor extent.

The steep to extremely steep, shallow, well drained Montevallo soils are on the lower side slopes. The steep, moderately deep, somewhat excessively drained Wallen soils are on the upper side slopes.

Of minor extent in this unit are the deep, well drained Shelocta soils in coves and colluvial areas and the shallow, well drained Bays soils on shale uplands.

All of this unit is wooded, primarily with upland oaks and pine. The unit is suited to woodland. The slope, the hazard of erosion, and the depth to bedrock are the major management concerns.

This unit is generally unsuited to agricultural and urban uses because of the slope and the depth to bedrock.

5. Holston-Bellamy

Gently sloping to moderately steep, well drained and moderately well drained soils that have a loamy subsoil; on high and low terraces in the Southern Appalachian Ridges and Valleys area

This map unit is in gently sloping areas on low stream terraces along the major creeks and their tributaries and on the adjacent high stream terraces, which are dissected by drainageways. Slopes range from 2 to 20 percent.

This unit makes up about 2 percent of the county. It is about 50 percent Holston soils, 20 percent Bellamy soils, and 30 percent soils of minor extent.

The gently sloping to moderately steep, very deep, well drained Holston soils are on the ridgetops and side slopes of high terraces. The gently sloping, very deep, moderately well drained Bellamy soils are on low terraces adjacent to flood plains along small creeks. They have a slightly compact, brittle layer at a depth of about 2 feet. This brittle layer restricts root penetration and the movement of water through the soils.

Of minor extent in this unit are Waynesboro soils on high terraces and Steadman, Bloomingdale, and Pettyjon soils on flood plains. All of these soils are very deep. Waynesboro and Pettyjon soils are well drained, Steadman soils are moderately well drained, and Bloomingdale soils are poorly drained.

Most of this unit is within the city limits of Kingsport and is used for industrial and residential development. Areas that are not used for development are suited to agricultural and urban uses and are well suited to woodland. The slope and the hazard of erosion are the major management concerns.

6. Bays-Steadman-Bellamy

Nearly level to very steep, well drained and moderately well drained soils that have a loamy subsoil; on shale ridges, low terraces, and flood plains in the Southern Appalachian Ridges and Valleys area

This map unit is in nearly level areas on low terraces and flood plains and in moderately steep to very steep areas on shale ridges along Horse Creek and Reedy Creek in the western part of the county. Slopes range from 0 to 65 percent.

This unit makes up about 11 percent of the county. It is about 60 percent Bays soils, 14 percent Steadman soils, 16 percent Bellamy soils, and 10 percent soils of minor extent.

The moderately steep to very steep, shallow, well drained Bays soils are on the shale ridges. The nearly level, very deep, moderately well drained Steadman soils are on flood plains. The gently sloping, very deep, moderately well drained Bellamy soils are on low terraces. They have a slightly compact, brittle layer at a depth of about 2 feet. This brittle layer restricts root penetration and the movement of water through the soils.

Of minor extent in this unit are the very deep, well drained Pettyjon soils and the very deep, poorly drained Bloomingdale soils, both of which are on flood plains.

About 60 percent of this unit has been cleared. Most of the remaining areas are wooded with mixed hardwoods. The low terraces and flood plains are suited to agricultural uses and woodland. The slope, the hazard of erosion, the depth to bedrock, and the flooding are the major management concerns.

Generally, this unit is poorly suited to urban uses because of the slope, the depth to bedrock, the flooding, and the wetness.

7. Keener-Ditney-Cataska

Moderately sloping to extremely steep, well drained to excessively drained soils that have a loamy subsoil; on the side slopes and foot slopes of Holston Mountain

This map unit is on the moderately sloping to extremely steep, highly dissected slopes of Holston Mountain, along the eastern border of the county. Slopes range from 5 to 80 percent.

This unit makes up about 7 percent of the county. It is about 35 percent Keener soils, 25 percent Ditney soils, 15 percent Cataska soils, and 25 percent soils of minor extent.

The moderately sloping to steep, very deep, well drained Keener soils are on foot slopes, on benches, and in coves on the mountain. The steep to extremely steep, moderately deep, well drained Ditney soils are on the ridgetops and upper side slopes of the mountain. The steep to extremely steep, shallow, excessively drained Cataska soils are on the lower side slopes of the mountain.

Of minor extent in this unit are the shallow, excessively drained Unicoi soils on side slopes; the very deep, well drained Shelocta, Brookshire, and Maymead soils in colluvial areas; and the very deep, well drained Lonon soils on foot slopes and toe slopes.

Most of this unit is wooded. A small acreage has been cleared and is used for wildlife food plots. The unit is well suited to woodland. The slope, the hazard of erosion, and the depth to bedrock are the major management concerns.

This unit is generally unsuited to agricultural and urban uses because of the slope and the depth to bedrock.

Detailed Soil Map Units

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

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

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

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

Soils of one series can differ in texture of the surface layer or of the substratum. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Bays silty clay loam, 12 to 20 percent slopes, eroded, is a phase of the Bays series.

Some map units are made up of two or more major soils. These map units are called soil complexes. A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Collegedale-Etowah complex, 5 to 12 percent slopes, eroded, is an example.

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

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

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

BaD2—Bays silty clay loam, 12 to 20 percent slopes, eroded. This soil is shallow, moderately steep, and well drained. It is on narrow ridges and long, convex side slopes on shale uplands in the Southern Appalachian Ridges and Valleys area in the western part of the county. Individual areas range from 50 to 200 acres in size. Slopes are smooth and convex.

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

Surface layer:

0 to 3 inches; dark grayish brown silty clay loam

Subsoil:

3 to 16 inches; strong brown channery silty clay loam

Substratum:

16 to 19 inches; strong brown very channery silty clay loam

Bedrock:

19 inches; partially weathered, fractured shale that has thin lenses of yellowish brown silty clay loam

In places the solum has a higher content of rock fragments. In some small areas, generally on very small north-facing slopes, the soil is 20 to 40 inches deep over shale.

Included with this soil in mapping are small areas of Bellamy, Bloomingdale, and Steadman soils, all of which are more than 60 inches deep over bedrock. Bellamy soils are on stream terraces. They make up about 5 percent of the unit. Bloomingdale soils are on flood plains and are poorly drained. They make up about 5 percent of the unit. Steadman soils are on flood plains and are moderately well drained. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Low
Organic matter content: Low
Natural fertility: High
Soil reaction: Strongly acid to moderately alkaline
Erosion hazard: Severe
Water table: None

Most areas are used as pasture, which supports tall fescue or orchardgrass and white clover. Some areas are wooded with northern red oak, chestnut oak, and Virginia pine. This soil is poorly suited to nearly all of the row crops and small grain crops commonly grown in the county. It is suited to hay and pasture. The hazard of erosion and the depth to bedrock are the major management concerns.

This soil is suited to woodland. The potential productivity is moderate. Seedling mortality and the hazard of windthrow are the major management concerns. The hazard of erosion and the equipment limitation are additional management concerns. Virginia pine, shortleaf pine, and eastern white pine are the best suited species.

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

The capability subclass is IVe.

BaE2—Bays silty clay loam, 20 to 35 percent slopes, eroded. This soil is shallow, steep, and well drained. It is on narrow ridges and long, convex side slopes on shale uplands in the Southern Appalachian Ridges and Valleys area in the western part of the county. Individual areas range from 50 to 200 acres in size. Slopes are smooth and convex.

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

Surface layer:
0 to 3 inches; dark grayish brown silty clay loam

Subsoil:
3 to 16 inches; strong brown channery silty clay loam

Substratum:
16 to 19 inches; strong brown very channery silty clay loam

Bedrock:
19 inches; partially weathered, fractured shale that has thin lenses of yellowish brown silty clay loam

In places the solum has a higher content of rock fragments. In some small areas, generally on very small north-facing slopes, the soil is 20 to 40 inches deep over shale.

Included with this soil in mapping are small areas of Bellamy and Steadman soils, both of which are more than 60 inches deep over bedrock. Bellamy soils are on stream terraces. They make up about 10 percent of the unit. Steadman soils are on flood plains and are moderately well drained. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Low
Organic matter content: Low
Soil reaction: Strongly acid to moderately alkaline
Erosion hazard: Severe
Water table: None

Most areas are used as pasture, which supports tall fescue or orchardgrass and white clover. Some areas are wooded with northern red oak, chestnut oak, and Virginia pine. This soil is unsuited to most agricultural uses. It is poorly suited to hay and pasture. The slope and the depth to bedrock are the major limitations.

This soil is suited to woodland. The potential productivity is moderate. Seedling mortality and the hazard of windthrow are the major management concerns. The hazard of erosion and the equipment limitation are additional management concerns. Virginia pine, shortleaf pine, and eastern white pine are the best suited species.

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

The capability subclass is VIe.

BaF2—Bays silty clay loam, 35 to 65 percent slopes, eroded. This soil is shallow, very steep, and well drained. It is on narrow ridges and long, convex side slopes on shale uplands in the Southern Appalachian Ridges and Valleys area in the western part of the county. Individual areas range from 150 to 200 acres in size. Slopes are smooth and convex.

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

Surface layer:
0 to 3 inches; dark grayish brown silty clay loam

Subsoil:
3 to 16 inches; strong brown channery silty clay loam

Substratum:
16 to 19 inches; strong brown very channery silty clay loam

Bedrock:
19 inches; partially weathered, fractured shale that has thin lenses of yellowish brown silty clay loam

In places the solum has a higher content of rock fragments. In some small areas, generally on very small north-facing slopes, the soil is 20 to 40 inches deep over shale.

Included with this soil in mapping are small areas of Bellamy and Steadman soils, both of which are more than 60 inches deep over bedrock. Bellamy soils are on stream terraces. They make up about 10 percent of the unit. Steadman soils are on flood plains and are moderately well drained. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Low
Organic matter content: Low
Soil reaction: Strongly acid to moderately alkaline
Erosion hazard: Severe
Water table: None

Most areas are used as pasture, which supports tall fescue or orchardgrass and white clover. Some areas are wooded with northern red oak, chestnut oak, and Virginia pine. This soil is unsuited to most agricultural uses. The slope and the depth to bedrock are the major limitations.

This soil is poorly suited to woodland. The potential productivity is low. The hazard of erosion, the equipment limitation, seedling mortality, and the hazard of windthrow are the major management concerns. Virginia pine, shortleaf pine, and eastern white pine are the best suited species.

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

The capability subclass is VIIe.

BeB—Bellamy loam, 2 to 5 percent slopes. This soil is very deep, gently sloping, and moderately well drained. It is on low stream terraces in the Southern Appalachian Ridges and Valleys area. Individual areas range from 5 to 20 acres in size. Slopes are smooth and convex.

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

Surface layer:
0 to 5 inches; dark yellowish brown loam

Subsurface layer:
5 to 10 inches; dark yellowish brown loam

Subsoil:
10 to 19 inches; brownish yellow loam
19 to 32 inches; brownish yellow loam (brittle in 40 to 60 percent of the layer)
32 to 41 inches; brownish yellow clay loam
41 to 54 inches; mottled light yellowish brown, gray, and yellowish red clay loam

Substratum:
54 to 72 inches; yellowish brown sandy clay loam

In some areas the subsoil does not have a brittle layer. In other areas the content of clay is uniform throughout the profile.

Included with this soil in mapping are small areas of Bays, Bloomingdale, and Steadman soils. Bays soils are on shale uplands. They are less than 20 inches deep over shale bedrock. They make up less than 5 percent of the unit. Bloomingdale soils are on flood plains and are poorly drained. They make up about 5 percent of the unit. Steadman soils are on flood plains and are moderately well drained. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderate in the surface layer and subsurface layer and in the lower part of the subsoil and moderately slow in the upper part of the subsoil
Available water capacity: High
Organic matter content: Low
Soil reaction: Very strongly acid to slightly acid
Erosion hazard: Moderate
Water table: Perched at a depth of 18 to 36 inches

Nearly all areas have been cleared. Most are used for pasture and hay. A few are used for row crops. This soil is well suited to most agricultural uses. It is unsuitable for deep-rooted crops, however, because of a moderately deep root zone and the brittle layer in the subsoil. Wetness is a limitation during periods of heavy rainfall.

This soil is suited to trees. The potential productivity is moderate. Plant competition is the major management concern. Yellow-poplar, eastern white pine, and northern red oak are the best suited species.

This soil is poorly suited to most urban uses. The wetness and the brittle layer in the subsoil are the major limitations.

The capability subclass is IIe.

Bm—Bloomingdale silty clay loam, 0 to 2 percent slopes, occasionally flooded. This soil is very deep, nearly level, and poorly drained. It is on flood plains in the Southern Appalachian Ridges and Valleys area. Individual 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 5 inches; dark brown silty clay loam

Subsoil:
5 to 17 inches; gray silty clay loam

Substratum:
17 to 60 inches; gray silty clay

Included with this soil in mapping are small areas of Bays, Bellamy, and Steadman soils. Bays soils are on shale uplands. They are less than 20 inches deep over shale bedrock. They make up less than 5 percent of the unit. Bellamy soils are on stream terraces. They have a brittle layer in the subsoil. They make up about 5 percent of the unit. Steadman soils are on flood plains and are moderately well drained. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Organic matter content: Low
Soil reaction: Medium acid to moderately alkaline
Erosion hazard: Slight
Water table: Apparent, within a depth of 12 inches

Nearly all areas have been cleared and are used for pasture, hay, or row crops. The row crops are grown in drained areas. This soil is poorly suited to most agricultural uses. Flooding and very slow runoff are the main management concerns.

This soil is suited to trees. The potential productivity is moderate. The equipment limitation, seedling mortality, and plant competition are the major management concerns. American sycamore, sweetgum, yellow-poplar, pin oak, and northern red oak are the best suited species.

This soil is poorly suited to most urban uses. The wetness and the flooding are the major management concerns.

The capability subclass is IIIw.

BrE—Brookshire silt loam, 20 to 35 percent slopes. This soil is very deep, steep, and well drained. It is on the side slopes of north- and east-facing coves on Holston Mountain. Individual areas are long and narrow. They range from 10 to 50 acres in size. Slopes are smooth and concave.

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 silt loam

Subsurface layer:
5 to 8 inches; dark yellowish brown silt loam

Subsoil:
8 to 53 inches; strong brown gravelly silt loam

Substratum:
53 to 65 inches; brownish yellow cobbly silt loam

In some areas at elevations of less than 3,400 feet, the surface layer is thinner and lighter colored. In some areas at elevations of more than 3,400 feet, the dark surface layer is more than 10 inches thick.

Included with this soil in mapping are small areas of soils that have more than 35 percent stones and cobbles on the surface and throughout the subsoil. These soils are in drainageways. They make up about 10 percent of the unit. Also included are Ditney and Cataska soils along the upper side slopes in convex areas. These soils make up about 10 percent of the unit. Ditney soils are sandier throughout than the Brookshire soil and are less than 40 inches deep over sandstone bedrock. Cataska soils are less than 20 inches deep over phyllite bedrock.

Important soil properties—

Permeability: Moderately rapid or rapid
Available water capacity: High
Organic matter content: Moderate
Soil reaction: Strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded, primarily with yellow-poplar, northern red oak, hemlock, and white oak. This soil is unsuited to most agricultural uses. The slope is the major limitation.

This soil is well suited to woodland. The potential productivity is high. The hazard of erosion, the equipment limitation, and plant competition are the major management concerns. Yellow-poplar, eastern white pine, black walnut, and northern red oak are the best suited species.

This soil is poorly suited to most urban uses. The slope is the major limitation.

The capability subclass is VIe.

BrF—Brookshire silt loam, 35 to 65 percent slopes. This soil is very deep, very steep, and well drained. It is on the side slopes of north- and east-facing coves on Holston Mountain. Individual areas are long and narrow. They range from 10 to 100 acres in size. Slopes are smooth and concave.

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 silt loam

Subsurface layer:
5 to 8 inches; dark yellowish brown silt loam

Subsoil:
8 to 53 inches; strong brown gravelly silt loam

Substratum:
53 to 65 inches; brownish yellow cobbly silt loam

In some areas at elevations of less than 3,400 feet, the surface layer is lighter colored. In some areas at elevations of more than 3,400 feet, the dark surface layer is more than 10 inches thick.

Included with this soil in mapping are small areas of soils that have more than 35 percent stones and cobbles on the surface and throughout the subsoil. These soils are in drainageways. They make up about 10 percent of the unit. Also included are Ditney and Cataska soils along the upper side slopes in convex areas. These soils make up about 10 percent of the unit. Ditney soils are sandier throughout than the Brookshire soil and are less than 40 inches deep over sandstone bedrock. Cataska soils are less than 20 inches deep over phyllite bedrock.

Important soil properties—

Permeability: Moderately rapid or rapid
Available water capacity: High
Organic matter content: Moderate
Soil reaction: Strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded, primarily with yellow-poplar, northern red oak, hemlock, and white oak. This soil is unsuited to most agricultural uses. The slope is the major limitation.

This soil is well suited to woodland. The potential productivity is high. The hazard of erosion and the equipment limitation are the major management concerns. Plant competition is an additional management concern. Yellow-poplar, eastern white pine, black walnut, and northern red oak are the best suited species.

This soil is poorly suited to most urban uses. The slope is the major limitation.

The capability subclass is VIIe.

CaE—Cataska channery silt loam, 20 to 35 percent slopes. This soil is shallow, steep, and excessively drained. It is on all aspects on the upper side slopes and ridges on Holston Mountain. Individual areas are long and wide or irregularly shaped. They range from 30 to more than 100 acres in size. Slopes are smooth and convex.

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

Surface layer:
0 to 1 inch; dark brown channery silt loam

Subsurface layer:
1 to 4 inches; yellowish brown channery silt loam

Subsoil:
4 to 18 inches; strong brown very channery silt loam

Bedrock:
18 to 24 inches; fractured and partially weathered phyllite that has strong brown silt loam in fractures

In some places the soil is deeper over hard bedrock. In other places the solum has less than 35 percent rock fragments. In some areas on the points of small spur ridges, the soil has a higher content of clay and has a yellowish red subsoil.

Included with this soil in mapping are small areas of Brookshire, Ditney, Shelocta, and Unicoi soils. Brookshire and Shelocta soils are in coves and slightly concave areas. They are deeper over bedrock than the Cataska soil. They make up about 5 percent of the unit. Ditney and Unicoi soils are on the higher slopes. They are underlain by sandstone. They make up about 10 percent of the unit.

Important soil properties—

Permeability: Moderately rapid or rapid
Available water capacity: Very low
Organic matter content: Low
Soil reaction: Strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded with chestnut oak, northern red oak, and pitch pine. Most areas have a dense understory of laurel and ivy. This soil is unsuited to most agricultural uses. The slope and the depth to bedrock are the major limitations.

This soil is poorly suited to woodland. The potential productivity is low. The hazard of windthrow is the major management concern. The equipment limitation, seedling mortality, and plant competition are additional management concerns. Pitch pine is the best suited species.

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

The capability subclass is VIIs.

CaF—Cataska channery silt loam, 35 to 50 percent slopes. This soil is shallow, very steep, and excessively drained. It is on the upper side slopes and ridges on Holston Mountain. Individual areas are long and wide or irregularly shaped. They range from 50 to several hundred acres in size. Slopes are smooth and convex.

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

Surface layer:
0 to 1 inch; dark brown channery silt loam

Subsurface layer:
1 to 4 inches; yellowish brown channery silt loam

Subsoil:
4 to 15 inches; strong brown very channery silt loam

Bedrock:
15 to 24 inches; fractured and partially weathered phyllite that has strong brown silt loam in fractures

In some places the soil is deeper over hard bedrock. In other places the solum has less than 35 percent rock fragments.

Included with this soil in mapping are small areas of Ditney, Unicoi, and Shelocta soils. Ditney and Unicoi soils are on the higher slopes. They have a higher content of sand throughout than the Cataska soil and are underlain by sandstone bedrock. They make up about 5 percent of the unit. Shelocta soils are in concave colluvial areas. They are deeper over bedrock than the Cataska soil. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderately rapid or rapid
Available water capacity: Very low
Organic matter content: Low
Soil reaction: Strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded with chestnut oak, northern red oak, and pitch pine. Most areas have a dense understory of laurel and ivy. This soil is unsuited to most agricultural uses. The slope and the depth to bedrock are the major limitations.

This soil is poorly suited to woodland. The potential productivity is low. The equipment limitation and the hazard of windthrow are the major management concerns. The hazard of erosion and seedling mortality are additional management concerns. Pitch pine is the best suited species.

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

The capability subclass is VIIs.

CaG—Cataska channery silt loam, 50 to 80 percent slopes. This soil is shallow, extremely steep, and excessively drained. It is on the upper side slopes and ridges on Holston Mountain. Individual areas are long and wide or irregularly shaped. They range from 100 to several hundred acres in size. Slopes are smooth and convex.

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

Surface layer:
0 to 1 inch; dark brown channery silt loam

Subsurface layer:
1 to 4 inches; yellowish brown channery silt loam

Subsoil:
4 to 12 inches; strong brown very channery silt loam

Bedrock:
12 to 20 inches; fractured and partially weathered phyllite that has strong brown silt loam in fractures

In some places the soil is shallower over hard bedrock. In other places the solum has less than 35 percent rock fragments.

Included with this soil in mapping are small areas of Ditney, Unicoi, and Shelocta soils. Ditney and Unicoi soils are on the higher slopes. They have a higher content of sand throughout than the Cataska soil and are underlain by sandstone bedrock. They make up about 5 percent of the unit. Shelocta soils are in concave colluvial areas. They are deeper over bedrock than the Cataska soil. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderately rapid or rapid
Available water capacity: Very low
Organic matter content: Low
Soil reaction: Strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded with chestnut oak, northern red oak, and pitch pine. Most areas have a dense understory of laurel and ivy. This soil is unsuited to most agricultural uses. The slope and the depth to bedrock are the major limitations.

This soil is poorly suited to woodland. The potential productivity is low. The equipment limitation and the hazard of windthrow are the major management concerns. Seedling mortality and plant competition are additional management concerns. Pitch pine is the best suited species.

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

The capability subclass is VIIs.

CcF—Cataska cobbly loam, 35 to 50 percent slopes. This soil is shallow, very steep, and excessively drained. It is on the upper side slopes and ridges on Holston Mountain. Individual areas are long and wide or irregularly shaped. They range from 20 to 100 acres in size. Slopes are smooth and convex.

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

Surface layer:
0 to 1 inch; dark brown cobbly loam

Subsurface layer:
1 to 4 inches; yellowish brown cobbly loam

Subsoil:
4 to 15 inches; strong brown shaly to very channery silt loam

Bedrock:
15 to 24 inches; fractured and partially weathered phyllite that has strong brown silt loam in fractures

In some places the soil is deeper over hard bedrock. In other places the solum has less than 35 percent rock fragments.

Included with this soil in mapping are small areas of Ditney, Unicoi, and Shelocta soils. Ditney and Unicoi soils are on the higher slopes. They have a higher content of sand throughout than the Cataska soil and are underlain by sandstone bedrock. They make up about 5 percent of the unit. Shelocta soils are in concave colluvial areas. They are deeper over bedrock than the Cataska soil. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderately rapid or rapid
Available water capacity: Very low
Organic matter content: Low
Soil reaction: Strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded with chestnut oak, northern red oak, and pitch pine. Most areas have a dense understory of laurel and ivy. This soil is unsuited to most agricultural uses. The slope and the depth to bedrock are the major limitations.

This soil is poorly suited to woodland. The potential productivity is low. The equipment limitation and the hazard of windthrow are the major management concerns. The hazard of erosion and seedling mortality are additional management concerns. Pitch pine is the best suited species.

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

The capability subclass is VIIs.

CeC2—Collegedale-Etowah complex, 5 to 12 percent slopes, eroded. These soils are very deep, strongly sloping, and well drained. They are on limestone uplands in the Southern Appalachian Ridges and Valleys area. The two soils occur as areas so closely intermingled that they could not be separated at the scale selected for mapping. Individual areas range from 5 to 30 acres in size. Slopes are smooth and convex in areas of the Collegedale soil and are smooth and concave in areas of the Etowah soil.

The Collegedale soil makes up about 55 percent of the unit. It makes up 45 to 60 percent of each mapped area.

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

Surface layer:
0 to 4 inches; strong brown silt loam

Subsoil:
4 to 50 inches; yellowish red clay
50 to 62 inches; mottled red, yellowish red, and brownish yellow silty clay

The Etowah soil makes up about 30 percent of the unit. It makes up 20 to 40 percent of each mapped area.

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

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

Subsurface layer:
7 to 14 inches; strong brown silty clay loam

Subsoil:
14 to 52 inches; yellowish red clay loam
52 to 65 inches; yellowish red silty clay loam

In some small concave areas, the solum has more than 15 percent rock fragments.

Included with these soils in mapping are Talbott soils at the base of the steeper slopes. These included soils are less than 40 inches deep over bedrock. Also included are areas of a gravelly soil in drainageways. Included soils make up about 15 percent of the unit.

Important soil properties—

Permeability: Collegedale—moderately slow; Etowah—moderate
Available water capacity: Collegedale—moderate; Etowah—high
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Moderate
Water table: None

Nearly all areas have been cleared and are used for pasture or row crops. Some areas are wooded, mainly with upland oaks.

The Collegedale soil is suited to nearly all of the row crops and small grain crops commonly grown in the county and to hay and pasture. The clayey subsoil restricts root growth and the movement of water and air through the soil. Erosion is a hazard in the steeper areas.

The Collegedale soil is poorly suited to most urban uses because of the clayey subsoil and the slope.

The Etowah soil is suited to all of the row crops and small grain crops commonly grown in the county. It is well suited to hay and pasture. Erosion is the major hazard.

The Etowah soil is suited to most urban uses. The slope is the major limitation.

Both soils are well suited to woodland. The potential productivity is high. Plant competition is the major management concern. The equipment limitation is an additional management concern. Black walnut, yellow-poplar, eastern white pine, and loblolly pine are the best suited species.

The capability subclass is IVe in areas of the Collegedale soil and IIIe in areas of the Etowah soil.

CeD3—Collegedale-Etowah complex, 12 to 20 percent slopes, severely eroded. These soils are very deep, moderately steep, and well drained. They are on limestone uplands in the Southern Appalachian Ridges and Valleys area. The two soils occur as areas so closely intermingled that they could not be separated at the scale selected for mapping. Individual areas range from 5 to 30 acres in size. Slopes are smooth and convex in areas of the Collegedale soil and are smooth and concave in areas of the Etowah soil.

The Collegedale soil makes up about 55 percent of the unit. It makes up 45 to 60 percent of each mapped area.

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

Surface layer:
0 to 4 inches; strong brown silty clay loam

Subsoil:
4 to 60 inches; yellowish red silty clay

The Etowah soil makes up about 30 percent of the unit. It makes up 20 to 40 percent of each mapped area.

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

Surface layer:
0 to 4 inches; brown silty clay loam

Subsoil:
4 to 50 inches; yellowish red silty clay loam
50 to 60 inches; yellowish red clay

In some small concave areas, the solum has more than 15 percent rock fragments.

Included with these soils in mapping are Talbott soils at the base of the steeper slopes. These included soils are less than 40 inches deep over bedrock. Also included are areas of a gravelly soil in drainageways. Included soils make up about 15 percent of the unit.

Important soil properties—

Permeability: Collegedale—moderately slow; Etowah—moderate
Available water capacity: Collegedale—moderate; Etowah—high
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

Nearly all areas have been cleared and are used for pasture or row crops. Some areas are wooded, mainly with upland oaks.

The Collegedale soil is unsuited to nearly all of the row crops and small grain crops commonly grown in the county. It is poorly suited to hay and pasture. The clayey subsoil restricts root growth and the movement of water and air through the soil. Erosion is the major hazard.

The Collegedale soil is poorly suited to most urban uses because of the clayey subsoil and the slope.

The Etowah soil is unsuited to most of the row crops and small grain crops commonly grown in the county. It is suited to hay and pasture. Erosion is the major hazard.

The Etowah soil is poorly suited to most urban uses. The slope is the major limitation.

Both soils are well suited to woodland. The potential productivity is high. The hazard of erosion, the equipment limitation, and plant competition are the major management concerns. Black walnut, yellow-poplar, eastern white pine, and loblolly pine are the best suited species.

The capability subclass is VIIe in areas of the Collegedale soil and VIe in areas of the Etowah soil.

CeE3—Collegedale-Etowah complex, 20 to 35 percent slopes, severely eroded. These soils are very deep, steep, and well drained. They are on limestone uplands in the Southern Appalachian Ridges and Valleys area. The two soils occur as areas so closely intermingled that they could not be separated at the scale selected for mapping. Individual areas range from 5 to 30 acres in size. Slopes are smooth and convex in areas of the Collegedale soil and are smooth and concave in areas of the Etowah soil.

The Collegedale soil makes up about 55 percent of the unit. It makes up 45 to 60 percent of each mapped area.

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

Surface layer:
0 to 4 inches; strong brown silty clay loam

Subsoil:
4 to 60 inches; yellowish red silty clay

The Etowah soil makes up about 30 percent of the unit. It makes up 20 to 40 percent of each mapped area.

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

Surface layer:
0 to 4 inches; brown silty clay loam

Subsoil:
4 to 50 inches; yellowish red silty clay loam
50 to 60 inches; yellowish red clay

In some small concave areas, the solum has more than 15 percent rock fragments.

Included with these soils in mapping are Talbott soils at the base of the steeper slopes. These included soils are less than 40 inches deep over bedrock. Also included are areas of a gravelly soil in drainageways. Included soils make up about 15 percent of the unit.

Important soil properties—

Permeability: Collegedale—moderately slow; Etowah—moderate
Available water capacity: Collegedale—moderate; Etowah—high
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

Nearly all areas have been cleared and are used as pasture. Some areas are wooded, mainly with upland oaks.

The Collegedale soil is unsuited to nearly all of the row crops and small grain crops commonly grown in the county. It is poorly suited to hay and pasture. The clayey subsoil restricts root growth and the movement of water and air through the soil. Erosion is the major hazard.

The Collegedale soil is poorly suited to most urban uses. The clayey subsoil and the slope are the major limitations.

The Etowah soil is generally unsuited to row crops, small grain, and hay. It is poorly suited to pasture. Erosion is the major hazard.

The Etowah soil is poorly suited to most urban uses. The slope is the major limitation.

Both soils are suited to woodland. The potential productivity is moderate. The hazard of erosion, the equipment limitation, and plant competition are the major management concerns. Black walnut, yellow-poplar, eastern white pine, and loblolly pine are the best suited species.

The capability subclass is VIIe in areas of the Collegedale soil and VIe in areas of the Etowah soil.

CuD—Collegedale-Urban land complex, 5 to 20 percent slopes. This map unit occurs as areas of a very deep, sloping to moderately steep, well drained Collegedale soil intermingled with areas of Urban land. The unit is on limestone uplands in the Southern Appalachian Ridges and Valleys area. The Collegedale soil and Urban land occur as areas so closely intermingled that they could not be separated at the scale selected for mapping. Individual areas range from 35 to 200 acres in size.

The Collegedale soil makes up about 40 percent of the unit. It makes up 30 to 50 percent of each mapped area.

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

Surface layer:
0 to 4 inches; strong brown silt loam

Subsoil:
4 to 50 inches; yellowish red clay
50 to 62 inches; mottled red, yellowish red, and brownish yellow silty clay

The Urban land is covered with streets, parking lots, sidewalks, buildings, and other structures. It makes up about 30 percent of the unit. It makes up 25 to 45 percent of each mapped area.

Disturbed areas in this unit have been excavated during the installation of utilities and cut and filled during grading and shaping activities. They have been so altered that individual soils cannot be identified. These areas vary so considerably that predictions cannot be made about their suitability for land uses without onsite investigation. They make up about 10 percent of the unit. They make up 10 to 15 percent of each mapped area.

In some small concave areas, the solum has more than 15 percent rock fragments.

Included in mapping are Talbott soils at the base of the steeper slopes. These soils are less than 40 inches deep over bedrock. Also included is a gravelly soil in drainageways. Included soils make up about 15 percent of the unit.

Important properties of the Collegedale soil—

Permeability: Moderately slow
Available water capacity: Moderate
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

The Collegedale soil is used for parks, building site development, lawns, and gardens. It is poorly suited to most urban uses. It is suited to lawns, gardens, trees, and shrubs. The clayey subsoil restricts root growth and the movement of water and air through the soil. The clayey subsoil and the slope are the major limitations affecting building site development. They can be overcome by good design and proper construction procedures.

This unit is not assigned to a land capability classification.

CuE—Collegedale-Urban land complex, 20 to 35 percent slopes. This map unit occurs as areas of a very deep, moderately steep or steep, well drained Collegedale soil intermingled with areas of Urban land. The unit is on limestone uplands in the Southern Appalachian Ridges and Valleys area. The Collegedale soil and Urban land occur as areas so closely intermingled that they could not be separated at the scale selected for mapping. Individual areas range from 35 to 200 acres in size.

The Collegedale soil makes up about 40 percent of the unit. It makes up 30 to 50 percent of each mapped area.

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

Surface layer:
0 to 4 inches; strong brown silt loam

Subsoil:
4 to 50 inches; yellowish red clay
50 to 62 inches; mottled red, yellowish red, and brownish yellow silty clay

The Urban land is covered with streets, parking lots, sidewalks, buildings, and other structures. It makes up about 30 percent of the unit. It makes up 25 to 45 percent of each mapped area.

Disturbed areas in this unit have been excavated during the installation of utilities and cut and filled during grading and shaping activities. They have been so altered that individual soils cannot be identified. These areas vary so considerably that predictions cannot be made about their suitability for land uses without onsite investigation. They make up about 10 percent of the unit. They make up 10 to 15 percent of each mapped area.

In some small concave areas, the solum has more than 15 percent rock fragments.

Included in mapping are Talbott soils at the base of the steeper slopes. These soils are less than 40 inches deep over bedrock. Also included is a gravelly soil in drainageways. Included soils make up about 15 percent of the unit.

Important properties of the Collegedale soil—

Permeability: Moderately slow
Available water capacity: Moderate
Organic matter content: Low
Natural fertility: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

The Collegedale soil is used for parks, building site development, lawns, and gardens. It is poorly suited to most urban uses. It is suited to lawns, gardens, trees, and shrubs. The clayey subsoil restricts root growth and the movement of water and air through the soil. The clayey subsoil and the slope are the major limitations affecting building site development. They can be overcome by good design and proper construction procedures.

This unit is not assigned to a land capability classification.

DtE—Ditney sandy loam, 20 to 35 percent slopes. This soil is moderately deep, steep, and well drained. It is on high crests and side slopes on Holston Mountain.

Individual areas are long and wide or narrow or are irregular in shape. They range from 10 to 75 acres in size. Slopes are smooth and convex.

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

Surface layer:
0 to 3 inches; dark grayish brown sandy loam

Subsurface layer:
3 to 7 inches; yellowish brown sandy loam

Subsoil:
7 to 24 inches; yellowish brown cobbly sandy loam

Bedrock:
24 to 27 inches; partially weathered and fractured sandstone

In some areas soft bedrock is within a depth of 40 inches.

Included with this soil in mapping are small areas of Unicoi, Cataska, and Maymead soils. Unicoi soils are on convex slopes. They have more than 35 percent rock fragments in the solum and are less than 20 inches deep over bedrock. They make up about 10 percent of the unit. Cataska soils are on the lower convex slopes. They have less sand throughout than the Ditney soil and are less than 20 inches deep over bedrock. They make up about 5 percent of the unit. Maymead soils are in concave colluvial areas. They are more than 40 inches deep over bedrock. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: Low
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded with upland oaks, maple, and Virginia pine. Most areas have a dense understory of laurel and ivy. This soil is unsuited to most agricultural uses. The slope and inaccessibility are the major limitations.

This soil is suited to woodland. The potential productivity is moderate. The equipment limitation and plant competition are the major management concerns. Shortleaf pine, Virginia pine, and eastern white pine are the best suited species.

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

The capability subclass is VIIe.

DtF—Ditney sandy loam, 35 to 50 percent slopes. This soil is moderately deep, very steep, and well drained. It is on high crests and side slopes on Holston Mountain. Individual areas are long and wide or narrow or are irregular in shape. They range from 10 to 75 acres in size. Slopes are smooth and convex.

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

Surface layer:
0 to 3 inches; dark grayish brown sandy loam

Subsurface layer:
3 to 7 inches; yellowish brown sandy loam

Subsoil:
7 to 24 inches; yellowish brown cobbly sandy loam

Bedrock:
24 to 27 inches; partially weathered and fractured sandstone

In some areas soft bedrock is within a depth of 40 inches.

Included with this soil in mapping are small areas of Unicoi, Cataska, and Maymead soils. Unicoi soils are on convex slopes. They have more than 35 percent rock fragments in the solum and are less than 20 inches deep over bedrock. They make up about 10 percent of the unit. Cataska soils are on the lower convex slopes. They have less sand throughout than the Ditney soil and are less than 20 inches deep over bedrock. They make up about 5 percent of the unit. Maymead soils are in concave colluvial areas. They are more than 40 inches deep over bedrock. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: Low
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded with upland oaks, maple, and Virginia pine. Most areas have a dense understory of laurel and ivy. This soil is unsuited to most agricultural uses. The slope and inaccessibility are the major limitations.

This soil is suited to woodland. The potential productivity is moderate. The equipment limitation is the major management concern. The hazard of erosion and plant competition are additional management concerns. Shortleaf pine, Virginia pine, and eastern white pine are the best suited species.

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

The capability subclass is VIIe.

DtG—Ditney sandy loam, 50 to 80 percent slopes. This soil is moderately deep, extremely steep, and well drained. It is on high crests and side slopes on Holston Mountain. Individual areas are long and wide or narrow or are irregular in shape. They range from 10 to 75 acres in size. Slopes are smooth and convex.

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

Surface layer:
0 to 3 inches; dark grayish brown sandy loam

Subsurface layer:
3 to 7 inches; yellowish brown sandy loam

Subsoil:
7 to 24 inches; yellowish brown cobbly sandy loam

Bedrock:
24 to 27 inches; partially weathered and fractured sandstone

In some areas soft bedrock is within a depth of 40 inches.

Included with this soil in mapping are small areas of Unicoi, Cataska, and Maymead soils. Unicoi soils are on convex slopes. They have more than 35 percent rock fragments in the solum and are less than 20 inches deep over bedrock. They make up about 10 percent of the unit. Cataska soils are on the lower convex slopes. They have less sand throughout than the Ditney soil and are less than 20 inches deep over bedrock. They make up about 5 percent of the unit. Maymead soils are in concave colluvial areas. They are more than 40 inches deep over bedrock. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: Low
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded with upland oaks, maple, and Virginia pine. Most areas have a dense understory of laurel and ivy. This soil is unsuited to most agricultural uses. The slope and inaccessibility are the major limitations.

This soil is poorly suited to woodland. The potential productivity is low. The equipment limitation is the major management concern. The hazard of erosion and plant competition are additional management concerns. Shortleaf pine, Virginia pine, and eastern white pine are the best suited species.

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

The capability subclass is VIIe.

HoB—Holston loam, 2 to 5 percent slopes. This soil is very deep, gently sloping, and well drained. It is on high stream terraces in the Southern Appalachian Ridges and Valleys area. Individual areas range from 5 to 15 acres in size. Slopes are smooth and convex.

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

Surface layer:
0 to 6 inches; brown loam

Subsurface layer:
6 to 10 inches; yellowish brown loam

Subsoil:
10 to 23 inches; yellowish brown loam
23 to 62 inches; strong brown clay loam

In some areas the solum has more clay. In other areas the soil is redder throughout.

Included with this soil in mapping are small areas of Etowah and Waynesboro soils. Etowah soils are in concave areas. They have less clay in the subsoil than the Holston soil. They make up about 5 percent of the unit. Waynesboro soils are in landscape positions similar to those of the Holston soil. They have more clay in the subsoil than the Holston soil and are redder throughout. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Moderate
Water table: None

Nearly all areas have been cleared and are used for pasture or row crops. Some areas are wooded, mainly with upland oaks. This soil is well suited to nearly all of the row crops and small grain crops commonly grown in the county and to hay and pasture.

This soil is well suited to woodland. The potential productivity is high. Plant competition is the major management concern. Black walnut, yellow-poplar, eastern white pine, and loblolly pine are the best suited species.

This soil is well suited to most urban uses.

The capability subclass is IIe.

HoC2—Holston loam, 5 to 12 percent slopes, eroded. This soil is very deep, strongly sloping, and well drained. It is on high stream terraces in the Southern Appalachian Ridges and Valleys area. Individual areas range from 5 to 15 acres in size. Slopes are smooth and convex.

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

Surface layer:
0 to 5 inches; brown loam

Subsurface layer:
5 to 10 inches; yellowish brown loam

Subsoil:
10 to 23 inches; yellowish brown loam
23 to 62 inches; strong brown clay loam

In some areas the solum has more clay. In other areas the soil is redder throughout.

Included with this soil in mapping are small areas of Etowah and Waynesboro soils. Etowah soils are in concave areas. They have less clay in the subsoil than the Holston soil. They make up about 5 percent of the unit. Waynesboro soils are in landscape positions similar to those of the Holston soil. They have more clay in the subsoil than the Holston soil and are redder throughout. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Moderate
Water table: None

Nearly all areas have been cleared and are used for pasture or row crops. Some areas are wooded, mainly with upland oaks. This soil is suited to nearly all of the row crops and small grain crops commonly grown in the county. It is suited to hay and is well suited to pasture.

This soil is well suited to woodland. The potential productivity is high. Plant competition is the major management concern. Black walnut, yellow-poplar, eastern white pine, and loblolly pine are the best suited species.

This soil is suited to most urban uses. The slope is the major limitation. It can be overcome by good design and proper construction procedures.

The capability subclass is IIIe.

HoD2—Holston loam, 12 to 20 percent slopes, eroded. This soil is very deep, moderately steep, and well drained. It is on high stream terraces in the Southern Appalachian Ridges and Valleys area. Individual areas range from 5 to 15 acres in size. Slopes are smooth and convex.

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

Surface layer:
0 to 5 inches; brown loam

Subsurface layer:
5 to 10 inches; yellowish brown loam

Subsoil:
10 to 23 inches; yellowish brown loam
23 to 62 inches; strong brown clay loam

In some areas the solum has more clay. In other areas the soil is redder throughout.

Included with this soil in mapping are small areas of Etowah and Waynesboro soils. Etowah soils are in concave areas. They have less clay in the subsoil than the Holston soil. They make up about 5 percent of the unit. Waynesboro soils are in landscape positions similar to those of the Holston soil. They have more clay in the subsoil than the Holston soil and are redder throughout. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

Nearly all areas have been cleared and are used for pasture or row crops. Some areas are wooded, mainly with upland oaks. This soil is poorly suited to nearly all of the row crops and small grain crops commonly grown in the county. It is suited to hay and pasture.

This soil is well suited to woodland. The potential productivity is high. The hazard of erosion, the equipment limitation, and plant competition are the major management concerns. Black walnut, yellow-poplar, eastern white pine, and loblolly pine are the best suited species.

This soil is suited to most urban uses. The slope is the major limitation. It can be overcome by good design and proper construction procedures.

The capability subclass is IVe.

HuC—Holston-Urban land complex, 2 to 12 percent slopes. This map unit occurs as areas of a very deep, gently sloping to strongly sloping, well drained Holston soil intermingled with areas of Urban land. The unit is on high stream terraces in the Southern Appalachian Ridges and Valleys area. The Holston soil and Urban land occur as areas so closely intermingled that they could not be separated at the scale selected for mapping. Individual areas range from 25 to 150 acres in size.

The Holston soil makes up about 40 percent of the unit. It makes up 30 to 50 percent of each mapped area.

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

Surface layer:
0 to 6 inches; brown loam

Subsurface layer:
6 to 10 inches; yellowish brown loam

Subsoil:
10 to 23 inches; yellowish brown loam
23 to 62 inches; strong brown clay loam

The Urban land is covered with streets, parking lots, sidewalks, buildings, and other structures. It makes up about 30 percent of the unit. It makes up 25 to 45 percent of each mapped area.

Disturbed areas in this unit have been excavated during the installation of utilities and cut and filled during grading and shaping activities. They have been so altered that individual soils cannot be identified. These areas vary so considerably that predictions cannot be made about their suitability for land uses without onsite investigation. They make up about 10 percent of the unit. They make up 10 to 15 percent of each mapped area.

Included in mapping are small areas of Etowah and Waynesboro soils. Etowah soils are in concave areas. They have less clay in the subsoil than the Holston soil. They make up about 5 percent of the unit. Waynesboro soils are in landscape positions similar to those of the Holston soil. They have more clay in the subsoil than the Holston soil and are redder throughout. They make up about 5 percent of the unit.

Important properties of the Holston soil—

Permeability: Moderate
Available water capacity: High
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Moderate
Water table: None

The Holston soil is used for parks, building site development, lawns, and gardens. It is suited to most urban uses. The slope is the major limitation. It can be overcome by good design and proper construction procedures.

This unit is not assigned to a land capability classification.

JeE—Jeffrey loam, 20 to 35 percent slopes. This soil is moderately deep, steep, and well drained. It is on north- and east-facing side slopes on Holston Mountain, in the areas between Holston High Knob and Holston High Point. Individual areas are long and narrow. They range from 10 to 30 acres in size. Slopes are generally smooth and convex.

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 loam

Subsurface layer:
7 to 9 inches; dark brown loam

Subsoil:
9 to 21 inches; brown gravelly loam

Substratum:
21 to 28 inches; yellowish brown cobbly fine sandy loam

Bedrock:
28 inches; tilted and fractured, hard metasandstone

In some places the surface layer is thinner and lighter colored. In other places the subsoil is silty. In some small areas the dark surface layer is more than 10 inches thick.

Included with this soil in mapping are small areas of Brookshire, Cataska, and Unicoi soils. Brookshire soils are in concave areas. They are more than 40 inches deep over bedrock. They make up about 5 percent of the unit. Cataska soils are on the lower slopes. They have more than 35 percent rock fragments and are less than 20 inches deep over soft phyllite bedrock. They make up about 5 percent of the unit. Unicoi soils are on the lower, extremely steep side slopes. They have more than 35 percent fragments of sandstone and are less than 20 inches deep over hard sandstone bedrock. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderate or moderately rapid
Available water capacity: Low
Organic matter content: Moderate
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded with northern red oak, hickory, and cherry. This soil is unsuited to most agricultural uses. The slope and the depth to bedrock are the major limitations.

This soil is suited to woodland. The potential productivity is moderate. Plant competition is the major management concern. The equipment limitation is an additional management concern. Eastern white pine is the best suited species.

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

The capability subclass is VIe.

JeF—Jeffrey loam, 35 to 50 percent slopes. This soil is moderately deep, very steep, and well drained. It is on north- and east-facing side slopes on Holston Mountain, in the areas between Holston High Knob and Holston High Point. Individual areas are long and narrow. They range from 10 to 30 acres in size. Slopes are generally smooth and convex.

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 loam

Subsurface layer:
7 to 9 inches; dark brown loam

Subsoil:
9 to 21 inches; brown gravelly loam

Substratum:
21 to 28 inches; yellowish brown cobbly fine sandy loam

Bedrock:
28 inches; tilted and fractured metasandstone

In some places the surface layer is thinner and lighter colored. In other places the subsoil is silty. In some small areas the dark surface layer is more than 10 inches thick.

Included with this soil in mapping are small areas of Brookshire, Cataska, and Unicoi soils. Brookshire soils are in concave areas. They are more than 40 inches deep over bedrock. They make up about 5 percent of the unit. Cataska soils are on the lower slopes. They have more than 35 percent rock fragments and are less than 20 inches deep over soft phyllite bedrock. They make up about 5 percent of the unit. Unicoi soils are on the lower, extremely steep side slopes. They have more than 35 percent fragments of sandstone and are less than 20 inches deep over hard sandstone bedrock. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderate or moderately rapid
Available water capacity: Low
Organic matter content: Moderate
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded with northern red oak, hickory, and cherry. They have a dense understory of rhododendron. This soil is unsuited to most agricultural uses. The slope and the depth to bedrock are the major limitations.

This soil is suited to woodland. The potential productivity is moderate. The equipment limitation is the major management concern. The hazard of erosion and plant competition are additional management concerns. Eastern white pine is the best suited species.

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

The capability subclass is VIIe.

JuC—Junaluska loam, 5 to 12 percent slopes. This soil is moderately deep, strongly sloping, and well drained. It is on outlier ridges of Holston Mountain. Individual areas are long and wide or are irregular in shape. They range from 10 to 50 acres in size. Slopes are smooth and convex.

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

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

Subsurface layer:
2 to 6 inches; strong brown loam

Subsoil:
6 to 10 inches; strong brown loam
10 to 27 inches; yellowish red clay loam

Bedrock:
27 inches; soft sandstone

In some areas the soil has less sand in the subsoil and is underlain by phyllite.

Included with this soil in mapping are small areas of Keener soils. These soils are on colluvial fans. They are more than 60 inches deep over bedrock. They make up about 10 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Low
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Moderate
Water table: None

All areas are wooded, dominantly with northern red oak and chestnut oak. This soil is poorly suited to row crops and hay. It is suited to pasture. Erosion is the major hazard.

This soil is suited to woodland. The potential productivity is moderate. The hazard of windthrow and plant competition are the major management concerns. Eastern white pine and shortleaf pine are the best suited species.

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

The capability subclass is IVe.

JuD—Junaluska loam, 12 to 20 percent slopes. This soil is moderately deep, moderately steep, and well drained. It is on outlier ridges of Holston Mountain. Individual areas are long and wide or are irregular in shape. They range from 10 to 50 acres in size. Slopes are smooth and convex.

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

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

Subsurface layer:
2 to 6 inches; strong brown loam

Subsoil:
6 to 10 inches; strong brown loam
10 to 27 inches; yellowish red clay loam

Bedrock:
27 inches; soft sandstone

In some areas the soil has less sand in the subsoil and is underlain by phyllite.

Included with this soil in mapping are small areas of Keener, Unicoi, and Montevallo soils. Keener soils are on colluvial fans. They are more than 60 inches deep over bedrock. They make up about 5 percent of the unit. Unicoi soils are on the higher, extremely steep mountain side slopes. They are less than 20 inches deep over sandstone bedrock. They make up about 5 percent of the unit. Montevallo soils are on the lower slopes. They are less than 20 inches deep over shale bedrock. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Low
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded, dominantly with northern red oak and chestnut oak. This soil is unsuited to most agricultural uses, but it is suited to pasture. The slope and the depth to bedrock are the major limitations.

This soil is suited to woodland. The potential productivity is moderate. The hazard of erosion, the equipment limitation, seedling mortality, the hazard of windthrow, and plant competition are the major management concerns. Eastern white pine and shortleaf pine are the best suited species.

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

The capability subclass is VIe.

JuE—Junaluska loam, 20 to 35 percent slopes. This soil is moderately deep, steep, and well drained. It is on outlier ridges of Holston Mountain. Individual areas are long and narrow or are irregular in shape. They range from 10 to 25 acres in size. Slopes are smooth and convex.

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

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

Subsurface layer:
2 to 6 inches; strong brown loam

Subsoil:
6 to 10 inches; strong brown loam
10 to 27 inches; yellowish red clay loam

Bedrock:
27 inches; soft sandstone

In some areas the soil has less sand in the subsoil and is underlain by phyllite.

Included with this soil in mapping are small areas of Keener, Unicoi, and Montevallo soils. Keener soils are on the lower slopes. They are more than 60 inches deep over bedrock. They make up about 5 percent of the unit. Unicoi soils are on the higher, extremely steep mountain side slopes. They are less than 20 inches deep over sandstone bedrock. They make up about 5 percent of the unit. Montevallo soils are on the lower slopes. They are less than 20 inches deep over shale bedrock. They make up about 15 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Low
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded, dominantly with northern red oak and chestnut oak. This soil is unsuited to most agricultural uses. The slope and the depth to bedrock are the major limitations.

This soil is suited to woodland. The potential productivity is moderate. The hazard of erosion, the equipment limitation, seedling mortality, the hazard of windthrow, and plant competition are the major management concerns. Eastern white pine and shortleaf pine are the best suited species.

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

The capability subclass is VIIe.

KeC—Keener gravelly fine sandy loam, 5 to 12 percent slopes, cobbly. This soil is very deep, strongly sloping, and well drained. It is on colluvial fans, benches, and foot slopes and in coves on Holston Mountain. Individual areas range from 10 to 30 acres in size. Slopes are smooth and concave.

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

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

Subsurface layer:
3 to 10 inches; yellowish brown gravelly loam

Subsoil:
10 to 23 inches; yellowish brown loam
23 to 36 inches; strong brown cobbly clay loam
36 to 50 inches; strong brown cobbly sandy clay loam
50 to 63 inches; strong brown very cobbly sandy clay loam

In some areas the solum has less sand. In other areas the soil has no horizon of clay accumulation.

Included with this soil in mapping are small areas of Ditney, Unicoi, and Junaluska soils. Ditney and Unicoi soils are on the higher slopes. They are less than 40 inches deep over bedrock. They make up about 10 percent of the unit. Junaluska soils are on slopes having outliers of the mountain. They are less than 40 inches deep over bedrock. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Organic matter content: Low
Soil reaction: Extremely acid to medium acid
Erosion hazard: Moderate
Water table: None

Nearly all areas are wooded, mainly with yellow-poplar, upland oaks, and eastern white pine. A few small areas have been clearcut and are used for wildlife food plots. This soil is suited to nearly all of the row crops and small grain crops commonly grown in the county. It is suited to hay and well suited to pasture. Erosion is the major hazard.

This soil is well suited to woodland. The potential productivity is high. Plant competition is the major management concern. Black walnut, yellow-poplar, eastern white pine, and loblolly pine are the best suited species.

This soil is poorly suited to most urban uses. The slope is the major limitation.

The capability subclass is IIIs.

KeD—Keener gravelly fine sandy loam, 12 to 20 percent slopes, cobbly. This soil is very deep, moderately steep, and well drained. It is on colluvial fans, benches, and foot slopes and in coves on Holston Mountain. Individual areas range from 10 to 50 acres in size. Slopes are smooth and concave.

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

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

Subsurface layer:
3 to 10 inches; yellowish brown loam

Subsoil:
10 to 23 inches; yellowish brown loam
23 to 36 inches; strong brown cobbly clay loam
36 to 50 inches; strong brown cobbly sandy clay loam
50 to 63 inches; strong brown very cobbly sandy clay loam

In some areas the solum has less sand. In other areas the soil has no horizon of clay accumulation.

Included with this soil in mapping are small areas of Ditney, Unicoi, and Junaluska soils. Ditney and Unicoi soils are on the higher slopes. They are less than 40 inches deep over bedrock. They make up about 10 percent of the unit. Junaluska soils are on slopes having outliers of the mountain. They are less than 40 inches deep over bedrock. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Organic matter content: Low
Soil reaction: Extremely acid to medium acid
Erosion hazard: Severe
Water table: None

Nearly all areas are wooded, mainly with yellow-poplar, upland oaks, and eastern white pine. A few small areas have been clearcut and are used for wildlife food plots. This soil is poorly suited to nearly all of the row crops and small grain crops commonly grown in the county. It is poorly suited to hay but is suited to pasture. Erosion is the major hazard.

This soil is well suited to woodland. The potential productivity is high. The hazard of erosion, the equipment limitation, and plant competition are the major management concerns. Black walnut, yellow-poplar, eastern white pine, and loblolly pine are the best suited species.

This soil is poorly suited to most urban uses. The slope is the major limitation.

The capability subclass is IVs.

KeE—Keener gravelly fine sandy loam, 20 to 35 percent slopes, cobbly. This soil is very deep, steep, and well drained. It is on colluvial fans, benches, and foot slopes and in coves on Holston Mountain. Individual areas range from 10 to 25 acres in size. Slopes are smooth and concave.

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

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

Subsurface layer:
3 to 10 inches; yellowish brown loam

Subsoil:
10 to 23 inches; yellowish brown loam
23 to 36 inches; strong brown cobbly clay loam
36 to 50 inches; strong brown cobbly sandy clay loam
50 to 63 inches; strong brown very cobbly sandy clay loam

In some areas the solum has less sand. In other areas the soil has no horizon of clay accumulation.

Included with this soil in mapping are small areas of Ditney and Unicoi soils. These soils are on the higher slopes. They are less than 40 inches deep over bedrock. They make up about 10 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Organic matter content: Low
Soil reaction: Extremely acid to medium acid
Erosion hazard: Severe
Water table: None

All areas are wooded with yellow-poplar, upland oaks, and eastern white pine. This soil is unsuited to most agricultural uses. The slope is the major limitation.

This soil is well suited to woodland. The potential productivity is high. The hazard of erosion, the equipment limitation, and seedling mortality are the major management concerns. Black walnut, yellow-poplar, eastern white pine, and loblolly pine are the best suited species.

This soil is poorly suited to most urban uses. The slope is the major limitation.

The capability subclass is VIs.

LoD—Lonon loam, 12 to 20 percent slopes. This soil is very deep, moderately steep, and well drained. It is on foot slopes and benches on Holston Mountain and extends into the adjoining ridges and valleys. Individual areas are long and narrow. They range from 10 to 45 acres in size. Slopes are smooth or complex and slightly concave.

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

Surface layer:
0 to 2 inches; dark brown loam

Subsurface layer:
2 to 6 inches; yellowish brown loam

Subsoil:
6 to 50 inches; yellowish red cobbly loam
50 to 65 inches; red very cobbly loam

In some areas the soil is browner throughout. In other areas it has a higher content of sand.

Included with this soil in mapping are small areas of Junaluska and Montevallo soils. Junaluska soils are in convex areas, mainly on the points of ridges. They weathered in place and are less than 40 inches deep over bedrock. They make up about 3 percent of the unit. Montevallo soils are on the steep to extremely steep side slopes of stream valleys that dissect the unit. They have a solum that is less than 20 inches thick. They make up about 4 percent of the unit. Also included are small areas of soils that have more than 35 percent rock fragments in the subsoil. These soils are in the slightly more convex areas. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded with upland oaks, primarily northern red oak and chestnut oak. This soil is unsuited to most agricultural uses, but it is suited to hay and pasture. Erosion is the major hazard.

This soil is well suited to woodland. The potential productivity is high, especially in areas close to the mountains where cooler temperatures prevail and there is more available moisture. The long, narrow areas that extend into the adjoining valleys have warmer temperatures and less available moisture, both of which slightly affect production. The hazard of erosion, the equipment limitation, and plant competition are the major management concerns. Yellow-poplar, eastern white pine, and Virginia pine are the best suited species.

This soil is poorly suited to most urban uses. The slope is the major limitation.

The capability subclass is VIe.

MaD—Maymead loam, 12 to 20 percent slopes. This soil is very deep, moderately steep, and well drained. It is in coves and on colluvial benches on Holston Mountain. Individual areas are long and narrow. They range from 10 to 30 acres in size. Slopes are smooth and concave.

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

Surface layer:
0 to 1 inch; dark brown loam

Subsurface layer:
1 to 4 inches; dark yellowish brown loam

Subsoil:
4 to 12 inches; yellowish brown loam
12 to 45 inches; yellowish brown very cobbly loam

Substratum:
45 to 63 inches; yellowish brown extremely cobbly loam

In some areas the surface layer is thicker and darker. In other areas sandstone cobbles cover about 15 percent of the surface.

Included with this soil in mapping are small areas of Keener and Ditney soils. Keener soils are in the lower areas. They have a horizon of clay accumulation. They make up about 5 percent of the unit. Ditney soils are on the higher slopes. They are less than 40 inches deep over bedrock. They make up about 5 percent of the unit. Also included are some small, narrow areas of rubble consisting mainly of stones and boulders. These areas are in drainageways in the coves.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: High
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded, primarily with yellow-poplar, upland oaks, and hemlock. This soil is poorly suited to most agricultural uses, but it is suited to hay and pasture. Erosion is the major hazard.

This soil is well suited to woodland. The potential productivity is high. Plant competition is the major management concern. The hazard of erosion and the equipment limitation are additional management concerns. Yellow-poplar, eastern white pine, black walnut, and northern red oak are the best suited species.

This soil is poorly suited to most urban uses. The slope is the major limitation.

The capability subclass is IVe.

MaE—Maymead loam, 20 to 35 percent slopes. This soil is very deep, steep, and well drained. It is in coves and on colluvial benches on Holston Mountain. Individual areas are long and narrow. They range from 10 to 30 acres in size. Slopes are smooth and concave.

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

Surface layer:
0 to 1 inch; dark brown loam

Subsurface layer:
1 to 4 inches; dark yellowish brown loam

Subsoil:
4 to 12 inches; yellowish brown loam
12 to 45 inches; yellowish brown very cobbly loam

Substratum:
45 to 63 inches; yellowish brown extremely cobbly loam

In some areas the surface layer is thicker and darker. In other areas sandstone cobbles cover about 15 percent of the surface.

Included with this soil in mapping are small areas of Keener and Ditney soils. Keener soils are in the lower areas. They have a horizon of clay accumulation. They make up about 5 percent of the unit. Ditney soils are on the higher slopes. They are less than 40 inches deep over bedrock. They make up about 5 percent of the unit. Also included are some small, narrow areas of rubble consisting mainly of stones and boulders. These areas are in drainageways in the coves.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: High
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded, primarily with yellow-poplar, upland oaks, and hemlock. This soil is unsuited to most agricultural uses. It is poorly suited to hay and pasture. Erosion is the major hazard.

This soil is well suited to woodland. The potential productivity is high. Plant competition is the major management concern. The hazard of erosion and the equipment limitation are additional management concerns. Yellow-poplar, eastern white pine, black walnut, and northern red oak are the best suited species.

This soil is poorly suited to most urban uses. The slope is the major limitation.

The capability subclass is VIe.

MaF—Maymead loam, 35 to 50 percent slopes. This soil is very deep, very steep, and well drained. It is in coves and on colluvial benches on Holston Mountain. Individual areas are long and narrow. They range from 10 to 30 acres in size. Slopes are smooth and concave.

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

Surface layer:
0 to 1 inch; dark brown loam

Subsurface layer:
1 to 4 inches; dark yellowish brown loam

Subsoil:
4 to 12 inches; yellowish brown loam
12 to 45 inches; yellowish brown very cobbly loam

Substratum:
45 to 63 inches; yellowish brown extremely cobbly loam

In some areas the surface layer is thicker and darker. In other areas sandstone cobbles cover about 15 percent of the surface.

Included with this soil in mapping are small areas of Keener and Ditney soils. Keener soils are in the lower areas. They have a horizon of clay accumulation. They make up about 5 percent of the unit. Ditney soils are on the higher slopes. They are less than 40 inches deep over bedrock. They make up about 5 percent of the unit. Also included are some small, narrow areas of rubble consisting mainly of stones and boulders. These areas are in drainageways in the coves.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: High
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded, primarily with yellow-poplar, upland oaks, and hemlock. This soil is unsuited to most agricultural uses. Erosion is the major hazard.

This soil is suited to woodland. The potential productivity is high. The hazard of erosion and the equipment limitation are the major management concerns. Plant competition is an additional management concern. Yellow-poplar, eastern white pine, black walnut, and northern red oak are the best suited species.

This soil is poorly suited to most urban uses. The slope is the major limitation.

The capability subclass is VIIe.

MoD—Montevallo channery silt loam, 12 to 20 percent slopes. This soil is shallow, moderately steep, and well drained. It is on narrow ridges and long, convex side slopes on shale uplands in the Southern Appalachian Ridges and Valleys area. Individual areas range from 50 to 200 acres in size. Slopes are smooth and convex.

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

Surface layer:
0 to 3 inches; dark brown channery silt loam

Subsurface layer:
3 to 5 inches; yellowish brown channery silt loam

Subsoil:
5 to 16 inches; yellowish brown very channery silt loam

Bedrock:
16 inches; partially weathered, fractured shale that has thin lenses of yellowish brown silt loam in fractures

In some areas the solum has fewer rock fragments. In other areas the silty clay loam in the subsoil is intermittent.

Included with this soil in mapping are small areas of Keener and Shelocta soils close to Holston Mountain and small areas of soils that have a clayey subsoil, are less than 40 inches deep over shale, and are in the valleys. Keener soils are on colluvial fans. They are more than 60 inches deep over bedrock. They make up about 10 percent of the unit. Shelocta soils are on colluvial side slopes. They have fewer rock fragments in the solum than the Montevallo soil and are more than 60 inches deep over bedrock. They make up about 5 percent of the unit.

Important soil properties—

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

Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded with northern red oak, chestnut oak, and Virginia pine. This soil is unsuited to most agricultural uses, but it is suited to hay and pasture. The hazard of erosion and the depth to bedrock are the major management concerns.

This soil is suited to woodland. The potential productivity is moderate. Seedling mortality and the hazard of windthrow are the major management concerns. The hazard of erosion is an additional management concern. Virginia pine, shortleaf pine, and eastern white pine are the best suited species.

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

The capability subclass is VIIe.

MoE—Montevallo channery silt loam, 20 to 35 percent slopes. This soil is shallow, steep, and well drained. It is on narrow ridges and long, convex side slopes on shale uplands in the Southern Appalachian Ridges and Valleys area. Individual areas range from 100 to 200 acres in size. Slopes are smooth and convex.

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

Surface layer:
0 to 3 inches; dark brown channery silt loam

Subsurface layer:
3 to 5 inches; yellowish brown channery silt loam

Subsoil:
5 to 16 inches; yellowish brown very channery silt loam

Bedrock:
16 inches; partially weathered, fractured shale that has thin lenses of yellowish brown silt loam in fractures

In some areas the solum has fewer rock fragments. In other areas the silty clay loam in the subsoil is intermittent.

Included with this soil in mapping are small areas of Keener and Shelocta soils close to Holston Mountain and small areas of Collegedale and Etowah soils. Keener soils are on colluvial fans. They are more than 60 inches deep over bedrock. They make up about 10 percent of the unit. Shelocta soils are on colluvial side slopes. They have fewer rock fragments in the solum than the Montevallo soil and are more than 60 inches deep over bedrock. They make up about 5 percent of the unit. Collegedale soils are on the lower side slopes of the ridges in the valleys. They are more than 60 inches deep over bedrock. They make up about 10 percent of the unit. Etowah soils are on limestone uplands. They are more than 60 inches deep over bedrock. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Very low
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded with northern red oak, chestnut oak, and Virginia pine. This soil is unsuited to most agricultural uses. It is poorly suited to hay but is suited to pasture. The slope and the depth to bedrock are the major limitations.

This soil is suited to woodland. The potential productivity is low. Erosion is the major hazard. The equipment limitation, seedling mortality, and the hazard of windthrow are additional management concerns. Virginia pine, shortleaf pine, and eastern white pine are the best suited species.

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

The capability subclass is VIIe.

MoF—Montevallo channery silt loam, 35 to 50 percent slopes. This soil is shallow, very steep, and well drained. It is on narrow ridges and long, convex side slopes on shale uplands in the Southern Appalachian Ridges and Valleys area. Individual areas range from 150 to 200 acres in size. Slopes are smooth and convex.

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

Surface layer:
0 to 3 inches; dark brown channery silt loam

Subsurface layer:
3 to 5 inches; yellowish brown channery silt loam

Subsoil:
5 to 16 inches; yellowish brown very channery silt loam

Bedrock:
16 inches; partially weathered, fractured shale that has thin lenses of yellowish brown silt loam in fractures

In some areas the solum has fewer rock fragments. In other areas the silty clay loam in the subsoil is intermittent.

Included with this soil in mapping are small areas of Keener and Shelocta soils close to Holston Mountain and small areas of Collegedale and Etowah soils. Keener soils are on colluvial fans. They are more than 60 inches deep over bedrock. They make up about 10 percent of the unit. Shelocta soils are on colluvial side slopes. They have fewer rock fragments in the solum than the Montevallo soil and are more than 60 inches deep over bedrock. They make up about 5 percent of the unit. Collegedale soils are on the lower side slopes of ridges in the valleys. They are more than 60 inches deep over interbedded shale and limestone bedrock. They make up about 15 percent of the unit. Etowah soils are on uplands. They are more than 60 inches deep over bedrock. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Very low
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded with northern red oak, chestnut oak, and Virginia pine. This soil is unsuited to most agricultural uses. The slope and the depth to bedrock are the major limitations.

This soil is poorly suited to woodland. The potential productivity is low. The hazard of erosion, the equipment limitation, and seedling mortality are the major management concerns. The hazard of windthrow is an additional management concern. Virginia pine, shortleaf pine, and eastern white pine are the best suited species.

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

The capability subclass is VIIe.

MoG—Montevallo channery silt loam, 50 to 80 percent slopes. This soil is shallow, extremely steep, and well drained. It is on narrow ridges and long, convex side slopes on shale uplands in the Southern Appalachian Ridges and Valleys area. Individual areas range from 150 to 300 acres in size. Slopes are smooth and convex.

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

Surface layer:
0 to 3 inches; dark brown channery silt loam

Subsurface layer:
3 to 5 inches; yellowish brown channery silt loam

Subsoil:
5 to 16 inches; yellowish brown very channery silt loam

Bedrock:
16 inches; partially weathered, fractured shale that has thin lenses of yellowish brown silt loam in fractures

In some areas the solum has fewer rock fragments. In other areas the silty clay loam in the subsoil is intermittent.

Included with this soil in mapping are small areas of Keener and Shelocta soils. Keener soils are on colluvial fans. They are more than 60 inches deep over bedrock. They make up about 10 percent of the unit. Shelocta soils are on colluvial side slopes. They have fewer rock fragments in the solum than the Montevallo soil and are more than 60 inches deep over bedrock. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Very low
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded with northern red oak, chestnut oak, and Virginia pine. This soil is unsuited to most agricultural uses. The slope and the depth to bedrock are the major limitations.

This soil is poorly suited to woodland. The potential productivity is low. The hazard of erosion, the equipment limitation, and seedling mortality are the major management concerns. The hazard of windthrow is an additional management concern. Virginia pine, shortleaf pine, and eastern white pine are the best suited species.

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

The capability subclass is VIIe.

Pt—Pettyjon loam, 0 to 2 percent slopes, rarely flooded. This soil is very deep, nearly level, and well drained. It is on flood plains in the Southern Appalachian Ridges and Valleys area. Individual areas range from 5 to 15 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 loam

Subsoil:
6 to 44 inches; dark yellowish brown silt loam and loam

Substratum:
44 to 57 inches; dark brown fine sandy loam
57 to 64 inches; mottled gray, dark gray, dark yellowish brown, and yellowish brown fine sandy loam

Included with this soil in mapping are small areas of Bellamy and Steadman soils. Bellamy soils are on stream terraces and are moderately well drained. They have a brittle layer in the subsoil. They make up less than 5 percent of the unit. Steadman soils are on flood plains and are moderately well drained. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Organic matter content: Low
Soil reaction: Neutral or mildly alkaline
Erosion hazard: Slight
Water table: None

Nearly all areas have been cleared and are used for row crops, pasture, or hay. This soil is well suited to most agricultural uses.

This soil is well suited to woodland. The potential productivity is high. Plant competition is the major management concern. Yellow-poplar, black walnut, and northern red oak are the best suited species.

This soil is suited to most urban uses. The flooding is the major hazard.

The capability class is I.

SaE—Shelocta silt loam, 20 to 35 percent slopes. This soil is deep and very deep, steep, and well drained. It is in mountain coves and on benches and foot slopes in the uplands, dominantly in the eastern part of the county. Individual areas range from 10 to 20 acres in size. Slopes are smooth and concave.

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

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

Subsurface layer:
2 to 4 inches; yellowish brown silt loam

Subsoil:
4 to 24 inches; yellowish brown silt loam
24 to 65 inches; strong brown channery silty clay loam

In some areas the surface layer is thicker and darker. In other areas the solum has more shale fragments.

Included with this soil in mapping are small areas of Cataska and Montevallo soils, both of which are less than 20 inches deep over bedrock. Cataska soils are in the mountains. They make up about 4 percent of the unit. Montevallo soils are on shale uplands. They make up about 4 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded with poplar and upland oaks. This soil is unsuited to most agricultural uses. It is poorly suited to hay but is suited to pasture. The slope is the major limitation.

This soil is well suited to woodland. The potential productivity is high. Plant competition is the major management concern. The hazard of erosion and the equipment limitation are additional management concerns. Yellow-poplar, eastern white pine, black walnut, and northern red oak are the best suited species.

This soil is poorly suited to most urban uses. The slope is the major limitation.

The capability subclass is VIe.

SaF—Shelocta silt loam, 35 to 50 percent slopes. This soil is deep and very deep, very steep, and well drained. It is in mountain coves and on benches and foot slopes in the uplands, dominantly in the eastern part of the county. Individual areas range from 10 to 20 acres in size. Slopes are smooth and concave.

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

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

Subsurface layer:
2 to 4 inches; yellowish brown silt loam

Subsoil:
4 to 24 inches; yellowish brown silt loam
24 to 65 inches; strong brown channery silty clay loam

In some areas the surface layer is thicker and darker. In other areas the solum has more shale fragments.

Included with this soil in mapping are small areas of Cataska and Montevallo soils, both of which are less than 20 inches deep over bedrock. Cataska soils are in the mountains. They make up about 4 percent of the unit. Montevallo soils are in the uplands. They make up about 4 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded with poplar and upland oaks. This soil is unsuited to most agricultural uses. The slope is the major limitation.

This soil is well suited to woodland. The potential productivity is high. The hazard of erosion, the equipment limitation, and plant competition are the major management concerns. Yellow-poplar, eastern white pine, black walnut, and northern red oak are the best suited species.

This soil is poorly suited to most urban uses. The slope is the major limitation.

The capability subclass is VIIe.

ShF—Shelocta loam, 35 to 50 percent slopes. This soil is deep, very steep, and well drained. It is at the head of mountain coves, on convex colluvial side slopes, and on benches at elevations of more than 3,200 feet, dominantly in the eastern part of the county. Individual areas range from 10 to 20 acres in size. Slopes are smooth and concave.

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

Surface layer:
0 to 2 inches; dark brown loam

Subsurface layer:
2 to 4 inches; yellowish brown loam

Subsoil:
4 to 8 inches; dark yellowish brown gravelly silt loam
8 to 23 inches; yellowish brown gravelly silt loam
23 to 50 inches; yellowish brown very gravelly silt loam

Bedrock:
50 inches; fractured and tilted phyllite

In some places the surface layer is thicker and darker. In other places the solum has a higher content of rock fragments.

Included with this soil in mapping are small areas of Cataska, Ditney, and Unicoi soils. Cataska and Unicoi soils are in the mountains. They are less than 20 inches deep over bedrock. They make up about 4 percent of the unit. Ditney soils are on the higher slopes. They are less than 40 inches deep over bedrock. They make up about 4 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded with maple and upland oaks. This soil is unsuited to most agricultural uses. The slope is the major limitation.

This soil is poorly suited to woodland. The potential productivity is low. The hazard of erosion, the equipment limitation, and plant competition are the major management concerns. Maple, pitch pine, scarlet oak, and chestnut oak are the best suited species.

This soil is poorly suited to most urban uses. The slope is the major limitation.

The capability subclass is VIIe.

St—Steadman silt loam, 0 to 2 percent slopes, occasionally flooded. This soil is very deep, nearly level, and moderately well drained. It is on flood plains in the Southern Appalachian Ridges and Valleys area. Individual 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 12 inches; brown silt loam

Subsoil:
12 to 52 inches; dark yellowish brown silt loam

Substratum:
52 to 75 inches; mottled grayish brown, brown, and yellowish brown silty clay loam

Included with this soil in mapping are small areas of Bellamy, Bloomingdale, and Pettyjon soils. Bellamy soils are on stream terraces. They have a brittle layer in the subsoil. They make up about 5 percent of the unit. Bloomingdale soils are on flood plains and are poorly drained. They make up about 5 percent of the unit. Pettyjon soils are on flood plains and are well drained. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Organic matter content: Low
Soil reaction: Medium acid to mildly alkaline
Erosion hazard: Slight
Water table: Apparent, at a depth of 18 to 36 inches

Nearly all areas have been cleared and are used for pasture, hay, or row crops. This soil is well suited to most agricultural uses. Wetness is a limitation during periods of heavy rainfall.

This soil is well suited to woodland. The potential productivity is high. Plant competition is the major management concern. Yellow-poplar, eastern white pine, and northern red oak are the best suited species.

This soil is poorly suited to most urban uses. The wetness and the flooding are the major management concerns.

The capability subclass is IIw.

TbD2—Talbott-Rock outcrop-Bradyville complex, 12 to 20 percent slopes, eroded. This map unit occurs as areas of moderately deep or deep, moderately steep, well drained soils intermingled with areas of Rock outcrop. The unit is on limestone uplands in the Southern Appalachian Ridges and Valleys area. The two soils and the Rock outcrop occur as areas so closely intermingled that they could not be separated at the scale selected for mapping. Individual areas range from 5 to 30 acres in size. Slopes are smooth and convex.

The Talbott soil makes up about 38 percent of the unit. It makes up 36 to 40 percent of each mapped area.

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

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

Subsoil:
2 to 12 inches; yellowish red clay
12 to 22 inches; yellowish red silty clay

Bedrock:
22 inches; limestone

Limestone rock outcrops make up about 31 percent of the unit. They make up 28 to 34 percent of each mapped area. The outcrops occur as individual rocks and as ledges and bluffs. Some stones and boulders are on the surface in scattered areas throughout the unit.

The Bradyville soil makes up about 18 percent of the unit. It makes up 14 to 22 percent of each mapped area.

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

Surface layer:
0 to 3 inches; dark brown silt loam

Subsurface layer:
3 to 10 inches; strong brown silty clay loam

Subsoil:
10 to 21 inches; yellowish red silty clay loam
21 to 48 inches; yellowish red clay

Bedrock:
48 inches; limestone

Included in mapping are small areas of soils that are less than 20 inches deep over bedrock. These soils are closely associated with the limestone outcrops. Also included, in landscape positions similar to those of the Talbott and Bradyville soils, are soils that are more than 60 inches deep over bedrock. The included soils make up about 13 percent of the unit. They make up 4 to 22 percent of each mapped area.

Important properties of the Talbott and Bradyville soils—

Permeability: Moderately slow
Available water capacity: Talbott—low; Bradyville—high
Organic matter content: Low
Soil reaction: Slightly acid to mildly alkaline
Erosion hazard: Severe
Water table: None

Nearly all areas are wooded, mainly with upland oaks. A few areas have been cleared and are used as pasture. This unit is generally unsuited to row crops and hay because of the Rock outcrop. It is poorly suited to pasture. The clayey subsoil restricts root growth and the movement of water and air through the soils. The Rock outcrop and the slope hinder the use of equipment.

This unit is suited to woodland. The potential productivity is moderate. The hazard of erosion, the equipment limitation, and plant competition are the major management concerns. Loblolly pine, Virginia pine, and eastern redcedar are the best suited species.

This unit is poorly suited to most urban uses because of the Rock outcrop, the clayey subsoil, and the slope.

The capability subclass is VIe.

TbE2—Talbott-Rock outcrop-Bradyville complex, 20 to 35 percent slopes, eroded. This map unit occurs as areas of moderately deep or deep, steep, well drained soils intermingled with areas of Rock outcrop. The unit is on limestone uplands in the Southern

Appalachian Ridges and Valleys area. The two soils and the Rock outcrop occur as areas so closely intermingled that they could not be separated at the scale selected for mapping. Individual areas range from 5 to 30 acres in size. Slopes are smooth and convex.

The Talbott soil makes up about 37 percent of the unit. It makes up 34 to 40 percent of each mapped area.

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

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

Subsoil:
2 to 12 inches; yellowish red clay
12 to 22 inches; yellowish red silty clay

Bedrock:
22 inches; limestone

Limestone rock outcrops make up about 31 percent of the unit. They make up 29 to 34 percent of each mapped area. The outcrops occur as individual rocks and as ledges and bluffs. Some stones and boulders are on the surface in scattered areas throughout the unit.

The Bradyville soil makes up about 20 percent of the unit. It makes up 16 to 24 percent of each mapped area.

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

Surface layer:
0 to 3 inches; dark brown silt loam

Subsurface layer:
3 to 10 inches; strong brown silty clay loam

Subsoil:
10 to 21 inches; yellowish red silty clay loam
21 to 48 inches; red clay

Bedrock:
48 inches; limestone

Included in mapping are small areas of soils that are less than 20 inches deep over bedrock. These soils are closely associated with the limestone outcrops. Also included, in landscape positions similar to those of the Talbott and Bradyville soils, are soils that are more than 60 inches deep over bedrock. The included soils make up about 12 percent of the unit. They make up 2 to 21 percent of each mapped area.

Important properties of the Talbott and Bradyville soils—

Permeability: Moderately slow
Available water capacity: Talbott—low; Bradyville—high
Organic matter content: Low
Soil reaction: Slightly acid to mildly alkaline
Erosion hazard: Severe
Water table: None

Nearly all areas are wooded, mainly with upland oaks. A few areas have been cleared and are used as pasture. This unit is generally unsuited to row crops and hay because of the Rock outcrop. It is poorly suited to pasture. The clayey subsoil restricts root growth and the movement of water and air through the soils. The Rock outcrop and the slope hinder the use of equipment.

This unit is suited to woodland. The potential productivity is moderate. The hazard of erosion, the equipment limitation, and plant competition are the major management concerns. Loblolly pine, Virginia pine, and eastern redcedar are the best suited species.

This unit is poorly suited to most urban uses because of the Rock outcrop, the clayey subsoil, and the slope.

The capability subclass is VIe.

UnG—Unicoi cobbly sandy loam, 50 to 80 percent slopes. This soil is shallow, extremely steep, and excessively drained. It is on the upper side slopes on Holston and Delaney Mountains. Individual areas range from 30 to several hundred acres in size. Slopes are smooth and convex.

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

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

Subsurface layer:
1 to 5 inches; brown cobbly sandy loam

Subsoil:
5 to 18 inches; yellowish brown cobbly sandy loam

Bedrock:
18 inches; hard metasandstone

In some small areas the soil is made up mainly of cobbles, stones, and boulders and very little soil material.

Included with this soil in mapping are small areas of Ditney soils on ridgetops. These soils have less than 35 percent rock fragments in the solum and are more than 20 inches deep over bedrock. They make up about 10 percent of the unit.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: Very low
Organic matter content: Low

Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

All areas support laurel, ivy, chestnut oak, pitch pine, and Virginia pine. This soil is unsuited to agricultural uses. The slope is the major limitation.

This soil is poorly suited to woodland. The potential productivity is low. The equipment limitation and the hazard of windthrow are the major management concerns. The hazard of erosion and seedling mortality are additional management concerns. Virginia pine is the best suited species.

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

The capability subclass is VIIs.

Ur—Urban land. This map unit is in the cities of Kingsport and Bristol. Streets, parking lots, sidewalks, buildings, and other structures cover 85 percent or more of the surface. No identifiable soils are in areas of this unit. There are some small open areas that are not covered by structures, but the soils in these areas have been altered by the installation of utilities and by excavation for streets, buildings, and other structures. Onsite investigation is needed to determine the hazards or limitations affecting any specific use of this unit.

This unit is not assigned to a land capability classification.

WaF—Wallen gravelly loam, 30 to 65 percent slopes. This soil is moderately deep, very steep, and somewhat excessively drained. It is on the upper side slopes on Bays Mountain. Individual areas range from 30 to several hundred acres in size. Slopes are smooth and convex.

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

Surface layer:
0 to 1 inch; dark brown gravelly loam

Subsurface layer:
1 to 5 inches; brown gravelly loam

Subsoil:
5 to 32 inches; yellowish brown very gravelly loam

Bedrock:
32 inches; hard sandstone

In some small areas the soil is made up mainly of cobbles, stones, and boulders and very little soil material.

Included with this soil in mapping are small areas of Shelocta and Montevallo soils. Shelocta soils are in concave areas and coves. They have less than 35 percent rock fragments in the solum and are more than 60 inches deep over bedrock. They make up about 5 percent of the unit. Montevallo soils are on the lower convex slopes. They are less than 20 inches deep over acid shale. They make up about 10 percent of the unit.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: Low
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

All areas are wooded with chestnut oak, pitch pine, and Virginia pine. This soil is unsuited to most agricultural uses. The slope is the major limitation.

This soil is poorly suited to woodland. The potential productivity is low. The equipment limitation and the hazard of windthrow are the major management concerns. Seedling mortality is an additional management concern. Virginia pine is the best suited species.

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

The capability subclass is VIIs.

WbC2—Waynesboro loam, 5 to 12 percent slopes, eroded. This soil is very deep, strongly sloping, and well drained. It is on high stream terraces in the Southern Appalachian Ridges and Valleys area. Individual areas range from 5 to 15 acres in size. Slopes are smooth and convex.

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

Surface layer:
0 to 5 inches; brown loam

Subsurface layer:
5 to 11 inches; dark yellowish brown loam

Subsoil:
11 to 62 inches; yellowish red and red clay loam

In some areas the solum has less sand. In other areas the soil is browner throughout.

Included with this soil in mapping are small areas of Etowah and Holston soils. Etowah soils are in concave areas. They have less clay in the subsoil than the Waynesboro soil. They make up about 5 percent of the unit. Holston soils are in landscape positions similar to those of the Waynesboro soil. They have less clay in the subsoil than the Waynesboro soil and are browner throughout. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Moderate
Water table: None

Nearly all areas have been cleared and are used for pasture or row crops. Some areas are wooded, mainly with upland oaks. This soil is suited to nearly all of the row crops and small grain crops commonly grown in the county and to hay. It is well suited to pasture. Erosion is the major hazard.

This soil is well suited to woodland. The potential productivity is high. Plant competition is the major management concern. Black walnut, yellow-poplar, eastern white pine, and loblolly pine are the best suited species.

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

The capability subclass is IIIe.

WbD2—Waynesboro loam, 12 to 20 percent slopes, eroded. This soil is very deep, moderately steep, and well drained. It is on high stream terraces in the Southern Appalachian Ridges and Valleys area. Individual areas are 5 to 15 acres in size. Slopes are smooth and convex.

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

Surface layer:
0 to 5 inches; brown loam

Subsurface layer:
5 to 11 inches; dark yellowish brown loam

Subsoil:
11 to 62 inches; yellowish red and red clay loam

In some areas the solum has less sand. In other areas the soil is browner throughout.

Included with this soil in mapping are small areas of Etowah and Holston soils. Etowah soils are in concave areas. They have less clay in the subsoil than the Waynesboro soil. They make up about 5 percent of the unit. Holston soils are in landscape positions similar to those of the Waynesboro soil. They have less clay in the subsoil than the Waynesboro soil and are browner throughout. They make up about 5 percent of the unit.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Organic matter content: Low
Soil reaction: Very strongly acid or strongly acid
Erosion hazard: Severe
Water table: None

Nearly all areas have been cleared and are used for pasture or row crops. Some areas are wooded, mainly with upland oaks. This soil is poorly suited to nearly all of the row crops and small grain crops commonly grown in the county. It is suited to hay and pasture. Erosion is the major hazard.

This soil is well suited to woodland. The potential productivity is high. The hazard of erosion, the equipment limitation, and plant competition are the major management concerns. Black walnut, yellow-poplar, eastern white pine, and loblolly pine are the best suited species.

This soil is poorly suited to most urban uses. The slope is the major limitation.

The capability subclass is IVe.

Prime Farmland

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

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

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

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They are used for food or fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land is land not available for farming in National forests, National parks, military reservations, and State parks.

Prime farmland soils usually receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not frequently flooded during the growing season. The slope ranges mainly from 0 to 5 percent.

About 14,533 acres in Sullivan County, or 5.3 percent of the total acreage, meets the soil requirements for prime farmland. Scattered areas of this land are throughout the valleys in the county. Most of the prime farmland is used as cropland.

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

The soils identified as prime farmland in Sullivan County are:

BeB	Bellamy loam, 2 to 5 percent slopes
HoB	Holston loam, 2 to 5 percent slopes
Pt	Pettyjon loam, 0 to 2 percent slopes, rarely flooded
St	Steadman silt loam, 0 to 2 percent slopes, occasionally flooded

Use and Management of the Soils

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

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs *(4)*.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

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

A total of 58,018 acres in the county was cropland in 1985. Of this total, 21,727 acres was harvested cropland and 32,438 acres was pasture.

Two different kinds of areas are used for crops and pasture in the county—the mountains and the valleys. Almost all of the mountain areas remain forested with upland oak, poplar, Virginia pine, white pine, and various minor species. Small areas of pasture are in the mountain areas. Most pasture mixtures in these areas include tall fescue and white clover. Orchardgrass and red clover are the dominant hay crops. Most of the cropland in the valleys is planted to corn or tobacco. Alfalfa and small grain are planted for hay, silage, or grain. Most of the pastured areas support tall fescue and white clover. The hay crops include mixtures of orchardgrass and red clover. They also include alfalfa. The acreage used for alfalfa is increasing rapidly in the valleys.

Most of the soils in the county are well suited to pasture. Legumes should be seeded with orchardgrass or fescue when a pasture is established. They also should be seeded when pastures that support only grasses are renovated. The legumes increase the quality of the pastures. Information about pasture seeding and renovation can be obtained from local offices of the Cooperative Extension Service and the Soil Conservation Service.

Etowah, Holston, Pettyjon, and Waynesboro soils are used dominantly for crops and pasture in the valleys. Erosion-control measures, such as contour farming, contour stripcropping, conservation tillage, and conservation cropping systems, are needed on these soils.

On livestock farms, which require pasture and hay, including grasses and legumes in the cropping sequence can help to control erosion on sloping land and can provide nitrogen and improve tilth for the following crop. Erosion-control measures increase the rate of water infiltration, conserve moisture, help to control runoff, and help to maintain productivity. They also improve water quality by decreasing the amount of sediment that enters streams. Information about the design of erosion-control measures and assistance in planning conservation cropping systems are available in the local office of the Soil Conservation Service.

On all of the soils in the county, additions of lime and fertilizer should be based on the results of soil tests, on the needs of the crops, and on the expected level of yields. The soil testing laboratory of the Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to be applied.

Most of the soils in the county that are well suited to crops also are well suited to urban uses. Data on specific soils in this survey can be used in determining future land use priorities. The suitability of the soils for agricultural uses should be weighed against the potential for nonfarm development and the limitations affecting that development.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

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

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

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

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland *(6)*. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major, and generally expensive, landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

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

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

Class I soils have few limitations that restrict their use.

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

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

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

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

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

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

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production. There are no class VIII soils in Sullivan 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 a close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

There are no subclasses in class I because the soils of this class have few limitations. The soils in class V are subject to little or no erosion, but they have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation. Class V contains only the subclasses indicated by *w, s,* or *c.*

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

Woodland Management and Productivity

Originally, all of Sullivan County was forested. Forests currently make up about 46 percent of the land area. The oak-hickory-pine forest type makes up most of the forested areas. The part of the county that is in the Blue Ridge major land resource area supports mainly oaks and hickories. In some areas yellow-poplar and pine are mixed with the oaks and hickories. Yellow-poplar, beech, and eastern hemlock are prevalent in the deep gorges and moist coves on the mountainsides. In the Southern Appalachian Ridges and Valleys area, oaks, hickories, and Virginia pine are dominant. Other tree species that are common throughout the county are maple, ash, sycamore, and sweetgum.

Wood products are an important part of the economy in the county, although production is well below the potential of the forests. The forests in the county provide not only wood products but also opportunities for recreation, wildlife habitat, natural beauty, erosion control, and watershed protection.

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

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to applications of fertilizer than others, and some are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special reforestation efforts. In the section "Detailed Soil Map Units," the description of each map unit in the survey area suitable for timber includes information about productivity, limitations in harvesting timber, and management concerns in producing timber. Table 6 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate,* and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

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

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

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

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

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

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

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands.

The *volume* is the yield likely to be produced by the most important trees, expressed in cubic feet per acre per year calculated at the age of culmination of mean annual increment.

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

Recreation

Sullivan County has many recreational facilities, most of which are privately owned. The recreational activities in the county are dominantly water based. The Tennessee Valley Authority provides public picnic areas and boat-launching ramps in areas on or adjacent to South Holston, Boone, and Fort Patrick Henry Reservoirs.

One state park and numerous county and local parks are open to the public. The state and county parks have extensive recreational areas, including campgrounds. Other recreational facilities in the county include golf courses, swimming pools, country clubs, a planetarium, and a nature center.

In table 7, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines.

The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 7, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

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

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

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

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

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

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

Wildlife Habitat

Although a large part of Sullivan County has been developed or is densely populated, the wildlife resources are still abundant. Good populations of rabbit, dove, and quail are in areas of openland habitat. Squirrels are in areas where mast and den trees, such as oaks and hickories, are available. Waterfowl are commonly abundant along the rivers and lakes. Deer, turkey, and black bear are common in the forested areas in the mountains. The trees and shrubs around homes and other buildings provide habitat for a great variety of nongame wildlife, such as songbirds.

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

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

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

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

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

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

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

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

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

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

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

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

Engineering

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

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

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

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

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the 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 9 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock or to a very firm, dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, and shrinking and swelling can cause the movement of footings. Depth to a high water table, depth to bedrock, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock, depth to a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost-action potential, and depth to a high water table affect the traffic-supporting capacity.

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

Sanitary Facilities

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

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

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

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

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

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

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

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

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

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

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

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

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

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

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

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are 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 or stones, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

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

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and releases a variety of plant nutrients as it decomposes.

Water Management

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

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

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

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

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

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

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock or to other layers that affect the rate of water movement, permeability, depth to a high water table or depth of standing water if the soil is subject to ponding, slope, and susceptibility to flooding. 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 or sodium. Availability of drainage outlets is not considered in the ratings.

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

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

Soil Properties

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

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

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

Engineering Index Properties

Table 13 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

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

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

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

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

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

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. 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 generally are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

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

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

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

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water through the soil when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

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

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

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

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

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

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

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

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

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

Soil and Water Features

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

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

The four hydrologic soil groups are:

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

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

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

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

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

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

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

The information on flooding is based on evidence in the soil profile, namely, thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

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

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely, grayish colors or mottles in the soil. Indicated in table 15 are the depth to the seasonal high water table; the kind of water table, that is, *perched* or *apparent*; and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 15.

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

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

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

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

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

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

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(7)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 16 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udalf (*Ud*, meaning humid, plus *alf*, from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludalfs (*Hapl*, meaning minimal horizonation, plus *udalf*, the suborder of the Alfisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludalfs.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine, mixed, thermic Typic Hapludalfs.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the substratum within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(5)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(7)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

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

Bays Series

The Bays series consists of shallow, well drained, moderately steep to very steep soils that formed in material weathered from calcareous shale bedrock.

These soils are on narrow ridges and long, convex side slopes on shale uplands in the Southern Appalachian Ridges and Valleys area in the western part of the county. Slopes range from 12 to 65 percent.

Bays soils are geographically associated with Bellamy, Bloomingdale, and Steadman soils, all of which are more than 60 inches deep over bedrock. Bellamy soils are on stream terraces and are moderately well drained. They have a brittle layer in the subsoil. Bloomingdale soils are on flood plains and are poorly drained. Steadman soils are on flood plains and are moderately well drained.

Typical pedon of Bays silty clay loam, 12 to 20 percent slopes, eroded; from the intersection of Highway 81 and Lone Star Road, 1.5 miles south on Highway 81, then 2,000 feet west of the road:

Ap—0 to 3 inches; dark grayish brown (10YR 4/2) silty clay loam; moderate medium granular structure; friable; many fine and medium roots; about 10 percent fragments of shale as much as one-half inch across; strongly acid; abrupt wavy boundary.

Bw/Bt—3 to 16 inches; strong brown (7.5YR 5/6) channery silty clay loam (Bw part); weak fine subangular blocky structure; very friable; few fine and medium roots; common fine discontinuous tubular pores; about 25 percent channers of shale as much as 2 inches across; medium acid; intermittent pockets of strong brown (7.5YR 5/6) channery silty clay loam (Bt part); moderate medium subangular blocky structure; very friable; few fine and medium roots; common fine discontinuous tubular pores; few faint clay films; about 25 percent channers of shale as much as 2 inches across; medium acid; abrupt irregular boundary.

C—16 to 19 inches; strong brown (7.5YR 5/6) very channery silty clay loam; massive; friable; about 50 percent channers of shale as much as 2 inches across; strongly acid; clear irregular boundary.

Cr—19 inches; tilted and fractured, soft, partially weathered, yellowish and brownish shale that has thin lenses of yellowish brown silt loam in fractures.

The thickness of the solum ranges from 10 to 20 inches. Rippable shale bedrock is at a depth of 10 to 20 inches. The content of shale fragments ranges from 5 to 30 percent in the solum and from 5 to 50 percent in the C horizon. Reaction ranges from strongly acid to moderately alkaline in the solum and the C horizon.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. It is silt loam, silty clay loam, silty clay, or the channery analogs of those textures.

The BA horizon, if it occurs, has hue of 10YR, value of 4, and chroma of 4 to 6. It is silt loam, silty clay loam, silty clay, or the channery analogs of those textures.

The Bw/Bt horizon has hue of 2.5 to 7.5YR, value of 4 or 5, and chroma of 4 to 8. It is silty clay loam, silt loam, silty clay, or the channery analogs of those textures. The B horizon is dominantly a cambic horizon, but in some parts (less than 50 percent of the horizon) the content of clay increases enough for the horizon to meet the requirements for an argillic horizon or there is other evidence of clay eluviation. The C horizon has colors and textures similar to those of the Bw/Bt horizon.

Bellamy Series

The Bellamy series consists of very deep, moderately well drained, gently sloping soils that formed in a mantle of loamy colluvium and in the underlying older mixed alluvium. These soils have a layer with brittle properties at a depth of about 20 inches. They are on gently sloping, low stream terraces in the Southern Appalachian Ridges and Valleys area. Slopes range from 2 to 5 percent.

Bellamy soils are geographically associated with Bays, Bloomingdale, Steadman, and Pettyjon soils. Bays soils are on shale uplands. They are less than 20 inches deep over shale bedrock. Bloomingdale, Steadman, and Pettyjon soils are on flood plains. Bloomingdale soils are poorly drained. Steadman soils are moderately well drained. Pettyjon soils are well drained.

Typical pedon of Bellamy loam, 2 to 5 percent slopes; from the intersection of Highway 93 and Murrill Road, 600 feet north, 30 degrees west:

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

A—5 to 10 inches; dark yellowish brown (10YR 4/4) loam; weak medium granular structure; friable; many very fine and fine roots; strongly acid; abrupt smooth boundary.

Bw—10 to 19 inches; brownish yellow (10YR 6/6) loam; moderate medium subangular blocky structure; firm; common very fine roots; many fine and common medium tubular pores; strongly acid; gradual wavy boundary.

Btx—19 to 32 inches; brownish yellow (10YR 6/6) loam; common coarse faint light brownish gray (10YR 6/2) and few fine prominent yellowish red (5YR 5/8) mottles; weak coarse prismatic structure; firm; brittle in 40 to 60 percent of the volume; few very fine roots; common fine and medium tubular pores; strongly acid; gradual wavy boundary.

Bt1—32 to 41 inches; brownish yellow (10YR 6/6) clay loam; common fine faint light yellowish brown

(10YR 6/4), common coarse faint light brownish gray (10YR 6/2), and many fine prominent yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; friable; few very fine roots; common fine and medium tubular pores; few faint clay films on faces of peds and in pores; about 5 percent rounded gravel and quartz crystals as much as one-half inch across; very strongly acid; gradual wavy boundary.

Bt2—41 to 54 inches; mottled light yellowish brown (10YR 6/4), gray (10YR 6/1), and yellowish red (5YR 5/8) clay loam; moderate medium subangular blocky structure; friable; few fine tubular pores; few faint clay films on faces of peds and in pores; very strongly acid; gradual wavy boundary.

BC—54 to 72 inches; yellowish brown (10YR 5/4) sandy clay loam; common fine distinct strong brown (7.5YR 5/8) and common fine prominent yellowish red (5YR 5/8) mottles; massive; friable; very strongly acid.

The thickness of the solum ranges from 48 to more than 60 inches. The depth to bedrock is more than 60 inches. The content of rock fragments, mostly small, rounded pebbles, ranges from 0 to 5 percent throughout the profile. Reaction ranges from very strongly acid to slightly acid throughout the profile.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is loam or silt loam.

The BA horizon, if it occurs, has hue of 10YR or 7.5YR and value and chroma of 4 to 6. It is loam or silt loam.

The Btx and Bt horizons have hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 8. They have few or common mottles in shades of gray, brown, or red. These horizons are clay loam or loam.

The BC horizon has the same colors as the Btx and Bt horizons, or it is mottled in shades of gray, brown, and red. It is sandy clay loam or clay loam.

Bloomingdale Series

The Bloomingdale series consists of very deep, poorly drained, nearly level soils that formed in mixed alluvium derived from shale and limestone. These soils are on flood plains in the Southern Appalachian Ridges and Valleys area. Slopes range from 0 to 2 percent.

Bloomingdale soils are geographically associated with Bays, Bellamy, and Steadman soils. Bays soils are on shale uplands. They are less than 20 inches deep over shale bedrock. Bellamy soils are on low stream terraces and are moderately well drained. They have a brittle layer in the subsoil. Steadman soils are on flood plains and are moderately well drained.

Typical pedon of Bloomingdale silty clay loam, 0 to 2 percent slopes, occasionally flooded; off Highway 11W, from its intersection with Olios Bowers Hill Road, 3,400 feet west and 125 feet north:

Ap—0 to 5 inches; dark brown (10YR 4/3) silty clay loam; many fine faint grayish brown (10YR 5/2) mottles; weak fine subangular blocky structure; friable; common fine roots; few irregularly shaped iron concretions and stains; neutral; clear smooth boundary.

Bg—5 to 17 inches; gray (10YR 5/1) silty clay loam; many medium faint yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; friable; common fine roots; common fine tubular pores; many irregularly shaped iron concretions and stains; slightly acid; gradual wavy boundary.

Cg1—17 to 25 inches; gray (10YR 6/1) silty clay; many medium distinct strong brown (7.5YR 5/8) mottles; massive; friable; common fine roots; few fine tubular pores; slightly acid; gradual smooth boundary.

Cg2—25 to 35 inches; gray (10YR 6/1) silty clay; common fine faint pale brown (10YR 6/3) and many medium distinct strong brown (7.5YR 5/8) mottles; massive; friable; few fine and common very fine roots; common fine and few medium tubular pores; neutral; gradual smooth boundary.

Cg3—35 to 60 inches; gray (10YR 6/1) silty clay; common coarse distinct strong brown (7.5YR 5/8) mottles; massive; friable; few very fine roots; neutral.

The thickness of the solum ranges from 14 to 40 inches. The depth to bedrock is more than 60 inches. The content of rock fragments, mostly rounded pebbles, ranges from 0 to 5 percent to a depth of 40 inches and is as much as 20 percent below that depth. Reaction ranges from medium acid to moderately alkaline throughout the profile.

The Ap horizon has hue of 10YR to 2.5Y, value of 4 or 5, and chroma of 2 to 4. It has mottles in shades of gray or brown. It is commonly silty clay loam, but the range includes loam and silt loam.

The Bg horizon has hue of 7.5YR to 5Y and has value of 5 and chroma of 1 or has value of 6 and chroma of 1 or 2, or it is neutral in hue and has value of 5 or 6. It has mottles in shades of gray or brown. It is silty clay loam, silty clay, or clay.

The Cg horizon has hue of 7.5YR to 5Y and has value of 5 and chroma of 1 or has value of 6 or 7 and chroma of 1 or 2, or it is neutral in hue and has value of 5 to 7. It has mottles in shades of gray, brown, or red. It is commonly silty clay, but the range includes silty clay loam and clay. Below a depth of 40 inches, the range also includes the gravelly analogs of silty clay, silty clay loam, and clay.

Bradyville Series

The Bradyville series consists of deep, well drained, moderately steep and steep soils that formed in clayey material weathered from limestone. These soils are on limestone uplands in the Southern Appalachian Ridges and Valleys area. Slopes range from 12 to 35 percent.

Bradyville soils are geographically associated with Montevallo, Collegedale, and Talbott soils. Montevallo soils are on shale uplands. They are less than 20 inches deep over bedrock. Collegedale soils are on limestone uplands. They are more than 60 inches deep over bedrock. Talbott soils are in landscape positions similar to those of the Bradyville soils. They are less than 40 inches deep over bedrock.

Typical pedon of Bradyville silt loam, in an area of Talbott-Rock outcrop-Bradyville complex, 20 to 35 percent slopes, eroded; 2,000 feet southeast of Highway 81 at Sullivan Gardens:

A—0 to 3 inches; dark brown (7.5YR 4/4) silt loam; weak medium granular structure; friable; many fine and medium roots; neutral; clear smooth boundary.

BA—3 to 10 inches; strong brown (7.5YR 5/6) silty clay loam; weak fine subangular blocky structure; friable; common fine and medium roots; common fine and medium tubular pores; neutral; gradual smooth boundary.

Bt1—10 to 21 inches; yellowish red (5YR 5/8) silty clay loam; moderate medium subangular blocky structure; friable; common fine and few medium roots; common fine and medium tubular pores; few faint clay films on faces of peds; neutral; gradual smooth boundary.

Bt2—21 to 36 inches; red (2.5YR 4/8) clay; moderate medium angular blocky structure; firm; few fine roots; few fine tubular pores; common distinct clay films on faces of peds; mildly alkaline; gradual smooth boundary.

Bt3—36 to 48 inches; red (2.5YR 4/8) clay; moderate medium angular blocky structure; firm; common distinct clay films on faces of peds; about 10 percent angular fragments of chert as much as one-half inch across; mildly alkaline; abrupt smooth boundary.

R—48 inches; limestone bedrock.

The thickness of the solum and the depth to bedrock range from 40 to 60 inches. The content of chert fragments or limestone gravel ranges from 0 to 10 percent throughout the solum. Reaction ranges from slightly acid to mildly alkaline throughout the solum.

The A horizon has hue of 10YR or 7.5YR and value and chroma of 3 or 4. The BA horizon, if it occurs, has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. The Bt horizon has hue of 5YR to 2.5YR, value of 4 or 5, and chroma of 6 to 8. It commonly has mottles in shades of brown, yellow, or red. It is clay, silty clay, or silty clay loam.

Brookshire Series

The Brookshire series consists of very deep, well drained, steep and very steep soils that formed in colluvium derived from metasedimentary rocks, such as phyllite and sandstone. These soils are on the side slopes of north- and east-facing coves on Holston Mountain. Elevations range from 2,500 to 4,000 feet. Slopes range from 20 to 65 percent.

Brookshire soils are geographically associated with Cataska, Ditney, and Unicoi soils. Cataska soils are on slopes. They have more rock fragments throughout than the Brookshire soils and have a solum that is less than 20 inches thick. Ditney and Unicoi soils are on the higher slopes. They have a higher content of sand in the solum than the Brookshire soils and are less than 40 inches deep over bedrock.

Typical pedon of Brookshire silt loam, 35 to 65 percent slopes; on Dogwood Bench Road, 1,000 feet from Highway 421, about 50 feet south of the road:

Oi—1 inch to 0; forest litter of hardwood leaves and twigs.

A1—0 to 5 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; very friable; many fine and medium roots; about 10 percent rounded fragments of sandstone as much as one-half inch across; strongly acid; clear smooth boundary.

A2—5 to 8 inches; dark yellowish brown (10YR 3/3) silt loam; weak medium granular structure; very friable; common fine and medium roots; about 12 percent fragments of sandstone as much as 1 inch across; strongly acid; clear smooth boundary.

Bw1—8 to 18 inches; strong brown (7.5YR 4/6) gravelly silt loam; weak medium subangular blocky structure parting to weak medium granular; friable; common fine and medium and few coarse roots; many fine and medium tubular pores; about 15 percent fragments of sandstone as much as 3 inches across; strongly acid; gradual smooth boundary.

Bw2—18 to 31 inches; strong brown (7.5YR 5/8) gravelly silt loam; weak medium subangular blocky structure parting to weak medium granular; friable; few fine, medium, and coarse roots; many fine and medium tubular pores; about 20 percent fragments of sandstone as much as 3 inches across; strongly acid; gradual smooth boundary.

Bw3—31 to 53 inches; strong brown (7.5YR 5/8) gravelly silt loam; weak medium subangular blocky structure parting to weak medium granular; friable; few fine, medium, and coarse roots; few fine and medium tubular pores; about 25 percent subangular fragments of sandstone as much as 4 inches across; strongly acid; gradual smooth boundary.

C—53 to 65 inches; brownish yellow (7.5YR 6/8) cobbly silt loam; massive; friable; about 30 percent fragments of sandstone as much as 6 inches across; strongly acid.

The thickness of the solum ranges from 40 to 55 inches. The depth to hard bedrock ranges from 40 to more than 60 inches. The content of sandstone fragments as much as 6 inches across ranges from 10 to 30 percent throughout the profile. It generally increases with increasing depth.

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

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

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

The C horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8. It is silt loam or loam in the fine-earth fraction.

Cataska Series

The Cataska series consists of shallow, excessively drained, steep to extremely steep soils that formed in material weathered from phyllite. These soils are on all aspects on the upper side slopes and ridges on Holston Mountain. Elevations range from 2,000 to 4,000 feet. Slopes range from 20 to 80 percent.

Cataska soils are geographically associated with Ditney, Unicoi, Shelocta, and Brookshire soils. Ditney and Unicoi soils are on the higher slopes. They are sandy and are more than 40 inches deep over sandstone bedrock. Shelocta and Brookshire soils are in coves and colluvial areas. They are more than 40 inches deep over bedrock.

Typical pedon of Cataska channery silt loam, 20 to 35 percent slopes; 2,000 feet from Highway 421 on Dogwood Bench Road, 30 feet east of the road:

Oi—1 inch to 0; partially decomposed forest litter of hardwood leaves and twigs.

A—0 to 1 inch; dark brown (10YR 3/3) channery silt loam; weak medium granular structure; very friable; many fine and medium and few coarse roots; about 15 percent fragments of phyllite as much as 1 inch long; strongly acid; clear smooth boundary.

E—1 to 4 inches; yellowish brown (10YR 5/4) channery silt loam; weak medium granular structure; very friable; many fine and medium and few coarse roots; about 15 percent fragments of phyllite as much as 2 inches long; strongly acid; gradual smooth boundary.

Bw1—4 to 10 inches; strong brown (7.5YR 5/6) very channery silt loam; weak medium subangular blocky structure parting to weak medium granular; friable; common fine and many medium and coarse roots; common fine and medium tubular pores; about 35 percent fragments of phyllite as much as 2 inches long; strongly acid; clear wavy boundary.

Bw2—10 to 18 inches; strong brown (7.5YR 5/4) very channery silt loam; weak medium subangular blocky structure parting to moderate medium granular; friable; few fine and coarse and common medium roots; few fine tubular pores; about 50 percent fragments of phyllite as much as 4 inches long; strongly acid; clear wavy boundary.

Cr—18 to 24 inches; fractured, partially weathered phyllite that has thin lenses of strong brown (7.5YR 5/8) silt loam in fractures.

The thickness of the solum ranges from 12 to 18 inches. The depth to hard bedrock ranges from 20 to 30 inches. The content of rock fragments ranges from 15 to 20 percent in the A and E horizons and from 35 to 60 percent in the Bw horizon.

The A horizon has hue of 10YR, value of 3, and chroma of 2 or 3. The E horizon, if it occurs, has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The Bw horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 to 8.

Collegedale Series

The Collegedale series consists of very deep, well drained, strongly sloping to steep soils that formed in material weathered from limestone. These soils are on limestone uplands in the Southern Appalachian Ridges and Valleys area. Slopes range from 5 to 35 percent.

Collegedale soils are geographically associated with Montevallo and Etowah soils. Montevallo soils are on shale uplands. They are less than 20 inches deep over bedrock. Etowah soils are in concave areas. They have less clay in the subsoil than the Collegedale soils.

Typical pedon of Collegedale silt loam, in an area of Collegedale-Etowah complex, 5 to 12 percent slopes, eroded; 0.5 mile west on Bowman Ford Road from Highway 11E, 700 feet north of the road:

Ap—0 to 4 inches; strong brown (7.5YR 5/6) silt loam; moderate medium granular structure; very friable; many fine and medium roots; about 10 percent fragments of chert and shale as much as one-half inch in diameter; medium acid; clear smooth boundary.

Bt1—4 to 20 inches; yellowish red (5YR 5/8) clay; moderate medium subangular blocky structure; friable; common fine and few medium roots; common fine and medium tubular pores; thin distinct clay films on faces of peds; about 10 percent fragments of chert and shale as much as one-half inch in diameter; strongly acid; gradual smooth boundary.

Bt2—20 to 36 inches; yellowish red (5YR 5/8) clay; moderate medium angular blocky structure; firm; few fine roots; common fine and medium tubular pores; thin distinct clay films on faces of peds; about 5 percent fragments of chert and shale as much as one-half inch in diameter; strongly acid; gradual smooth boundary.

Bt3—36 to 50 inches; yellowish red (5YR 5/8) clay; common medium distinct light yellowish brown (10YR 6/4) and few medium faint strong brown (7.5YR 5/6) mottles; moderate medium angular blocky structure; firm; few fine tubular pores; thin distinct clay films on faces of peds; about 5 percent fragments of chert and shale as much as one-half inch in diameter; strongly acid; clear smooth boundary.

Bt4—50 to 62 inches; mottled yellowish red (5YR 5/8), red (2.5YR 4/8), and brownish yellow (10YR 6/8) silty clay; moderate medium and coarse angular blocky structure; firm; thin distinct clay films on faces of peds; about 10 percent fragments of shale as much as one-half inch in diameter; strongly acid.

The thickness of the solum and the depth to bedrock are more than 60 inches. The content of chert or shale fragments ranges from 0 to 10 percent throughout the profile. Reaction is strongly acid or very strongly acid, except in areas where the surface layer has been limed.

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

The BA horizon, if it occurs, has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6. It is silty clay loam or silt loam.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8. It commonly has mottles in shades of brown, yellow, or red. It is clay or silty clay.

Ditney Series

The Ditney series consists of moderately deep, well drained, steep to extremely steep soils that formed in material weathered from metasedimentary rock, such as feldspathic sandstone. These soils are on high mountain crests and side slopes on Holston Mountain. Elevations range from 2,000 to 4,300 feet. Slopes range from 20 to 80 percent.

Ditney soils are geographically associated with Unicoi, Maymead, and Cataska soils. Unicoi soils are on the lower slopes. They are less than 20 inches deep over bedrock. Maymead soils are in colluvial areas. They are more than 40 inches deep over bedrock. Cataska soils are on the lower slopes. They have more than 35 percent rock fragments in the solum and are underlain by phyllite bedrock.

Typical pedon of Ditney sandy loam, 20 to 35 percent slopes; on Highway 421, about 1,000 feet southwest of Dogwood Bench Road, 50 feet north of the road:

Oi—1 inch to 0; partially decomposed forest litter of pine needles and hardwood leaves and twigs.

A—0 to 3 inches; dark grayish brown (10YR 4/2) sandy loam; weak fine granular structure; very friable; many fine and medium and few coarse roots; about 5 percent fragments of sandstone as much as 2 inches across; strongly acid; clear smooth boundary.

BE—3 to 7 inches; yellowish brown (10YR 5/6) sandy loam; weak medium granular structure; very friable; many fine and medium and few coarse roots; about 5 percent fragments of sandstone as much as 2 inches across; strongly acid; gradual smooth boundary.

Bw1—7 to 18 inches; yellowish brown (10YR 5/6) cobbly sandy loam; weak medium subangular blocky structure; friable; common fine and medium and few coarse roots; many fine and medium tubular pores; about 20 percent fragments of sandstone as much as 5 inches across; very strongly acid; gradual smooth boundary.

Bw2—18 to 24 inches; yellowish brown (10YR 5/6) cobbly sandy loam; weak medium subangular blocky structure; friable; few fine and medium roots; many fine and medium tubular pores; about 30 percent fragments of sandstone as much as 6 inches across; very strongly acid; abrupt smooth boundary.

Cr—24 to 27 inches; partially weathered, fractured sandstone.

R—27 inches; hard metasandstone bedrock.

The thickness of the solum ranges from 20 to 30 inches. The depth to bedrock ranges from 30 to 40 inches. The content of rock fragments ranges from 5 to 20 percent in the surface layer and from 15 to 30 percent in the subsoil. Reaction is strongly acid or very strongly acid throughout the solum.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. Where value is 3, the horizon is less than 7 inches thick. It is sandy loam, loam, or the gravelly or cobbly analogs of those textures.

The BE and Bw horizons have hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. They are sandy loam, loam, or the gravelly or cobbly analogs of those textures.

Etowah Series

The Etowah series consists of very deep, well drained, strongly sloping to steep soils that formed in thick deposits of old alluvium. These soils are on high stream terraces in the Southern Appalachian Ridges and Valleys area. Slopes range from 5 to 35 percent.

Etowah soils are geographically associated with Collegedale, Montevallo, and Waynesboro soils. Collegedale soils are on limestone uplands. They have a higher content of clay throughout than the Etowah soils and formed in material weathered from limestone. Montevallo soils are on shale uplands. They are less than 20 inches deep over bedrock. Waynesboro soils are on high terraces. They have a clayey subsoil.

Typical pedon of Etowah silt loam, in an area of Collegedale-Etowah complex, 12 to 20 percent slopes, severely eroded; from Highway 75, turn onto Bondtown Road, go 0.5 mile, turn right on dead-end road, go 0.7 mile; site is 100 feet east of the road:

Ap—0 to 7 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium granular structure; very friable; many very fine and fine and common medium roots; about 5 percent rounded gravel and subangular chert as much as 1 inch in diameter; slightly acid; clear smooth boundary.

Bt1—7 to 14 inches; strong brown (7.5YR 4/6) silty clay loam; weak medium subangular blocky structure; friable; few fine and medium roots; about 5 percent rounded gravel and subangular chert as much as one-half inch in diameter; strongly acid; gradual smooth boundary.

Bt2—14 to 30 inches; yellowish red (5YR 5/6) clay loam; moderate fine and medium subangular blocky structure; friable; few fine, medium, and coarse roots; many fine and medium tubular pores; thin distinct clay films on faces of peds; about 10 percent rounded gravel and subangular chert as much as one-half inch in diameter; strongly acid; gradual smooth boundary.

Bt3—30 to 52 inches; yellowish red (5YR 5/8) clay loam; common medium distinct red (2.5YR 4/8) mottles; moderate medium and coarse subangular blocky structure; friable; few fine roots; common fine and medium tubular pores; thin distinct clay films on faces of peds; about 10 percent rounded gravel and subangular chert and shale as much as one-half inch in diameter; strongly acid; gradual smooth boundary.

Bt4—52 to 65 inches; yellowish red (5YR 5/8) silty clay loam; moderate fine and medium subangular blocky structure; friable; few fine roots; common fine tubular pores; thin distinct clay films on faces of peds; about 5 percent rounded gravel and highly weathered shale fragments as much as one-half inch in diameter; strongly acid.

The thickness of the solum and the depth to bedrock are more than 60 inches. The content of rounded gravel or subangular chert and shale fragments ranges from 0 to 15 percent throughout the profile. Reaction is strongly acid, except in areas where the surface layer has been limed.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 to 4. It is dominantly silt loam or loam, but in severely eroded areas it is silty clay loam.

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

Holston Series

The Holston series consists of very deep, well drained, gently sloping to moderately steep soils that formed in thick deposits of old alluvium. These soils are on high stream terraces in the Southern Appalachian Ridges and Valleys area. Slopes range from 2 to 20 percent.

Holston soils are geographically associated with Collegedale and Etowah soils. Collegedale soils are on limestone uplands. They have a higher content of clay throughout than the Holston soils and formed in residuum. Etowah soils are on high stream terraces. They have a reddish subsoil.

Typical pedon of Holston loam, 2 to 5 percent slopes; 2,400 feet west of the intersection of Riverside Road and Weaver Pike at Riverside:

Ap—0 to 6 inches; brown (10YR 5/3) loam; moderate medium granular structure; very friable; many fine and medium roots; about 12 percent rounded sandstone gravel 2 to 3 inches in diameter; medium acid; clear smooth boundary.

BE—6 to 10 inches; yellowish brown (10YR 5/6) loam; weak fine subangular blocky structure; friable; common fine and medium roots; common fine and medium tubular pores; about 12 percent rounded sandstone gravel 2 to 3 inches in diameter; slightly acid; clear smooth boundary.

Bt1—10 to 23 inches; yellowish brown (10YR 5/6) loam; moderate medium subangular blocky structure; friable; common fine and few medium roots; common fine and medium tubular pores; thin distinct clay films on faces of peds; about 5 percent rounded sandstone gravel 1 to 2 inches in diameter; strongly acid; gradual smooth boundary.

Bt2—23 to 41 inches; strong brown (7.5YR 5/8) clay loam; moderate medium subangular blocky structure; friable; few fine roots; common fine and medium tubular pores; thin distinct clay films on faces of peds; about 5 percent rounded sandstone gravel 1 to 2 inches in diameter; strongly acid; gradual smooth boundary.

Bt3—41 to 62 inches; strong brown (7.5YR 5/8) clay loam; moderate medium subangular blocky structure; friable; few fine roots; common fine and medium tubular pores; thin distinct clay films on faces of peds; about 12 percent rounded sandstone gravel 2 to 3 inches in diameter; strongly acid.

The thickness of the solum and the depth to bedrock are more than 60 inches. The content of rounded sandstone gravel or cobbles ranges from 0 to 15 percent throughout the profile. Reaction is strongly acid or very strongly acid, except in areas where the surface layer has been limed.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. It is generally loam or fine sandy loam, but in severely eroded areas it is clay loam.

The BE horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 8. The Bt horizon generally has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. In some pedons, however, it has hue of 5YR in the lower part. It is loam or clay loam.

Jeffrey Series

The Jeffrey series consists of moderately deep, well drained, steep and very steep soils that formed in material weathered from metasedimentary rocks, such as phyllite and sandstone. These soils are on east- and north-facing side slopes on Holston Mountain, in the areas between Holston High Knob and Holston High Point. Elevations range from 3,500 to 4,300 feet. Slopes range from 20 to 50 percent.

Jeffrey soils are geographically associated with Cataska, Ditney, and Brookshire soils. Cataska soils are generally on the lower slopes. They have more than 35 percent rock fragments and are less than 20 inches deep over soft phyllite bedrock. Ditney soils are generally on south- and west-facing slopes. They do not have a dark surface layer. Brookshire soils are in north- and east-facing coves. They are more than 40 inches deep over bedrock.

Typical pedon of Jeffrey loam, 20 to 35 percent slopes; on Holston Mountain Road, 2,000 feet northeast of the Rye Patch Knob television tower, 25 feet north of the road, under a power line:

Oi—1 inch to 0; forest litter of hardwood leaves and twigs.

A1—0 to 7 inches; very dark grayish brown (10YR 3/2) loam; weak fine granular structure; very friable; many fine and medium roots; about 5 percent fragments of metasandstone as much as 1 inch across; strongly acid; clear smooth boundary.

A2—7 to 9 inches; dark brown (10YR 3/3) loam; weak fine subangular blocky structure parting to weak fine and medium granular; very friable; common fine and medium roots; about 10 percent fragments of metasandstone as much as 3 inches across; very strongly acid; abrupt smooth boundary.

Bw—9 to 21 inches; brown (10YR 4/3) gravelly loam; weak medium subangular blocky structure; friable; few fine and medium roots; few fine and medium tubular pores; about 15 percent fragments of metasandstone as much as 3 inches across; very strongly acid; gradual smooth boundary.

BC—21 to 28 inches; yellowish brown (10YR 5/6) cobbly fine sandy loam; weak medium subangular blocky structure; friable; few fine and coarse roots; about 30 percent fragments of metasandstone as much as 5 inches across; very strongly acid; abrupt wavy boundary.

R—28 inches; tilted and fractured, hard metasandstone bedrock.

The thickness of the solum and the depth to bedrock range from 20 to 35 inches. The content of metasandstone or phyllite fragments ranges from 5 to 15 percent in the A horizon, from 15 to 30 percent in the Bw horizon, and from 25 to 50 percent in the BC and C horizons. Reaction is strongly acid or very strongly acid throughout the solum.

The A horizon has hue of 10YR, value of 3, and chroma of 2 or 3. The Bw horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. It is loam or gravelly loam. The BC and C horizons have hue of 10YR, value of 5, and chroma of 6. They are loam or fine sandy loam in the fine-earth fraction.

Junaluska Series

The Junaluska series consists of moderately deep, well drained, strongly sloping to steep soils that formed in material weathered from metasedimentary rocks, such as phyllite and metasandstone. These soils are on outlier ridges of Holston Mountain. Elevations range from 1,800 to 2,800 feet. Slopes range from 5 to 35 percent.

Junaluska soils are geographically associated with Keener, Montevallo, and Unicoi soils. Keener soils are on colluvial fans. They are more than 60 inches deep over bedrock. Montevallo soils are on extremely steep side slopes. They are less than 20 inches deep over shale bedrock. Unicoi soils are on the higher, extremely steep mountain side slopes. They are less than 20 inches deep over sandstone bedrock.

Typical pedon of Junaluska loam, 12 to 20 percent slopes; on Cherokee National Forest Road 87, about 0.5 mile west of Left Prong Big Creek, 30 feet south of the road:

Oe—1 inch to 0; slightly decomposed forest litter of hardwood leaves and twigs.

A—0 to 2 inches; dark yellowish brown (10YR 4/4) loam; weak fine granular structure; very friable; many fine and medium and few coarse roots; strongly acid; clear smooth boundary.

BA—2 to 6 inches; strong brown (7.5YR 5/6) loam; weak fine subangular blocky and moderate medium granular structure; very friable; common fine and medium and few coarse roots; strongly acid; clear smooth boundary.

Bt1—6 to 10 inches; strong brown (7.5YR 5/6) loam; weak fine and medium subangular blocky structure; friable; common fine and medium and few coarse roots; many fine and medium tubular pores; few thin faint clay films on faces of peds and in pores; strongly acid; clear smooth boundary.

Bt2—10 to 20 inches; yellowish red (5YR 5/8) clay loam; moderate medium subangular blocky structure; friable; few fine, medium, and coarse roots; common fine and medium tubular pores; thin distinct clay films on vertical and horizontal faces of peds; strongly acid; gradual smooth boundary.

Bt3—20 to 27 inches; yellowish red (5YR 5/8) clay loam; moderate medium subangular blocky structure; friable; common fine and medium tubular pores; thin distinct clay films on vertical and horizontal faces of peds; about 10 percent fragments of sandstone as much as 3 inches across; strongly acid; abrupt smooth boundary.

Cr1—27 to 32 inches; soft, dusky red sandstone that can be dug with a spade; very strongly acid; abrupt irregular boundary.

Cr2—32 to 50 inches; soft, faint purple siltstone that can be dug with a spade; very strongly acid; abrupt irregular boundary.

Cr3—50 to 67 inches; multicolored, fractured phyllite that can be removed from fractures.

The thickness of the solum ranges from 20 to 35 inches. The depth to hard bedrock is more than 40 inches. Reaction is strongly acid or very strongly acid throughout the solum and the Cr horizon.

The A horizon has hue of 10YR or 7.5YR and value and chroma of 3 or 4. It is loam or fine sandy loam.

The BA horizon, if it occurs, has hue of 7.5YR, value of 5, and chroma of 6 to 8. It is loam or fine sandy loam.

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

Keener Series

The Keener series consists of very deep, well drained, strongly sloping to steep soils that formed in loamy colluvium. These soils are on foot slopes, benches, and colluvial fans and in coves on Holston Mountain. Elevations range from 1,500 to 3,000 feet. Slopes range from 5 to 35 percent.

Keener soils are geographically associated with Ditney, Unicoi, and Maymead soils. Ditney and Unicoi soils are on the higher slopes. They are less than 40 inches deep over bedrock. Maymead soils are in landscape positions similar to those of the Keener soils. They do not have an argillic horizon.

Typical pedon of Keener gravelly fine sandy loam, 12 to 20 percent slopes, cobbly; on U.S. Forest Service Road 6099, about 0.75 mile from the gate at Forest Service Road 87 and 100 feet south, 60 degrees east of the road:

A—0 to 3 inches; dark brown (10YR 3/3) gravelly fine sandy loam; weak fine granular structure; very friable; many fine, medium, and coarse roots; about 15 percent fragments of arkosic sandstone as much as 3 inches across; extremely acid; clear wavy boundary.

BA—3 to 10 inches; yellowish brown (10YR 5/4) loam; weak fine subangular blocky structure; friable; many fine, medium, and coarse roots; about 5 percent fragments of arkosic sandstone as much as 3 inches across; very strongly acid; gradual wavy boundary.

Bt1—10 to 23 inches; yellowish brown (10YR 5/8) loam; weak medium subangular blocky structure; friable; common fine, medium, and coarse roots; common fine and few medium tubular pores; few faint clay films on faces of peds and in pores; about 5 percent fragments of arkosic sandstone as much as 3 inches across; very strongly acid; gradual smooth boundary.

Bt2—23 to 36 inches; strong brown (7.5YR 5/8) cobbly clay loam; moderate medium subangular blocky structure; friable; few fine and medium roots;

common fine and medium tubular pores; few faint clay films on faces of peds and in pores; about 25 percent fragments of arkosic sandstone as much as 10 inches across; very strongly acid; gradual wavy boundary.

Bt3—36 to 50 inches; strong brown (7.5YR 5/8) cobbly sandy clay loam; moderate medium subangular blocky structure; friable; few fine and medium roots; common fine and medium tubular pores; few faint clay films on faces of peds and in pores; about 30 percent fragments of arkosic sandstone as much as 10 inches across; very strongly acid; gradual wavy boundary.

BC—50 to 63 inches; strong brown (7.5YR 5/6) very cobbly sandy clay loam; common medium prominent red (2.5YR 4/8) and common medium distinct brownish yellow (10YR 6/8) mottles; weak fine subangular blocky structure; friable; few faint clay films on faces of peds; about 50 percent fragments of arkosic sandstone as much as 10 inches across; very strongly acid.

The solum is more than 40 inches thick. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 35 percent in the A horizon, from 0 to 30 percent in the BA and Bt horizons, and from 10 to 50 percent in the BC and C horizons. Reaction is medium acid to extremely acid throughout the profile.

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

Some pedons have an E horizon. This horizon has hue of 10YR, value of 5 or 6, and chroma of 4. It is loam or fine sandy loam in the fine-earth fraction.

The BA horizon, if it occurs, has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is loam or fine sandy loam in the fine-earth fraction.

The Bt and BC horizons have hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 6 to 8. They are loam, clay loam, or sandy clay loam in the fine-earth fraction. Some pedons do not have a BC horizon.

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

Some pedons have a lithologic discontinuity below the control section. The material below the discontinuity has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 5 to 8. It is loam or clay loam in the fine-earth fraction.

Lonon Series

The Lonon series consists of very deep, well drained, moderately steep soils that formed in colluvium derived from fine grained metasedimentary rocks, such as phyllite, sandstone, and siltstone. These soils are on foot slopes and benches on Holston Mountain and extend into the adjoining ridges and valleys. Elevations range from 1,800 to 2,000 feet. Slopes range from 12 to 20 percent.

Lonon soils are geographically associated with Montevallo and Junaluska soils. Montevallo soils are on side slopes on shale ridges. They have a solum that is less than 20 inches thick. Junaluska soils are on outlier ridges of the mountain. They weathered in place and are less than 40 inches deep over bedrock.

Typical pedon of Lonon loam, 12 to 20 percent slopes; on U.S. Highway 421, about 2.75 miles from the south end of the American Legion Bridge, 30 feet east of the road:

A—0 to 2 inches; dark brown (10YR 4/3) loam; weak fine granular structure; very friable; many fine and medium and few coarse roots; about 10 percent fragments of rounded sandstone as much as 3 inches across; strongly acid; clear smooth boundary.

E—2 to 6 inches; yellowish brown (10YR 5/6) loam; moderate medium granular structure; very friable; many fine and medium and few coarse roots; about 10 percent fragments of rounded sandstone as much as 3 inches across; strongly acid; gradual smooth boundary.

BE—6 to 14 inches; strong brown (7.5YR 5/6) cobbly loam; weak medium subangular blocky structure; friable; many fine and medium and few coarse roots; about 15 percent fragments of rounded sandstone as much as 5 inches across; strongly acid; gradual smooth boundary.

Bt1—14 to 29 inches; yellowish red (5YR 5/8) cobbly loam; moderate medium subangular blocky structure; friable; few fine and medium roots; many fine and medium tubular pores; thin faint clay films on vertical faces of peds and on some rock fragments; about 15 percent fragments of rounded sandstone as much as 5 inches across; strongly acid; gradual smooth boundary.

Bt2—29 to 50 inches; yellowish red (5YR 5/8) cobbly loam; moderate medium subangular blocky structure; friable; common fine and medium tubular pores; thin faint clay films on vertical faces of peds and on some rock fragments; about 15 percent fragments of rounded sandstone as much as 5 inches across; strongly acid; clear wavy boundary.

BC—50 to 65 inches; red (2.5YR 4/8) very cobbly loam; common medium distinct brownish yellow (10YR 6/8) and strong brown (7.5YR 5/8) mottles; massive; friable; about 50 percent rounded fragments of sandstone as much as 18 inches across; strongly acid.

The thickness of the solum ranges from 45 to more than 60 inches. The depth to bedrock is more than 5 feet. The content of sandstone, shale, phyllite, or siltstone fragments ranges from 0 to 30 percent in the A and Bt horizons and is as much as 50 percent below the Bt horizon. It generally increases with increasing depth. Most pedons have a stone line at a depth of about 50 inches. Reaction is strongly acid or very strongly acid throughout the profile.

The A horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 to 4. The E horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 to 6. The BE and Bt horizons have hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8. They are loam, clay loam, or the cobbly analogs of those textures. The BC and C horizons have colors and textures similar to those of the Bt horizon.

Maymead Series

The Maymead series consists of very deep, well drained, moderately steep to very steep soils that formed in colluvium derived from metasedimentary rocks, such as phyllite and sandstone. These soils are in coves and on colluvial benches on Holston Mountain. Elevations range from 1,800 to 3,200 feet. Slopes range from 12 to 50 percent.

Maymead soils are geographically associated with Ditney, Unicoi, Brookshire, and Keener soils. Ditney and Unicoi soils are on the higher slopes and ridges. They are less than 40 inches deep over bedrock. Brookshire soils are in landscape positions similar to those of the Maymead soils. They have a dark surface layer. Keener soils are at the lower elevations. They have an argillic horizon.

Typical pedon of Maymead loam, 20 to 35 percent slopes; from McQueens Gap, 1.0 mile southwest on U.S. Forest Service Road 4431, about 50 feet south of the road:

Oe—1 inch to 0; partially decomposed forest litter of leaves and twigs.

A—0 to 1 inch; dark brown (10YR 3/3) loam; weak fine granular structure; very friable; many fine, medium, and coarse roots; about 5 percent metasandstone fragments as much as 1 inch across; strongly acid; clear smooth boundary.

E—1 to 4 inches; dark yellowish brown (10YR 4/4) loam; weak medium granular structure; very friable; many fine and medium and few coarse roots; about 10 percent metasandstone fragments as much as 1 inch across; strongly acid; clear smooth boundary.

Bw1—4 to 12 inches; yellowish brown (10YR 5/6) loam; weak medium subangular blocky structure parting to weak medium granular; friable; common fine and medium and few coarse roots; about 10 percent metasandstone fragments as much as 2 inches across; strongly acid; clear smooth boundary.

Bw2—12 to 24 inches; yellowish brown (10YR 5/6) cobbly loam; weak medium subangular blocky structure; friable; few fine and medium roots; about 25 percent metasandstone fragments as much as 4 inches across; strongly acid; clear smooth boundary.

Bw3—24 to 45 inches; yellowish brown (10YR 5/6) very cobbly loam; weak fine subangular blocky structure; very friable; few fine and medium roots; about 35 percent metasandstone fragments as much as 5 inches across; strongly acid; clear smooth boundary.

C—45 to 63 inches; yellowish brown (10YR 5/6) extremely cobbly loam; massive; very friable; few fine roots; about 60 percent metasandstone fragments as much as 6 inches across; strongly acid.

The thickness of the solum and the depth to bedrock range from 40 to 70 inches. The content of sandstone fragments ranges from 15 to 35 percent in the control section and from 10 to 50 percent below the control section. The fragments generally increase in number and size with increasing depth. Reaction is strongly acid or very strongly acid throughout the profile.

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

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

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

The C horizon, if it occurs, has the same colors and textures as the B horizon but does not have structure and commonly has a higher content of rock fragments.

Montevallo Series

The Montevallo series consists of shallow, well drained, moderately steep to extremely steep soils that formed in material weathered from shale bedrock. These soils are on narrow ridges and long, convex side slopes on shale uplands in the Southern Appalachian Ridges and Valleys area. Slopes range from 12 to 80 percent.

Montevallo soils are geographically associated with

Keener and Shelocta soils in areas adjacent to Holston Mountain. Keener soils are on colluvial fans and foot slopes. They are more than 60 inches deep over bedrock and have a higher sand content throughout than the Montevallo soils. Shelocta soils are in colluvial areas in drainageways. They are more than 60 inches deep over bedrock and have a lower content of rock fragments throughout than the Montevallo soils. In areas that dissect the valley, Montevallo soils are associated with Collegedale and Etowah soils. Collegedale soils are on the lower convex side slopes. They are more than 60 inches deep over interbedded shale and limestone bedrock and have a clayey subsoil. Etowah soils are on the lower concave side slopes. They are more than 60 inches deep over bedrock and have a loamy subsoil.

Typical pedon of Montevallo channery silt loam, 12 to 20 percent slopes; from Jacob's Creek Road, 2,000 feet south on Highway 421, then 100 feet north of the intersection of Highway 421 and U.S. Forest Road 4002:

Oi—1 inch to 0; slightly decomposed forest litter of pine needles and hardwood leaves and twigs.

A—0 to 3 inches; dark brown (10YR 3/3) channery silt loam; weak fine granular structure; very friable; many fine and medium and few coarse roots; about 20 percent fragments of shale as much as 1 inch across; strongly acid; clear smooth boundary.

Bw1—3 to 5 inches; yellowish brown (10YR 5/4) channery silt loam; weak fine granular structure; very friable; common fine and medium roots; about 30 percent fragments of shale as much as 2 inches across; strongly acid; clear wavy boundary.

Bw2—5 to 16 inches; yellowish brown (10YR 5/6) very channery silt loam; weak medium subangular blocky structure; friable; common fine and medium roots; common fine and medium tubular pores; about 45 percent fragments of shale as much as 3 inches across; strongly acid; clear wavy boundary.

Cr—16 to 60 inches; fractured and tilted, soft, partially weathered shale that has thin lenses of yellowish brown silt loam in fractures.

The thickness of the solum ranges from 10 to 20 inches. The content of shale fragments ranges from 20 to 35 percent in the A and BE horizons and from 40 to 60 percent in the Bw horizon. Reaction is strongly acid or very strongly acid throughout the solum.

The A horizon has hue of 10YR, value of 3, and chroma of 2 or 3. It is less than 6 inches thick. The Bw horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 to 6. It is channery or very channery silt loam.

Pettyjon Series

The Pettyjon series consists of very deep, well drained, nearly level soils that formed in loamy alluvium derived from shale and limestone. These soils are on flood plains in the Southern Appalachian Ridges and Valleys area. Slopes range from 0 to 2 percent.

Pettyjon soils are geographically associated with Bays, Bellamy, and Steadman soils. Bays soils are on uplands. They are less than 20 inches deep over shale bedrock. Bellamy soils are on low terraces. They have a brittle layer in the subsoil. Steadman soils are on flood plains and are moderately well drained.

Typical pedon of Pettyjon loam, 0 to 2 percent slopes, rarely flooded; from the intersection of Highway 93 and Murrill Road, 1,625 feet north, 23 degrees west:

Ap—0 to 6 inches; dark brown (10YR 4/3) loam; moderate fine and medium granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

BA—6 to 13 inches; dark yellowish brown (10YR 4/4) loam; few fine faint yellowish brown (10YR 5/6) mottles; moderate medium granular structure; friable; common fine roots; common fine tubular pores; neutral; clear wavy boundary.

Bw1—13 to 30 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine subangular blocky structure; friable; few fine roots; many fine and common medium tubular pores; neutral; clear smooth boundary.

Bw2—30 to 44 inches; dark yellowish brown (10YR 4/4) loam; weak fine subangular blocky structure; friable; common fine tubular pores; neutral; clear smooth boundary.

C1—44 to 57 inches; dark brown (10YR 4/3) fine sandy loam; massive; friable; neutral; clear smooth boundary.

C2—57 to 64 inches; mottled brownish yellow (10YR 6/6) and yellowish brown (10YR 5/6) fine sandy loam; massive; friable; neutral.

The solum is more than 40 inches thick. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 5 percent throughout the profile. Reaction is neutral or mildly alkaline throughout the profile.

The Ap horizon has hue of 7.5YR or 10YR, value of 4, and chroma of 3 or 4. The BA horizon, if it occurs, and the Bw horizon have hue of 7.5YR or 10YR and value and chroma of 4. The C horizon has hue of 7.5YR or 10YR, value of 4, and chroma of 3 or 4, or it is mottled in shades of gray, yellow, and brown. The texture is silt loam, loam, or fine sandy loam throughout the profile.

Shelocta Series

The Shelocta series consists of deep and very deep, well drained, steep and very steep soils that formed in mixed colluvium derived from acid shale, siltstone, and sandstone. These soils are in mountain coves and on benches and foot slopes in the uplands, dominantly in the eastern part of the county. Elevations range from 1,400 to 3,200 feet. Slopes range from 20 to 50 percent.

Shelocta soils are geographically associated with Cataska, Maymead, and Keener soils, which are on the higher slopes. Cataska soils are less than 40 inches deep over bedrock. Maymead soils do not have an argillic horizon. Keener soils have a higher content of sand throughout than the Shelocta soils.

Typical pedon of Shelocta silt loam, 35 to 50 percent slopes; 2,000 feet east of the intersection of Highway 421 and U.S. Forest Service Road 4331:

Oi—2 inches to 0; partially decomposed mat of hardwood leaves and twigs.

A—0 to 2 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; very friable; many fine and medium roots; about 5 percent fragments of shale as much as one-half inch long; strongly acid; clear smooth boundary.

E—2 to 4 inches; yellowish brown (10YR 5/4) silt loam; weak medium granular structure; very friable; many fine and medium roots; about 5 percent shale fragments as much as one-half inch long; strongly acid; gradual smooth boundary.

BE—4 to 10 inches; yellowish brown (10YR 5/6) silt loam; weak fine subangular blocky and weak medium granular structure; friable; common fine and medium and few coarse roots; many fine and medium tubular pores; about 10 percent shale fragments as much as 1 inch long; strongly acid; gradual smooth boundary.

Bt1—10 to 24 inches; yellowish brown (10YR 5/6) silt loam; weak fine subangular blocky structure parting to weak medium granular; friable; common medium and coarse roots; many fine and medium tubular pores; few faint clay films; about 10 percent fragments of shale as much as 1 inch long; strongly acid; gradual smooth boundary.

Bt2—24 to 40 inches; strong brown (7.5YR 5/8) channery silty clay loam; moderate medium subangular blocky structure; friable; common medium and coarse roots; many fine and medium tubular pores; few faint clay films; about 15 percent shale fragments as much as 2 inches long; strongly acid; gradual smooth boundary.

Bt3—40 to 47 inches; strong brown (7.5YR 5/8) channery silty clay loam; moderate medium subangular blocky structure; friable; few fine and medium roots; common fine and medium tubular pores; few faint clay films; about 15 percent shale fragments as much as 2 inches long; strongly acid; gradual smooth boundary.

BC—47 to 65 inches; strong brown (7.5YR 5/8) channery silty clay loam; weak medium subangular blocky structure; friable; few fine and medium roots; about 20 percent shale fragments as much as 4 inches long; strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches. The depth to bedrock ranges from 48 to more than 120 inches. The content of shale fragments ranges from 5 to 35 percent in the A and B horizons and is as much as 70 percent in the C horizon. Reaction is strongly acid or very strongly acid throughout the profile.

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

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

The BE and Bt horizons have hue of 10YR or 7.5YR and value and chroma of 4 to 6. They are silt loam, silty clay loam, or the channery or gravelly analogs of those textures. The BC horizon has the same colors and textures as the Bt horizon.

Steadman Series

The Steadman series consists of very deep, moderately well drained, nearly level soils that formed in mixed alluvium derived from shale and limestone. These soils are on flood plains in the Southern Appalachian Ridges and Valleys area. Slopes range from 0 to 2 percent.

Steadman soils are geographically associated with Bays, Bellamy, Bloomingdale, and Pettyjon soils. Bays soils are on shale uplands. They are less than 20 inches deep over shale bedrock. Bellamy soils are on low terraces. They have a brittle layer in the subsoil. Bloomingdale and Pettyjon soils are on flood plains. Bloomingdale soils are poorly drained. Pettyjon soils are well drained.

Typical pedon of Steadman silt loam, 0 to 2 percent slopes, occasionally flooded; from the intersection of Highway 93 and Lone Star Road, 500 feet south, 60 degrees west:

Ap1—0 to 6 inches; brown (10YR 4/3) silt loam; moderate medium granular structure; very friable;

many very fine and fine roots; medium acid; gradual smooth boundary.

Ap2—6 to 12 inches; brown (10YR 4/3) silt loam; weak fine subangular blocky structure parting to weak medium granular; very friable; common very fine and fine roots; few fine tubular pores; neutral; clear smooth boundary.

Bw1—12 to 24 inches; dark yellowish brown (10YR 4/4) silt loam; weak coarse prismatic structure parting to weak fine subangular blocky; friable; common very fine and fine roots; many fine and common medium tubular pores; continuous light brownish gray (10YR 6/2) silt coatings on faces of peds and in pores; medium acid; gradual wavy boundary.

Bw2—24 to 39 inches; dark yellowish brown (10YR 4/6) silt loam; few fine faint grayish brown (10YR 5/2) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; few very fine roots; many fine and common medium tubular pores; continuous light brownish gray (10YR 6/2) silt coatings on faces of peds and in pores; medium acid; clear smooth boundary.

Bw3—39 to 52 inches; dark yellowish brown (10YR 4/6) silty clay loam; common medium faint grayish brown (10YR 5/2) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; many fine and common medium tubular pores; continuous light brownish gray (10YR 6/2) silt coatings on faces of peds and in pores; medium acid; clear smooth boundary.

C1—52 to 64 inches; mottled grayish brown (10YR 5/2), brown (10YR 4/3), and yellowish brown (10YR 5/6) silty clay loam; weak coarse prismatic structure parting to weak medium subangular blocky; friable; few very fine roots; continuous light brownish gray (10YR 6/2) silt coatings on faces of peds and in pores; slightly acid; gradual smooth boundary.

C2—64 to 75 inches; mottled grayish brown (10YR 5/2), brown (10YR 4/3), and yellowish brown (10YR 5/6) silty clay loam; massive; friable; slightly acid.

The thickness of the solum ranges from 40 to more than 60 inches. The depth to bedrock is more than 60 inches. The content of rock fragments, mostly small, rounded pebbles, ranges from 0 to 5 percent in the solum and from 0 to 15 percent in the C horizon. Reaction ranges from medium acid to mildly alkaline.

The Ap horizon has hue of 10YR and value and chroma of 3 or 4. It is silty clay loam, silt loam, or loam.

The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. It has no mottles or has few or common mottles in shades of gray, brown, yellow, or red. It is silt loam or silty clay loam.

The C horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 6, or it is profusely mottled. It has common or many mottles in shades of gray, brown, yellow, or red. It is silt loam, loam, silty clay loam, or the gravelly analogs of those textures.

Talbott Series

The Talbott series consists of moderately deep, well drained, moderately steep and steep soils that formed in material weathered from limestone. These soils are on limestone uplands in the Southern Appalachian Ridges and Valleys area. Slopes range from 12 to 35 percent.

Talbott soils are geographically associated with Montevallo, Collegedale, and Bradyville soils. Montevallo soils are on shale uplands. They are less than 20 inches deep over bedrock. Collegedale soils are on limestone uplands. They are more than 60 inches deep over bedrock. Bradyville soils are in landscape positions similar to those of the Talbott soils. They are medium textured in the upper part of the subsoil and are more than 40 inches deep over bedrock.

Typical pedon of Talbott silt loam, in an area of Talbott-Rock outcrop-Bradyville complex, 20 to 35 percent slopes, eroded; 1,800 feet due south of Sanders Cemetery:

A—0 to 2 inches; dark brown (10YR 3/3) silt loam; weak medium granular structure; friable; many fine and medium roots; mildly alkaline; clear smooth boundary.

Bt1—2 to 12 inches; yellowish red (5YR 5/8) clay; moderate medium angular blocky structure; firm; common fine and few medium roots; few fine and medium tubular pores; common distinct clay films on faces of peds; mildly alkaline; gradual smooth boundary.

Bt2—12 to 22 inches; yellowish red (5YR 5/8) silty clay; common medium prominent brownish yellow (10YR 6/8) and distinct red (2.5YR 4/8) mottles; moderate medium angular blocky structure; firm; few fine roots; few fine tubular pores; common distinct clay films on faces of peds; mildly alkaline; abrupt smooth boundary.

R—22 inches; limestone bedrock.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. The content of chert fragments or limestone gravel ranges from 0 to 10 percent throughout the solum. Reaction ranges from slightly acid to mildly alkaline throughout the solum.

The A horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 to 4. Where value is 3, the horizon is less than 6 inches thick.

The Bt horizon has hue of 5YR to 2.5YR, value of 4 or 5, and chroma of 6 to 8. It commonly has mottles in shades of brown, yellow, or red. It is clay or silty clay.

Unicoi Series

The Unicoi series consists of shallow, excessively drained, extremely steep soils that formed in material weathered from metasandstone. These soils are on the upper side slopes on Holston and Delaney Mountains. Elevations range from 2,000 to 3,800 feet. Slopes range from 50 to 80 percent.

Unicoi soils are geographically associated with Ditney and Cataska soils. Ditney soils are on the higher slopes. They are more than 20 inches deep over bedrock. Cataska soils are on the lower slopes. They have less sand throughout than the Unicoi soils and are underlain by phyllite bedrock.

Typical pedon of Unicoi cobbly sandy loam, 50 to 80 percent slopes; from U.S. Forest Service Road 4002, about 3,500 feet south of Highway 421, about 200 feet north of the road:

Oi—4 to 2 inches; slightly decomposed forest litter consisting of pine needles and hardwood leaves and twigs.

Oe—2 inches to 0; partially decomposed forest litter and organic matter.

A—0 to 1 inch; very dark grayish brown (10YR 3/2) cobbly sandy loam; weak fine granular structure; very friable; many fine and medium and few coarse roots; about 30 percent metasandstone fragments as much as 8 inches across; strongly acid; abrupt wavy boundary.

E—1 to 5 inches; brown (10YR 5/3) cobbly sandy loam; weak fine granular structure; very friable; many fine and medium and few coarse roots; about 35 percent metasandstone fragments as much as 8 inches across; strongly acid; clear wavy boundary.

Bw—5 to 18 inches; yellowish brown (10YR 5/6) very cobbly sandy loam; weak fine subangular blocky structure; very friable; common fine, medium, and coarse roots; about 50 percent metasandstone fragments as much as 8 inches across; strongly acid.

R—18 inches; metasandstone bedrock.

The thickness of the solum and the depth to bedrock range from 10 to 20 inches. The content of sandstone fragments ranges from 35 to 65 percent in the subsoil. The fragments are 1 to 15 inches across. Reaction is strongly acid or very strongly acid throughout the solum.

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

The E horizon, if it occurs, has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is loam or sandy loam in the fine-earth fraction.

The Bw horizon has hue of 10YR, value of 4 to 6, and chroma of 3 to 6. It is loam or sandy loam in the fine-earth fraction.

Wallen Series

The Wallen series consists of moderately deep, somewhat excessively drained, very steep soils that formed in material weathered from acid sandstone. These soils are on the upper side slopes on Bays Mountain. Slopes range from 30 to 65 percent.

Wallen soils are geographically associated with Shelocta and Montevallo soils. Shelocta soils are in colluvial coves. They are more than 60 inches deep over bedrock. Montevallo soils are on the lower slopes. They are less than 20 inches deep over acid shale bedrock.

Typical pedon of Wallen gravelly loam, 30 to 65 percent slopes; 3,000 feet north of the Kingsport Reservoir dam:

Oe—2 inches to 0; partially decomposed forest litter and organic matter.

A—0 to 1 inch; dark brown (10YR 4/2) gravelly loam; weak fine granular structure; very friable; many fine and medium and few coarse roots; about 30 percent sandstone fragments as much as 3 inches across; strongly acid; abrupt wavy boundary.

E—1 to 5 inches; brown (10YR 5/3) gravelly loam; weak fine granular structure; very friable; many fine and medium and few coarse roots; about 30 percent sandstone fragments as much as 3 inches across; strongly acid; clear wavy boundary.

Bw1—5 to 18 inches; yellowish brown (10YR 5/6) very gravelly loam; weak fine subangular blocky structure; very friable; common fine, medium, and coarse roots; about 40 percent sandstone fragments as much as 3 inches across; strongly acid; clear smooth boundary.

Bw2—18 to 32 inches; yellowish brown (10YR 5/6) very gravelly loam; weak fine subangular blocky structure; very friable; few fine and medium roots; about 50 percent sandstone fragments as much as 3 inches across; strongly acid; clear smooth boundary.

R—32 inches; sandstone bedrock.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. The content of sandstone fragments ranges from 15 to 35 percent in the A and E horizons and from 35 to 65 percent in the Bw horizon. The fragments are 1 to 10 inches across. Reaction is strongly acid or very strongly acid throughout the solum.

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

The E horizon, if it occurs, has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is loam or fine sandy loam in the fine-earth fraction.

The Bw horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 6. It is loam or fine sandy loam in the fine-earth fraction.

Waynesboro Series

The Waynesboro series consists of very deep, well drained, strongly sloping to moderately steep soils that formed in thick deposits of old alluvium. These soils are on high stream terraces in the Southern Appalachian Ridges and Valleys area. Slopes range from 5 to 20 percent.

Waynesboro soils are geographically associated with Collegedale and Etowah soils. Collegedale soils are on limestone uplands. They have a higher content of clay throughout than the Waynesboro soils and formed in residuum. Etowah soils are on high stream terraces. They have a higher content of silt throughout than the Waynesboro soils and have less than 35 percent clay in the Bt horizon.

Typical pedon of Waynesboro loam, 5 to 12 percent slopes, eroded; 2,000 feet northwest from the end of Licklog Branch Road:

Ap—0 to 5 inches; brown (10YR 4/3) loam; moderate medium granular structure; very friable; many fine and medium roots; about 5 percent rounded sandstone gravel 2 to 3 inches in diameter; slightly acid; clear smooth boundary.

BA—5 to 11 inches; dark yellowish brown (10YR 4/6) loam; weak fine subangular blocky structure; friable; common fine and medium roots; common fine and medium tubular pores; about 5 percent rounded sandstone gravel 2 to 3 inches in diameter; medium acid; clear smooth boundary.

Bt1—11 to 29 inches; yellowish red (5YR 5/6) clay loam; moderate medium subangular blocky structure; friable; common fine and medium tubular pores; common distinct clay films on faces of peds; about 5 percent rounded sandstone gravel 2 to 3 inches in diameter; strongly acid; gradual smooth boundary.

Bt2—29 to 43 inches; yellowish red (5YR 5/8) clay loam; moderate medium subangular blocky structure; friable; few fine roots; common fine and medium tubular pores; common distinct clay films on faces of peds; about 5 percent rounded sandstone gravel 2 to 3 inches in diameter; strongly acid; gradual smooth boundary.

Bt3—43 to 62 inches; red (2.5YR 4/8) clay loam; moderate medium subangular blocky structure; friable; few fine roots; common fine and medium tubular pores; common distinct clay films on faces of peds; about 5 percent rounded sandstone gravel 2 to 3 inches in diameter; strongly acid.

The thickness of the solum and the depth to bedrock are more than 60 inches. The content of rounded sandstone gravel or cobbles ranges from 0 to 15 percent throughout the profile. Reaction is strongly acid or very strongly acid, except in areas where the surface layer has been limed.

The Ap horizon generally has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. In severely eroded areas, however, it has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8. It generally is loam, but in the severely eroded areas it is clay loam.

The BA horizon, if it occurs, has hue of 10YR to 5YR, value of 4 or 5, and chroma of 6 to 8. It is dominantly loam, but in severely eroded areas it is clay loam.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8. It commonly has mottles in shades of brown, yellow, or red. It is clay loam or clay.

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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.

Alkali (sodic) soil. Soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

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

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

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

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

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

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

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

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

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

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

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

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

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

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.

Deferred grazing. Postponing grazing or resting grazingland for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as fire, that exposes the surface.

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

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

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

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

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

Foot slope. The inclined surface at the base of a hill.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material. This contrasts with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

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

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Rippable bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 drawbar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

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

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, thickness of the line can be one fragment or more. It generally overlies material that weathered in place, and it is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

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

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). An otherwise suitable soil material that is too thin for the specified use.

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.

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

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-84 at Kingsport, Tennessee)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January	46.4	27.0	36.7	71	-2	23	3.82	2.37	5.12	8	5.8
February	51.3	28.9	40.1	74	3	30	3.78	1.97	5.35	8	4.7
March	60.5	35.9	48.2	82	14	102	4.44	2.66	6.02	9	2.4
April	71.4	44.5	58.0	87	26	250	3.75	2.51	4.88	8	.0
May	78.8	52.7	65.8	90	33	490	4.02	2.31	5.54	8	.0
June	84.8	60.1	72.5	94	44	675	3.64	2.29	4.85	8	.0
July	87.4	64.1	75.8	96	51	800	4.56	3.17	5.83	9	.0
August	86.7	63.3	75.0	95	51	775	3.60	2.13	4.91	7	.0
September	81.6	57.1	69.4	94	39	582	3.16	1.51	4.58	6	.0
October	71.5	45.7	58.6	86	26	278	2.65	1.19	3.89	5	.0
November	59.2	36.3	47.8	79	16	54	3.24	2.16	4.21	7	1.0
December	50.1	30.2	40.2	73	7	31	3.61	2.02	5.02	7	2.5
Yearly:											
Average	69.1	45.5	57.3	---	---	---	---	---	---	---	---
Extreme	---	---	---	97	-4	---	---	---	---	---	---
Total	---	---	---	---	---	4,090	44.27	39.24	49.14	90	16.4

* 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 Kingsport, Tennessee)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 3	Apr. 16	Apr. 30
2 years in 10 later than--	Mar. 28	Apr. 12	Apr. 26
5 years in 10 later than--	Mar. 17	Apr. 3	Apr. 18
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 30	Oct. 21	Oct. 9
2 years in 10 earlier than--	Nov. 3	Oct. 24	Oct. 13
5 years in 10 earlier than--	Nov. 11	Oct. 31	Oct. 22

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-84 at Kingsport, 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	218	194	171
8 years in 10	225	200	176
5 years in 10	238	211	186
2 years in 10	251	221	196
1 year in 10	258	227	202

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
BaD2	Bays silty clay loam, 12 to 20 percent slopes, eroded	5,078	1.8
BaE2	Bays silty clay loam, 20 to 35 percent slopes, eroded	9,395	3.4
BaF2	Bays silty clay loam, 35 to 65 percent slopes, eroded	10,918	4.0
BeB	Bellamy loam, 2 to 5 percent slopes	3,877	1.4
Bm	Bloomingdale silty clay loam, 0 to 2 percent slopes, occasionally flooded	5,682	2.1
BrE	Brookshire silt loam, 20 to 35 percent slopes	517	0.2
BrF	Brookshire silt loam, 35 to 65 percent slopes	1,159	0.4
CaE	Cataska channery silt loam, 20 to 35 percent slopes	772	0.3
CaF	Cataska channery silt loam, 35 to 50 percent slopes	1,331	0.5
CaG	Cataska channery silt loam, 50 to 80 percent slopes	723	0.3
CcF	Cataska cobbly loam, 35 to 50 percent slopes	232	0.1
CeC2	Collegedale-Etowah complex, 5 to 12 percent slopes, eroded	37,622	13.7
CeD3	Collegedale-Etowah complex, 12 to 20 percent slopes, severely eroded	38,137	13.8
CeE3	Collegedale-Etowah complex, 20 to 35 percent slopes, severely eroded	11,130	4.0
CuD	Collegedale-Urban land complex, 5 to 20 percent slopes	8,390	3.0
CuE	Collegedale-Urban land complex, 20 to 35 percent slopes	1,010	0.4
DtE	Ditney sandy loam, 20 to 35 percent slopes	1,703	0.6
DtF	Ditney sandy loam, 35 to 50 percent slopes	2,402	0.9
DtG	Ditney sandy loam, 50 to 80 percent slopes	945	0.3
HoB	Holston loam, 2 to 5 percent slopes	1,688	0.6
HoC2	Holston loam, 5 to 12 percent slopes, eroded	1,257	0.5
HoD2	Holston loam, 12 to 20 percent slopes, eroded	663	0.2
HuC	Holston-Urban land complex, 2 to 12 percent slopes	4,591	1.7
JeE	Jeffrey loam, 20 to 35 percent slopes	223	0.1
JeF	Jeffrey loam, 35 to 50 percent slopes	204	0.1
JuC	Junaluska loam, 5 to 12 percent slopes	253	0.1
JuD	Junaluska loam, 12 to 20 percent slopes	248	0.1
JuE	Junaluska loam, 20 to 35 percent slopes	182	0.1
KeC	Keener gravelly fine sandy loam, 5 to 12 percent slopes, cobbly	3,039	1.1
KeD	Keener gravelly fine sandy loam, 12 to 20 percent slopes, cobbly	4,649	1.7
KeE	Keener gravelly fine sandy loam, 20 to 35 percent slopes, cobbly	1,394	0.5
LoD	Lonon loam, 12 to 20 percent slopes	2,105	0.8
MaD	Maymead loam, 12 to 20 percent slopes	511	0.2
MaE	Maymead loam, 20 to 35 percent slopes	1,039	0.4
MaF	Maymead loam, 35 to 50 percent slopes	874	0.3
MoD	Montevallo channery silt loam, 12 to 20 percent slopes	6,612	2.4
MoE	Montevallo channery silt loam, 20 to 35 percent slopes	12,714	4.6
MoF	Montevallo channery silt loam, 35 to 50 percent slopes	13,223	4.8
MoG	Montevallo channery silt loam, 50 to 80 percent slopes	16,309	5.9
Pt	Pettyjon loam, 0 to 2 percent slopes, rarely flooded	819	0.3
SaE	Shelocta silt loam, 20 to 35 percent slopes	1,405	0.5
SaF	Shelocta silt loam, 35 to 50 percent slopes	1,333	0.5
ShF	Shelocta loam, 35 to 50 percent slopes	513	0.2
St	Steadman silt loam, 0 to 2 percent slopes, occasionally flooded	8,077	2.9
TbD2	Talbott-Rock outcrop-Bradyville complex, 12 to 20 percent slopes, eroded	16,521	6.0
TbE2	Talbott-Rock outcrop-Bradyville complex, 20 to 35 percent slopes, eroded	10,679	3.9
UnG	Unicoi cobbly sandy loam, 50 to 80 percent slopes	1,597	0.6
Ur	Urban land	5,463	2.0
WaF	Wallen gravelly loam, 30 to 65 percent slopes	831	0.3
WbC2	Waynesboro loam, 5 to 12 percent slopes, eroded	3,393	1.2
WbD2	Waynesboro loam, 12 to 20 percent slopes, eroded	2,268	0.8
	Water	9,400	3.4
	Total	275,100	100.0

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Tobacco	Corn silage	Alfalfa hay	Grass-legume hay	Tall fescue-ladino
		Bu	Lbs	Tons	Tons	Tons	AUM*
BaD2------------ Bays	IVe	---	---	---	---	1.5	5.0
BaE2------------ Bays	VIe	---	---	---	---	---	3.5
BaF2------------ Bays	VIIe	---	---	---	---	---	---
BeB------------- Bellamy	IIe	105	2,200	15	3.0	2.5	8.0
Bm-------------- Bloomingdale	IIIw	80	---	15	---	3.5	7.0
BrE------------- Brookshire	VIe	---	---	---	---	---	---
BrF------------- Brookshire	VIIe	---	---	---	---	---	---
CaE, CaF, CaG, CcF------------ Cataska	VIIs	---	---	---	---	---	---
CeC2:							
Collegedale----	IVe	60	1,800	---	2.8	2.5	5.5
Etowah---------	IIIe	80	2,250	12	3.0	3.0	6.0
CeD3:							
Collegedale----	VIIe	---	---	---	---	---	---
Etowah---------	VIe	---	---	---	---	---	---
CeE3:							
Collegedale----	VIIe	---	---	---	---	---	---
Etowah---------	VIe	---	---	---	---	---	---
CuD**, CuE**:							
Collegedale.							
Urban land.							
DtE, DtF, DtG--- Ditney	VIIe	---	---	---	---	---	---
HoB------------- Holston	IIe	120	2,300	18	4.0	4.5	7.5

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Tobacco	Corn silage	Alfalfa hay	Grass-legume hay	Tall fescue-ladino
		Bu	Lbs	Tons	Tons	Tons	AUM*
HoC2------------ Holston	IIIe	85	2,150	10	2.5	3.0	6.0
HoD2------------ Holston	IVe	70	1,600	---	2.5	2.5	5.5
HuC**: Holston.							
Urban land.							
JeE------------- Jeffrey	VIe	---	---	---	---	---	---
JeF------------- Jeffrey	VIIe	---	---	---	---	---	---
JuC------------- Junaluska	IVe	---	---	---	---	3.5	5.5
JuD------------- Junaluska	VIe	---	---	---	---	---	5.0
JuE------------- Junaluska	VIIe	---	---	---	---	---	---
KeC------------- Keener	IIIs	---	---	---	---	---	---
KeD------------- Keener	IVs	---	---	---	---	---	---
KeE------------- Keener	VIs	---	---	---	---	---	---
LoD------------- Lonon	VIe	---	---	---	---	---	5.0
MaD------------- Maymead	IVe	---	---	---	---	---	5.5
MaE------------- Maymead	VIe	---	---	---	---	---	5.5
MaF------------- Maymead	VIIe	---	---	---	---	---	---
MoD, MoE, MoF, MoG------------ Montevallo	VIIe	---	---	---	---	---	---
Pt-------------- Pettyjon	I	120	2,200	2.0	5.0	5.5	8.5
SaE------------- Shelocta	VIe	---	---	---	---	---	4.0
SaF, ShF-------- Shelocta	VIIe	---	---	---	---	---	---

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Tobacco	Corn silage	Alfalfa hay	Grass-legume hay	Tall fescue-ladino
		Bu	Lbs	Tons	Tons	Tons	AUM*
St-------------- Steadman	IIw	125	2,800	20	---	3.5	7.0
TbD2**:							
Talbott--------	VIe	---	---	---	---	---	3.5
Rock outcrop.							
Bradyville-----	VIe	---	---	---	---	---	---
TbE2**:							
Talbott--------	VIe	---	---	---	---	---	4.0
Rock outcrop.							
Bradyville-----	VIe	---	---	---	---	---	4.0
UnG------------- Unicoi	VIIs	---	---	---	---	---	---
Ur**. Urban land							
WaF------------- Wallen	VIIs	---	---	---	---	---	---
WbC2------------ Waynesboro	IIIe	90	2,200	---	3.0	3.0	6.0
WbD2------------ Waynesboro	IVe	80	---	---	2.5	2.5	5.5

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
BaD2------------ Bays	Moderate	Moderate	Severe	Severe	Slight	Northern red oak---- Virginia pine------- Eastern redcedar----	70 42 40	57 86 43	Virginia pine.
BaE2------------ Bays	Moderate	Moderate	Severe	Severe	Slight	Northern red oak---- Virginia pine------- Eastern redcedar----	70 42 40	57 86 43	Virginia pine.
BaF2------------ Bays	Severe	Severe	Severe	Severe	Slight	Northern red oak---- Virginia pine------- Eastern redcedar----	70 42 40	57 86 43	Virginia pine.
BeB------------- Bellamy	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar------- Northern red oak---- Sweetgum------------	95 75 90	100 57 100	Yellow-poplar, sweetgum, loblolly pine.
Bm-------------- Bloomingdale	Slight	Severe	Severe	Slight	Severe	Water oak----------- Sweetgum------------	80 80	72 86	Sweetgum, American sycamore.
BrE------------- Brookshire	Moderate	Moderate	Slight	Slight	Moderate	Yellow-poplar------- Northern red oak----	100 80	114 57	Yellow-poplar, black walnut, eastern white pine.
BrF------------- Brookshire	Severe	Severe	Slight	Slight	Moderate	Yellow-poplar------- Northern red oak----	100 80	114 57	Yellow-poplar, black walnut, eastern white pine.
CaE------------- Cataska	Slight	Moderate	Moderate	Severe	Moderate	Chestnut oak-------- Scarlet oak--------- Pitch pine----------	50 50 50	29 29 ---	Pitch pine.
CaF, CaG, CcF--- Cataska	Moderate	Severe	Moderate	Severe	Moderate	Chestnut oak-------- Scarlet oak--------- Pitch pine----------	50 50 50	29 29 ---	Pitch pine.
CeC2**:									
Collegedale----	Slight	Moderate	Slight	Slight	Moderate	Southern red oak---- Yellow-poplar------- White oak----------- Shortleaf pine------ Virginia pine------- Loblolly pine-------	70 90 70 70 70 80	57 86 57 114 114 114	Yellow-poplar, shortleaf pine, eastern white pine, loblolly pine.
Etowah---------	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar------- Southern red oak---- Loblolly pine------- Shortleaf pine------	90 80 90 80	86 57 129 129	Yellow-poplar, loblolly pine.

See footnotes at end of table.

TABLE 6.--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*	
CeD3**, CeE3**:									
Collegedale----	Moderate	Moderate	Moderate	Slight	Moderate	Loblolly pine-------	70	86	Loblolly pine, eastern white pine, shortleaf pine.
						Virginia pine-------	60	86	
						Eastern redcedar----	40	43	
Etowah---------	Moderate	Moderate	Slight	Slight	Moderate	Yellow-poplar-------	90	86	Yellow-poplar, loblolly pine.
						Southern red oak----	80	57	
						Loblolly pine-------	90	129	
						Shortleaf pine------	80	129	
CuD**:									
Collegedale----	Slight	Moderate	Slight	Slight	Moderate	Southern red oak----	70	57	Yellow-poplar, shortleaf pine, eastern white pine, loblolly pine.
						Yellow-poplar-------	90	86	
						White oak-----------	70	57	
						Shortleaf pine------	70	114	
						Virginia pine-------	70	114	
						Loblolly pine-------	80	114	
Urban land.									
CuE**:									
Collegedale----	Moderate	Moderate	Slight	Slight	Moderate	Southern red oak----	70	57	Yellow-poplar, shortleaf pine, eastern white pine, loblolly pine.
						Yellow-poplar-------	90	86	
						White oak-----------	70	57	
						Shortleaf pine------	70	114	
						Virginia pine-------	70	114	
						Loblolly pine-------	80	114	
Urban land.									
DtE------------- Ditney	Slight	Moderate	Slight	Slight	Moderate	Northern red oak----	60	43	Shortleaf pine, eastern white pine.
						Shortleaf pine------	60	86	
						Virginia pine-------	60	86	
						Eastern white pine--	70	114	
DtF, DtG-------- Ditney	Moderate	Severe	Slight	Slight	Moderate	Northern red oak----	60	43	Shortleaf pine, eastern white pine.
						Shortleaf pine------	60	86	
						Virginia pine-------	60	114	
						Eastern white pine--	70	114	
HoB, HoC2------- Holston	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar-------	86	86	Yellow-poplar, loblolly pine.
						Northern red oak----	78	57	
						Shortleaf pine------	69	114	
HoD2------------ Holston	Moderate	Moderate	Slight	Slight	Moderate	Yellow-poplar-------	86	86	Yellow-poplar.
						Northern red oak----	69	57	
						Shortleaf pine------	69	114	
HuC**:									
Holston--------	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar-------	86	86	Yellow-poplar, loblolly pine.
						Northern red oak----	78	57	
						Shortleaf pine------	69	114	
Urban land.									

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
JeE------------- Jeffrey	Slight	Moderate	Slight	Slight	Moderate	Yellow-poplar------- Eastern white pine-- Northern red oak----	80 70 60	72 114 43	Eastern white pine.
JeF------------- Jeffrey	Moderate	Severe	Slight	Slight	Moderate	Yellow-poplar------- Eastern white pine-- Northern red oak----	80 70 60	72 114 43	Eastern white pine.
JuC------------- Junaluska	Slight	Slight	Slight	Moderate	Moderate	Scarlet oak--------- Chestnut oak-------- White oak----------- Shortleaf pine------ Virginia pine------- Eastern white pine-- Pitch pine---------- Northern red oak---- Black oak----------- Hickory------------- Red maple----------- Blackgum------------	65 56 61 68 65 86 66 --- --- --- --- ---	43 43 43 100 100 157 100 --- --- --- --- ---	Eastern white pine, shortleaf pine.
JuD, JuE-------- Junaluska	Moderate	Moderate	Moderate	Moderate	Moderate	Scarlet oak--------- Chestnut oak-------- White oak----------- Shortleaf pine------ Virginia pine------- Eastern white pine-- Pitch pine---------- Northern red oak---- Black oak----------- Hickory------------- Red maple----------- Blackgum------------	65 56 61 68 65 86 66 --- --- --- --- ---	43 43 43 100 100 157 100 --- --- --- --- ---	Eastern white pine, shortleaf pine.
KeC------------- Keener	Slight	Slight	Slight	Slight	Moderate	Northern red oak---- Yellow-poplar------- Virginia pine-------	80 115 80	57 129 114	Northern red oak, yellow-poplar, eastern white pine.
KeD, KeE-------- Keener	Moderate	Moderate	Slight	Slight	Moderate	Northern red oak---- Yellow-poplar------- Virginia pine-------	80 115 80	57 129 114	Northern red oak, yellow-poplar, eastern white pine.
LoD------------- Lonon	Moderate	Moderate	Slight	Slight	Moderate	Eastern white pine-- Yellow-poplar------- White oak----------- Northern red oak---- Black oak----------- Red maple----------- Scarlet oak--------- Chestnut oak-------- Pitch pine---------- Hickory-------------	86 74 --- --- --- --- --- --- --- ---	157 157 --- --- --- --- --- --- --- ---	Eastern white pine.

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
MaD, MaE: Maymead	Moderate	Moderate	Slight	Slight	Severe	Yellow-poplar	90	86	Yellow-poplar, eastern white pine, black walnut.
						Northern red oak	75	57	
MaF: Maymead	Severe	Severe	Slight	Slight	Moderate	Yellow-poplar	90	86	Yellow-poplar, eastern white pine, black walnut.
						Northern red oak	75	57	
MoD, MoE: Montevallo	Severe	Moderate	Moderate	Moderate	Slight	Loblolly pine	61	86	Loblolly pine, shortleaf pine.
						Shortleaf pine	61	86	
						Virginia pine	61	86	
MoF, MoG: Montevallo	Severe	Severe	Severe	Moderate	Slight	Loblolly pine	61	86	Loblolly pine, Virginia pine.
						Shortleaf pine	61	86	
						Virginia pine	61	86	
Pt: Pettyjon	Slight	Slight	Slight	Slight	Severe	Yellow-poplar	100	114	Yellow-poplar, black walnut.
						White oak	80	57	
SaE: Shelocta	Moderate	Moderate	Slight	Slight	Severe	White oak	77	57	Yellow-poplar, black walnut, eastern white pine, shortleaf pine, white ash, white oak, northern red oak.
						Yellow-poplar	99	100	
						Cucumbertree	---	---	
						American beech	---	---	
						Shortleaf pine	77	129	
						Red maple	81	---	
						Scarlet oak	80	57	
SaF, ShF: Shelocta	Severe	Severe	Slight	Slight	Severe	White oak	77	57	Yellow-poplar, black walnut, eastern white pine, shortleaf pine, white ash, white oak, northern red oak.
						Yellow-poplar	99	100	
						Cucumbertree	---	---	
						American beech	---	---	
						Shortleaf pine	77	129	
						Red maple	81	---	
						Scarlet oak	80	57	
St: Steadman	Slight	Slight	Slight	Slight	Severe	Northern red oak	86	72	Northern red oak, shortleaf pine, eastern white pine.
						White oak	85	72	
						Yellow-poplar	95	100	
TbD2**, TbE2**:									
Talbott	Moderate	Moderate	Slight	Slight	Moderate	Northern red oak	65	43	Loblolly pine, shortleaf pine, eastern redcedar, Virginia pine.
						Loblolly pine	80	114	
						Shortleaf pine	64	100	
						Eastern redcedar	46	57	
Rock outcrop.									
Bradyville	Moderate	Moderate	Slight	Slight	Moderate	Yellow-poplar	90	86	Yellow-poplar, loblolly pine.
						Northern red oak	70	57	
						White oak	70	57	
						Eastern redcedar	40	43	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
UnG------------ Unicoi	Moderate	Severe	Moderate	Severe	Slight	Virginia pine-------	50	72	Virginia pine.
						Pitch pine----------	40	57	
						Scarlet oak---------	50	72	
						Chestnut oak--------	50	72	
WaF------------ Wallen	Moderate	Severe	Moderate	Moderate	Slight	Northern red oak----	60	43	Shortleaf pine, Virginia pine, loblolly pine.
						Shortleaf pine------	60	86	
						Virginia pine-------	65	100	
WbC2----------- Waynesboro	Slight	Slight	Slight	Slight	Moderate	Yellow-poplar-------	90	86	Yellow-poplar, shortleaf pine, loblolly pine, black walnut.
						Southern red oak----	70	57	
						White oak-----------	70	57	
						Loblolly pine-------	80	114	
WbD2----------- Waynesboro	Moderate	Moderate	Slight	Slight	Moderate	Yellow-poplar-------	90	86	Yellow-poplar, shortleaf pine, loblolly pine, black walnut.
						Southern red oak----	70	57	
						White oak-----------	70	57	
						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 7.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
BaD2 Bays	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: erodes easily.	Severe: slope, depth to rock.
BaE2, BaF2 Bays	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, erodes easily.	Severe: slope, depth to rock.
BeB Bellamy	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Moderate: wetness.	Moderate: wetness.
Bm Bloomingdale	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
BrE, BrF Brookshire	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
CaE, CaF, CaG, CcF Cataska	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
CeC2*:					
Collegedale	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Etowah	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
CeD3*:					
Collegedale	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Etowah	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
CeE3*:					
Collegedale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Etowah	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CuD*:					
Collegedale	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Urban land.					

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
CuE*:					
Collegedale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Urban land.					
DtE, DtF, DtG Ditney	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
HoB Holston	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
HoC2 Holston	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
HoD2 Holston	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
HuC*:					
Holston	Slight	Slight	Severe: slope.	Slight	Slight.
Urban land.					
JeE, JeF Jeffrey	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
JuC Junaluska	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, depth to rock.
JuD Junaluska	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
JuE Junaluska	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
KeC Keener	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Moderate: large stones.	Severe: large stones.
KeD Keener	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: large stones, slope.	Severe: large stones, slope.
KeE Keener	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.	Severe: large stones, slope.
LoD Lonon	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
MaD Maymead	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
MaE, MaF Maymead	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
MoD: Montevallo	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Moderate: slope.	Severe: droughty, slope.
MoE, MoF, MoG: Montevallo	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.	Severe: droughty, slope.
Pt: Pettyjon	Severe: flooding.	Slight	Slight	Slight	Slight.
SaE, SaF, ShF: Shelocta	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
St: Steadman	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
TbD2*:					
Talbott	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Rock outcrop.					
Bradyville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
TbE2*:					
Talbott	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
Bradyville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily, slope.	Severe: slope.
UnG: Unicoi	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: depth to rock, slope.
Ur*. Urban land					
WaF: Wallen	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
WbC2: Waynesboro	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
WbD2: Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
BaD2: Bays	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.
BaE2, BaF2: Bays	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.
BeB: Bellamy	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Bm: Bloomingdale	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
BrE, BrF: Brookshire	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
CaE, CaF, CaG, CcF: Cataska	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
CeC2*:										
Collegedale	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Etowah	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CeD3*:										
Collegedale	Poor	Fair	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Etowah	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CeE3*:										
Collegedale	Very poor.	Fair	Fair	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Etowah	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CuD*:										
Collegedale	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Urban land.										
CuE*:										
Collegedale	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Urban land.										
DtE, DtF, DtG: Ditney	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
HoB: Holston	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HoC2: Holston	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HoD2: Holston	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
HuC*:										
Holston	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Urban land.										
JeE, JeF: Jeffrey	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
JuC: Junaluska	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
JuD: Junaluska	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
JuE: Junaluska	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
KeC: Keener	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
KeD: Keener	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
KeE: Keener	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
LoD: Lonon	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
MaD: Maymead	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
MaE, MaF: Maymead	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
MoD: Montevallo	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
MoE, MoF, MoG: Montevallo	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Pt: Pettyjon	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
SaE: Shelocta	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
SaF, ShF: Shelocta	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
St----------------- Steadman	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
TbD2*, TbE2*:										
Talbott-----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rock outcrop.										
Bradyville--------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Very poor.	Poor	Very poor.
UnG---------------- Unicoi	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Ur*. Urban land										
WaF---------------- Wallen	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
WbC2--------------- Waynesboro	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WbD2--------------- Waynesboro	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
BaD2, BaE2, BaF2-- Bays	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.
BeB--------------- Bellamy	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: low strength, wetness.	Moderate: wetness.
Bm---------------- Bloomingdale	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness.
BrE, BrF---------- Brookshire	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CaE, CaF, CaG, CcF-------------- Cataska	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
CeC2*:						
Collegedale------	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
Etowah-----------	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
CeD3*, CeE3*:						
Collegedale------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Etowah-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CuD*:						
Collegedale------	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
Urban land.						
CuE*:						
Collegedale------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Urban land.						
DtE, DtF, DtG----- Ditney	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
HoB--------------- Holston	Slight---------	Slight---------	Slight---------	Slight---------	Slight---------	Slight.
HoC2-------------- Holston	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
HoD2-------------- Holston	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
HuC*:						
Holston----------	Slight---------	Slight---------	Slight---------	Moderate: slope.	Slight---------	Slight.
Urban land.						
JeE, JeF---------- Jeffrey	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
JuC--------------- Junaluska	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: slope, depth to rock.
JuD, JuE---------- Junaluska	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
KeC--------------- Keener	Moderate: large stones, slope.	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Moderate: slope, large stones.	Severe: large stones.
KeD, KeE---------- Keener	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
LoD--------------- Lonon	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MaD, MaE, MaF----- Maymead	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MoD, MoE, MoF, MoG-------------- Montevallo	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
Pt---------------- Pettyjon	Slight---------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
SaE, SaF, ShF----- Shelocta	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
St---------------- Steadman	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding.	Moderate: wetness, flooding.
TbD2*, TbE2*:						
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 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
TbD2*, TbE2*:						
Rock outcrop.						
Bradyville--------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
UnG--------------- Unicoi	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: depth to rock, slope.
Ur*. Urban land						
WaF--------------- Wallen	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
WbC2-------------- Waynesboro	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
WbD2-------------- Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
BaD2, BaE2, BaF2---- Bays	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
BeB----------------- Bellamy	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
Bm------------------ Bloomingdale	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
BrE, BrF------------ Brookshire	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
CaE, CaF, CaG, CcF-- Cataska	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.
CeC2*:					
Collegedale--------	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
Etowah-------------	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey.
CeD3*, CeE3*:					
Collegedale--------	Severe: percs slowly, slope.	Severe: slope.	Severe: too clayey, slope.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Etowah-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
CuD*:					
Collegedale--------	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
Urban land.					
CuE*:					
Collegedale--------	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Urban land.					

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
DtE, DtF, DtG: Ditney	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.
HoB: Holston	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, small stones.
HoC2: Holston	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, small stones, slope.
HoD2: Holston	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
HuC*: Holston	Moderate: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight	Fair: too clayey, small stones.
Urban land.					
JeE, JeF: Jeffrey	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.
JuC: Junaluska	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: seepage, depth to rock.	Severe: seepage, depth to rock.	Poor: depth to rock, small stones.
JuD, JuE: Junaluska	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: seepage, depth to rock, slope.	Poor: depth to rock, small stones, slope.
KeC: Keener	Moderate: percs slowly, slope, large stones.	Severe: seepage, slope.	Severe: seepage, large stones.	Moderate: slope.	Fair: too clayey, large stones, slope.
KeD, KeE: Keener	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, large stones.	Severe: slope.	Poor: slope.
LoD: Lonon	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
MaD, MaE, MaF: Maymead	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
MoD, MoE, MoF, MoG: Montevallo	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Pt------------------ Pettyjon	Moderate: flooding, percs slowly.	Moderate: seepage.	Moderate: flooding.	Moderate: flooding.	Good.
SaE, SaF, ShF------- Shelocta	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: slope.	Poor: small stones, slope.
St------------------ Steadman	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
TbD2*, TbE2*:					
Talbott------------	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
Rock outcrop.					
Bradyville---------	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: too clayey, hard to pack, slope.
UnG----------------- Unicoi	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
Ur*. Urban land					
WaF----------------- Wallen	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.
WbC2---------------- Waynesboro	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
WbD2---------------- Waynesboro	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
BaD2: Bays	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
BaE2, BaF2: Bays	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
BeB: Bellamy	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Bm: Bloomingdale	Poor: wetness.	Improbable: excess fines.	Improbable: too clayey, excess fines.	Poor: too clayey, wetness.
BrE, BrF: Brookshire	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
CaE, CaF, CaG, CcF: Cataska	Poor: depth to rock, slope.	Improbable: small stones, thin layer.	Improbable: thin layer.	Poor: small stones, slope.
CeC2*:				
Collegedale	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Etowah	Fair: low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey, slope.
CeD3*:				
Collegedale	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Etowah	Fair: low strength, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
CeE3*:				
Collegedale	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Etowah	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
CuD*:				
Collegedale	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Urban land.				
CuE*:				
Collegedale	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Urban land.				
DtE, DtF, DtG: Ditney	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
HoB, HoC2: Holston	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
HoD2: Holston	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
HuC*:				
Holston	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Urban land.				
JeE, JeF: Jeffrey	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
JuC: Junaluska	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
JuD: Junaluska	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
JuE: Junaluska	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
KeC: Keener	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, area reclaim.
KeD: Keener	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, area reclaim, slope.
KeE: Keener	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, area reclaim, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
LoD: Lonon	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
MaD: Maymead	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
MaE, MaF: Maymead	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
MoD: Montevallo	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, depth to rock, slope.
MoE, MoF, MoG: Montevallo	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, depth to rock, slope.
Pt: Pettyjon	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
SaE, SaF, ShF: Shelocta	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
St: Steadman	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
TbD2*:				
Talbott	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Rock outcrop.				
Bradyville	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, hard to pack, slope.
TbE2*:				
Talbott	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Rock outcrop.				
Bradyville	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, hard to pack, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
UnG: Unicoi	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Ur*. Urban land				
WaF: Wallen	Poor: depth to rock, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, slope.
WbC2: Waynesboro	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
WbD2: Waynesboro	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
BaD2, BaE2, BaF2-- Bays	Severe: depth to rock, slope.	Severe: piping.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
BeB--------------- Bellamy	Moderate: seepage, slope.	Severe: piping.	Slope----------	Erodes easily, wetness.	Erodes easily.
Bm---------------- Bloomingdale	Moderate: seepage.	Severe: hard to pack, wetness.	Flooding-------	Erodes easily, wetness.	Wetness, erodes easily.
BrE, BrF---------- Brookshire	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope----------	Slope.
CaE, CaF, CaG, CcF-------------- Cataska	Severe: depth to rock, slope.	Severe: seepage, thin layer.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
CeC2*:					
Collegedale------	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Etowah-----------	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
CeD3*:					
Collegedale------	Slight---------	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, percs slowly.
Etowah-----------	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope----------	Slope.
CeE3*:					
Collegedale------	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, percs slowly.
Etowah-----------	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope----------	Slope.
CuD*, CuE*:					
Collegedale------	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Urban land.					

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
DtE, DtF, DtG----- Ditney	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
HoB--------------- Holston	Moderate: seepage, slope.	Severe: piping.	Deep to water	Favorable------	Favorable.
HoC2, HoD2-------- Holston	Severe: slope.	Severe: piping.	Deep to water	Slope----------	Slope.
HuC*:					
Holston----------	Moderate: seepage, slope.	Severe: piping.	Deep to water	Favorable------	Favorable.
Urban land.					
JeE, JeF---------- Jeffrey	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, depth to rock.	Slope, droughty.
JuC, JuD, JuE----- Junaluska	Severe: seepage, slope.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
KeC, KeD, KeE----- Keener	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, large stones.	Large stones, slope.
LoD--------------- Lonon	Severe: slope.	Severe: piping.	Deep to water	Slope----------	Slope.
MaD, MaE, MaF----- Maymead	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, large stones.	Large stones, slope.
MoD, MoE, MoF, MoG-------------- Montevallo	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
Pt---------------- Pettyjon	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.
SaE, SaF, ShF----- Shelocta	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope----------	Slope.
St---------------- Steadman	Moderate: seepage.	Severe: piping, wetness.	Flooding-------	Erodes easily, wetness.	Erodes easily.
TbD2*, TbE2*:					
Talbott----------	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Rock outcrop.					

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
TbD2*, TbE2*:					
Bradyville-------	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
UnG--------------- Unicoi	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Ur*. Urban land					
WaF--------------- Wallen	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
WbC2, WbD2-------- Waynesboro	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope----------	Slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 10 inches	Fragments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
BaD2, BaE2, BaF2---------Bays	0-3	Silty clay loam.	CL	A-4, A-6	0	0-2	95-100	80-95	75-95	70-85	25-40	8-20
	3-19	Channery silt loam, channery silty clay loam.	CL	A-4, A-6	0	0-2	70-80	65-80	60-70	50-65	25-40	8-20
	19	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
BeB-----------Bellamy	0-19	Loam----------	ML, CL-ML, CL	A-4	0	0	90-100	85-100	75-100	55-85	20-35	2-10
	19-32	Loam, clay loam, silt loam.	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	75-100	55-85	25-40	6-16
	32-54	Loam, clay loam, silt loam.	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	75-100	55-85	25-40	6-16
	54-72	Loam, clay loam, sandy clay loam.	CL, SC, SC-SM, CL-ML	A-4, A-6	0	0	90-100	85-100	70-90	40-80	25-40	6-16
Bm------------Bloomingdale	0-5	Silty clay loam.	CL-ML, CL	A-4, A-6	0	0	95-100	90-100	85-100	60-95	25-40	5-15
	5-60	Silty clay loam, silty clay, clay.	ML, MH, CL, CH	A-7, A-6	0	0	95-100	95-100	90-100	85-95	35-55	12-30
BrE, BrF------Brookshire	0-65	Silt loam, gravelly silt loam.	ML, CL, GC, GM	A-4	0-5	0-5	55-85	50-85	45-75	35-65	18-30	3-10
CaE-----------Cataska	0-4	Channery silt loam.	CL-ML, ML, GM, GM-GC	A-4	0-2	3-15	55-80	50-75	45-70	40-60	<30	NP-6
	4-18	Slaty silt loam, channery silt loam, very channery silt loam.	GM-GC, GM, GP-GM	A-2, A-1	0-2	10-25	15-50	10-45	10-40	10-35	<30	NP-7
	18-24	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
CaF-----------Cataska	0-4	Channery silt loam.	CL-ML, ML, GM, GM-GC	A-4	0-2	3-15	55-80	50-75	45-70	40-60	<30	NP-6
	4-15	Slaty silt loam, channery silt loam, very channery loam.	GM-GC, GM, GP-GM	A-2, A-1	0-2	10-25	15-50	10-45	10-40	10-35	<30	NP-7
	15-24	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 10 inches	Fragments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
CaG----------- Cataska	0-4	Channery silt loam.	CL-ML, ML, GM, GM-GC	A-4	0-2	3-15	55-80	50-75	45-70	40-60	<30	NP-6
	4-12	Slaty silt loam, channery silt loam, very channery silt loam.	GM-GC, GM, GP-GM	A-2, A-1	0-2	10-25	15-50	10-45	10-40	10-35	<30	NP-7
	12-24	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
CcF----------- Cataska	0-4	Cobbly loam---	GM-GC, GM	A-4	5-25	0-2	45-75	40-70	35-65	25-50	<30	NP-6
	4-15	Slaty silt loam, channery silt loam, very channery silt loam.	GM-GC, GM, GP-GM	A-2, A-1	0-2	10-25	15-50	10-45	10-40	10-35	<30	NP-7
	15-24	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
CeC2*:												
Collegedale--	0-4	Silt loam-----	CL-ML, CL	A-4, A-6	0	0-2	90-100	85-100	75-95	70-90	24-39	5-16
	4-62	Silty clay, clay.	CH, CL	A-7	0	0-2	95-100	90-100	80-95	75-95	41-75	18-42
Etowah-------	0-7	Silt loam-----	ML, CL, SC-SM, CL-ML	A-4	0	0	80-100	75-100	70-95	45-70	20-30	3-10
	7-52	Silty clay loam, clay loam, silt loam.	CL	A-6	0	0	80-100	75-100	70-95	65-85	25-35	10-15
	52-65	Silty clay loam, clay loam, clay.	CL, ML, MH	A-6, A-7	0	0	80-100	75-100	70-95	65-85	39-60	15-25
CeD3*, CeE3*:												
Collegedale--	0-4	Silty clay loam.	CL, ML, CH, MH	A-6, A-7	---	0-2	95-100	90-100	80-95	75-95	34-55	12-28
	4-60	Clay, silty clay.	CH, CL	A-7	---	0-2	95-100	90-100	80-95	75-95	41-75	18-42
Etowah-------	0-4	Silty clay loam.	CL	A-6	0	0	80-100	75-100	70-95	65-85	25-35	10-15
	4-50	Silty clay loam, clay loam, silt loam.	CL	A-6	0	0	80-100	75-100	70-95	65-85	25-35	10-15
	50-60	Silty clay loam, clay loam, clay.	CL, ML, MH	A-6, A-7	0	0	80-100	75-100	70-95	65-85	39-60	15-25
CuD*, CuE*:												
Collegedale--	0-4	Silt loam-----	CL-ML, CL	A-4, A-6	0	0-2	90-100	85-100	75-95	70-90	24-39	5-16
	4-62	Silty clay, clay.	CH, CL	A-7	0	0-2	95-100	90-100	80-95	75-95	41-75	18-42
Urban land.												

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct	Pct					Pct	
DtE, DtF, DtG-- Ditney	0-7	Sandy loam----	ML, CL-ML, SC-SM, SM	A-4, A-2-4	0	0-6	90-100	80-95	65-80	30-60	<30	NP-10
	7-24	Loam, cobbly sandy loam, fine sandy loam.	SM, ML, CL-ML, SC-SM	A-4, A-2-4	0	5-30	65-100	60-100	45-75	25-60	<30	NP-10
	24-27	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
	27	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
HoB----------- Holston	0-6	Loam----------	ML, CL-ML, SM, SC-SM	A-4, A-2	0	0-5	80-100	75-100	65-100	30-75	<22	NP-6
	6-23	Loam, clay loam, sandy clay loam.	ML, CL-ML, SM, SC-SM	A-4, A-2	0	0-5	80-100	75-100	50-100	30-80	21-33	3-10
	23-62	Clay loam, loam, gravelly clay loam.	ML, CL, GC, SC	A-4, A-6, A-7, A-2	0	0-15	60-100	55-100	50-100	30-80	30-50	7-22
HoC2, HoD2---- Holston	0-5	Loam----------	ML, CL-ML, SM, SC-SM	A-4, A-2	0	0-5	80-100	75-100	65-100	30-75	<22	NP-6
	5-23	Loam, clay loam, sandy clay loam.	ML, CL-ML, SM, SC-SM	A-4, A-2	0	0-5	80-100	75-100	50-100	30-80	21-33	3-10
	23-62	Clay loam, loam, gravelly clay loam.	ML, CL, GC, SC	A-4, A-6, A-7, A-2	0	0-15	60-100	55-100	50-100	30-80	30-50	7-22
HuC*:												
Holston------	0-5	Loam----------	ML, CL-ML, SM, SC-SM	A-4, A-2	0	0-5	80-100	75-100	65-100	30-75	<22	NP-6
	5-23	Loam, clay loam, sandy clay loam.	ML, CL-ML, SM, SC-SM	A-4, A-2	0	0-5	80-100	75-100	50-100	30-80	21-33	3-10
	23-62	Clay loam, loam, gravelly clay loam.	ML, CL, GC, SC	A-4, A-6, A-7, A-2	0	0-15	60-100	55-100	50-100	30-80	30-50	7-22
Urban land.												
JeE, JeF------ Jeffrey	0-9	Loam----------	ML, SM	A-4	0	0-2	80-90	75-85	65-80	40-60	<30	NP-7
	9-28	Cobbly sandy loam, cobbly loam, gravelly fine sandy loam.	ML, SM, GM	A-4, A-2	0	5-20	65-90	55-85	45-75	30-60	<30	NP-7
	28	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
JuC, JuD, JuE- Junaluska	0-10	Loam----------	SM, ML, MH	A-6, A-5, A-4	---	0-5	85-100	80-100	65-89	35-60	29-56	NP-14
	10-27	Channery loam, channery clay loam, sandy clay loam.	CL, ML, SC, SM	A-6, A-7	---	5-15	75-100	60-100	55-95	40-73	29-50	10-20
	27-67	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
KeC, KeD, KeE-Keener	0-10	Gravelly fine sandy loam.	ML, SM, CL-ML, SC-SM	A-4	0	5-35	85-95	80-95	65-95	40-80	<25	NP-7
	10-50	Cobbly clay loam, cobbly sandy clay loam.	ML, CL-ML, CL	A-4	0	15-35	95-100	95-100	70-100	55-85	18-30	3-10
	50-63	Very cobbly clay loam, very cobbly sandy clay loam.	CL-ML, SC-SM, SM, SC	A-4	0	15-50	95-100	95-100	70-100	40-70	18-30	3-10
LoD-----------Lonon	0-6	Loam----------	SM, ML	A-2-4, A-4	---	0-5	90-100	85-100	60-85	25-65	<30	NP-7
	6-50	Cobbly loam, cobbly sandy clay loam, cobbly clay loam.	ML, SC, CL, SM	A-4, A-6, A-2	---	10-25	85-95	75-90	65-80	30-55	25-40	7-14
	50-65	Very cobbly loam, very cobbly sandy clay loam, very cobbly clay loam.	ML, SC, CL, GC	A-4, A-6, A-2	---	25-45	55-80	55-75	50-70	25-65	25-40	7-14
MaD, MaE------Maymead	0-4	Loam----------	ML, CL-ML	A-4	0	0-3	80-95	75-90	65-80	50-60	<25	NP-7
	4-63	Gravelly loam, cobbly loam, cobbly sandy loam.	CL-ML, ML, SM, GM	A-4	0	10-25	70-90	65-85	55-75	40-60	<25	NP-7
MaF-----------Maymead	0-12	Loam----------	ML, CL-ML	A-4	0	0-3	80-95	75-90	65-80	50-60	<25	NP-7
	12-63	Gravelly loam, cobbly loam, very cobbly loam, extremely cobbly loam.	CL-ML, ML, SM, GM	A-4	0	10-45	70-90	65-85	55-75	40-60	<25	NP-7
MoD, MoE, MoF, MoG----------Montevallo	0-5	Channery silt loam.	SC-SM, SC, CL-ML, CL	A-4	0	0-5	60-88	50-75	45-70	40-65	<30	NP-10
	5-16	Very channery silt loam, extremely channery loam.	GM-GC, GC, SC-SM, SC	A-2, A-4, A-6, A-1-b	0	0-5	35-70	23-50	15-45	15-40	20-40	2-15
	16-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Pt------------Pettyjon	0-6	Loam----------	ML	A-4	0	0	95-100	95-100	90-100	70-90	<30	NP-7
	6-44	Loam, fine sandy loam, silt loam.	ML	A-4	0	0	95-100	95-100	90-100	70-90	<30	NP-7
	44-64	Loam, fine sandy loam, silt loam.	ML, SM	A-4	0	0	95-100	95-100	90-100	40-85	<30	NP-7

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
SaE, SaF------ Shelocta	0-4	Silt loam-----	ML, CL-ML	A-4	0-2	0-5	80-95	75-95	60-95	55-90	<35	NP-10
	4-24	Silty clay loam, silt loam, channery silty clay loam.	CL, CL-ML, GC, SC	A-6, A-4	0-5	0-10	55-95	50-95	45-95	40-90	25-40	4-15
	24-65	Channery silt loam, channery silty clay loam, very channery clay loam.	GM, GC, ML, CL	A-4, A-6, A-2, A-1-b	0-10	0-15	40-85	35-70	25-70	20-65	20-40	3-20
ShF----------- Shelocta	0-4	Loam----------	ML, CL-ML	A-4	0-2	0-5	80-95	75-95	60-95	55-90	<35	NP-10
	4-23	Silty clay loam, silt loam, channery silty clay loam.	CL, CL-ML, GC, SC	A-6, A-4	0-5	0-10	55-95	50-95	45-95	40-90	25-40	4-15
	23-50	Channery silt loam, channery silty clay loam, very channery clay loam.	GM, GC, ML, CL	A-4, A-6, A-2, A-1-b	0-10	0-15	40-85	35-70	25-70	20-65	20-40	3-20
	50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
St------------ Steadman	0-12	Silt loam-----	ML, CL, CL-ML	A-4, A-6	0	0	100	95-100	80-100	70-95	20-35	2-15
	12-52	Silt loam, silty clay loam.	CL, CH	A-4, A-6, A-7	0	0	100	95-100	90-100	85-95	35-55	12-30
	52-75	Loam, silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	0	100	95-100	90-100	70-95	25-40	4-18
TbD2*:												
Talbott------	0-2	Silt loam-----	CL	A-4, A-6	0	0-5	95-100	90-100	85-95	75-95	25-40	8-16
	2-22	Clay, silty clay.	CL, MH, CH	A-7	0	0-10	95-100	90-100	85-95	80-95	41-80	20-45
	22	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Rock outcrop.												
Bradyville---	0-3	Silt loam-----	ML, CL, CL-ML	A-4, A-6	0	0-5	80-100	75-100	70-95	65-90	15-35	3-15
	3-21	Silty clay loam.	CL	A-7, A-6	0	0-5	80-100	75-100	70-95	65-90	32-45	12-22
	21-48	Silty clay, clay.	CH, MH	A-7	0	0-10	80-100	75-100	65-90	60-85	52-70	26-40
	48	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 10 inches	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
TbE2*:												
Talbott------	0-2	Silt loam-----	CL	A-4, A-6	0	0-5	95-100	90-100	85-95	75-95	25-40	8-16
	2-22	Clay, silty clay.	CL, MH, CH	A-7	0	0-10	95-100	90-100	85-95	80-95	41-80	20-45
	22	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Rock outcrop.												
Bradyville---	0-10	Silt loam-----	ML, CL, CL-ML	A-4, A-6	0	0-5	80-100	75-100	70-95	65-90	15-35	3-15
	10-21	Silty clay loam.	CL	A-7, A-6	0	0-5	80-100	75-100	70-95	65-90	32-45	12-22
	21-48	Silty clay, clay.	CH, MH	A-7	0	0-10	80-100	75-100	65-90	60-85	52-70	26-40
	48	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
UnG----------- Unicoi	0-5	Cobbly sandy loam.	SM, SC-SM	A-2, A-1-b	0-5	5-25	70-85	60-75	30-50	20-35	<25	NP-6
	5-18	Very cobbly loam, very cobbly sandy loam, very stony loam.	GM, GM-GC, SM, SC-SM	A-2, A-1-b	0	20-50	60-75	40-65	30-50	20-35	<25	NP-6
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Ur*. Urban land												
WaF----------- Wallen	0-5	Gravelly loam	ML, SM, CL-ML, SC-SM	A-2, A-4	0	2-15	70-85	60-80	40-70	30-55	<35	NP-10
	5-32	Very gravelly loam, very cobbly silt loam, very channery fine sandy loam.	GM, GM-GC, SC-SM, SM	A-2, A-4, A-1	0	25-55	35-65	30-60	20-50	10-40	<35	NP-10
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
WbC2, WbD2---- Waynesboro	0-5	Loam----------	ML, CL-ML, CL, SM	A-4	0	0-5	85-100	80-100	70-95	43-70	18-30	2-9
	5-11	Clay loam, loam, sandy clay loam.	CL, SC	A-4, A-6, A-7	0	0-5	90-100	85-100	75-95	45-75	30-41	9-17
	11-62	Clay loam, sandy clay, clay.	MH, CL, ML	A-4, A-6, A-7	0	0-5	90-100	80-100	70-98	55-75	35-68	9-32

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
BaD2, BaE2, BaF2-	0-3	20-35	1.30-1.50	0.6-2.0	0.18-0.22	5.1-8.4	Low----------	0.37	2	1-2
Bays	3-19	20-35	1.30-1.50	0.6-2.0	0.13-0.17	5.1-8.4	Low----------	0.32		
	19	---	---	0.0-0.2	---	---	-------------	----		
BeB--------------	0-19	12-25	1.35-1.50	0.6-2.0	0.16-0.22	4.5-6.5	Low----------	0.37	5	1-2
Bellamy	19-32	18-32	1.45-1.60	0.2-0.6	0.14-0.18	4.5-6.5	Low----------	0.32		
	32-54	18-32	1.40-1.55	0.6-2.0	0.14-0.18	4.5-6.5	Low----------	0.32		
	54-72	20-35	1.40-1.55	0.6-2.0	0.14-0.18	4.5-6.5	Low----------	0.32		
Bm---------------	0-5	18-30	1.10-1.30	0.6-2.0	0.17-0.22	5.6-8.4	Low----------	0.37	5	1-3
Bloomingdale	5-60	35-60	1.30-1.50	0.6-2.0	0.17-0.22	5.6-8.4	Moderate-----	0.37		
BrE, BrF---------	0-65	10-18	1.30-1.45	2.0-20	0.13-0.18	5.1-5.5	Low----------	0.32	4	1-3
Brookshire										
CaE--------------	0-4	12-22	1.30-1.40	2.0-20	0.10-0.14	5.1-5.5	Low----------	0.20	1	1-3
Cataska	4-18	12-22	1.30-1.45	2.0-20	0.04-0.09	5.1-5.5	Low----------	0.15		
	18-24	---	---	0.0-0.06	---	---	-------------	----		
CaF--------------	0-4	12-22	1.30-1.40	2.0-20	0.10-0.14	5.1-5.5	Low----------	0.20	1	1-3
Cataska	4-15	12-22	1.30-1.45	2.0-20	0.04-0.09	5.1-5.5	Low----------	0.15		
	15-24	---	---	0.0-0.06	---	---	-------------	----		
CaG--------------	0-4	12-22	1.30-1.40	2.0-20	0.10-0.14	5.1-5.5	Low----------	0.20	1	1-3
Cataska	4-12	12-22	1.30-1.45	2.0-20	0.04-0.09	5.1-5.5	Low----------	0.15		
	12-24	---	---	0.0-0.06	---	---	-------------	----		
CcF--------------	0-4	12-22	1.30-1.40	2.0-20	0.08-0.12	3.6-5.5	Low----------	0.15	1	1-3
Cataska	4-15	12-22	1.30-1.45	2.0-20	0.04-0.09	3.6-5.5	Low----------	0.15		
	15-24	---	---	0.0-0.06	---	---	-------------	----		
CeC2*:										
Collegedale-----	0-4	20-35	1.30-1.50	0.6-2.0	0.18-0.22	4.5-5.5	Low----------	0.37	5	1-2
	4-62	40-60	1.45-1.60	0.2-0.6	0.12-0.16	4.5-5.5	Moderate-----	0.24		
Etowah----------	0-7	15-27	1.30-1.45	0.6-2.0	0.15-0.20	4.5-5.5	Low----------	0.37	5	1-3
	7-52	23-35	1.35-1.50	0.6-2.0	0.16-0.20	4.5-5.5	Low----------	0.32		
	52-65	32-45	1.40-1.55	0.6-2.0	0.16-0.20	4.5-5.5	Low----------	0.32		
CeD3*, CeE3*:										
Collegedale-----	0-4	35-45	1.40-1.60	0.2-0.6	0.14-0.20	4.5-5.5	Moderate-----	0.28	5	1-2
	4-60	40-60	1.50-1.70	0.2-0.6	0.12-0.16	4.5-5.5	Moderate-----	0.24		
Etowah----------	0-4	27-35	1.35-1.50	0.6-2.0	0.16-0.20	4.5-5.5	Low----------	0.32	5	1-3
	4-50	23-35	1.35-1.50	0.6-2.0	0.16-0.20	4.5-5.5	Low----------	0.32		
	50-60	32-45	1.40-1.55	0.6-2.0	0.16-0.20	4.5-5.5	Low----------	0.32		
CuD*, CuE*:										
Collegedale-----	0-4	20-35	1.30-1.50	0.6-2.0	0.18-0.22	4.5-5.5	Low----------	0.37	5	1-2
	4-62	40-60	1.45-1.60	0.2-0.6	0.12-0.16	4.5-5.5	Moderate-----	0.24		
Urban land.										

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
DtE, DtF, DtG: Ditney	0-7	5-18	1.50-1.65	2.0-6.0	0.10-0.15	3.6-5.5	Low	0.24	2	1-3
	7-24	5-18	1.50-1.65	2.0-6.0	0.10-0.15	3.6-5.5	Low	0.24		
	24-27	---	---	0.0-0.02	---	---	-------------	----		
	27	---	---	0.0-0.01	---	---	-------------	----		
HoB: Holston	0-6	10-25	1.35-1.50	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.28	5	.5-2
	6-23	18-35	1.40-1.55	0.6-2.0	0.13-0.20	4.5-5.5	Low	0.32		
	23-62	20-45	1.40-1.60	0.6-2.0	0.10-0.18	4.5-5.5	Low	0.32		
HoC2, HoD2: Holston	0-5	10-25	1.35-1.50	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.28	5	.5-2
	5-23	18-35	1.40-1.55	0.6-2.0	0.13-0.20	4.5-5.5	Low	0.32		
	23-62	20-45	1.40-1.60	0.6-2.0	0.10-0.18	4.5-5.5	Low	0.32		
HuC*:										
Holston	0-5	10-25	1.35-1.50	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.28	5	.5-2
	5-23	18-35	1.40-1.55	0.6-2.0	0.13-0.20	4.5-5.5	Low	0.32		
	23-62	20-45	1.40-1.60	0.6-2.0	0.10-0.18	4.5-5.5	Low	0.32		
Urban land.										
JeE, JeF: Jeffrey	0-9	10-18	1.45-1.55	0.6-6.0	0.10-0.15	4.5-5.5	Low	0.17	2	2-4
	9-28	8-15	1.45-1.55	0.6-6.0	0.07-0.13	4.5-5.5	Low	0.17		
	28	---	---	0.0-0.02	---	---	-------------	----		
JuC, JuD, JuE: Junaluska	0-10	5-18	1.35-1.60	2.0-6.0	0.12-0.20	3.6-6.0	Low	0.28	2	1-3
	10-27	18-35	1.30-1.65	0.6-2.0	0.12-0.18	3.6-6.0	Low	0.15		
	27-67	---	---	---	---	---	-------------	----		
KeC, KeD, KeE: Keener	0-10	5-25	1.35-1.60	2.0-6.0	0.12-0.17	4.5-6.0	Low	0.20	5	1-2
	10-50	10-35	1.30-1.45	0.6-2.0	0.10-0.15	4.5-6.0	Low	0.20		
	50-63	10-35	1.30-1.45	2.0-6.0	0.08-0.12	4.5-6.0	Low	0.20		
LoD: Lonon	0-6	7-20	1.35-1.60	2.0-6.0	0.14-0.20	3.6-6.0	Low	0.24	5	.5-2
	6-50	18-35	1.30-1.50	0.6-2.0	0.09-0.15	3.6-6.0	Low	0.15		
	50-65	18-35	1.30-1.50	0.6-2.0	0.09-0.15	3.6-6.0	Low	0.15		
MaD, MaE: Maymead	0-4	8-18	1.40-1.55	2.0-6.0	0.15-0.18	4.5-5.5	Low	0.24	5	1-3
	4-63	8-18	1.40-1.55	2.0-6.0	0.13-0.18	4.5-5.5	Low	0.17		
MaF: Maymead	0-12	8-18	1.40-1.55	2.0-6.0	0.15-0.18	4.5-5.5	Low	0.24	5	1-3
	12-63	8-18	1.40-1.55	2.0-6.0	0.13-0.18	4.5-5.5	Low	0.17		
MoD, MoE, MoF, MoG: Montevallo	0-5	7-27	1.25-1.45	0.6-2.0	0.09-0.18	4.5-6.0	Low	0.28	1	.5-2
	5-16	15-35	1.25-1.50	0.6-2.0	0.02-0.12	4.5-6.0	Low	0.32		
	16-60	---	---	0.0-0.2	---	---	-------------	----		
Pt: Pettyjon	0-6	12-27	1.20-1.50	0.6-2.0	0.17-0.22	6.6-7.8	Low	0.37	5	1-3
	6-44	18-27	1.20-1.50	0.6-2.0	0.17-0.22	6.6-7.8	Low	0.37		
	44-64	12-27	1.30-1.60	0.6-2.0	0.15-0.20	6.6-7.8	Low	0.32		
SaE, SaF: Shelocta	0-4	10-25	1.15-1.30	0.6-2.0	0.16-0.22	4.5-5.5	Low	0.32	4	.5-3
	4-24	18-34	1.30-1.55	0.6-2.0	0.10-0.20	4.5-5.5	Low	0.28		
	24-65	15-34	1.30-1.55	0.6-6.0	0.08-0.16	4.5-5.5	Low	0.17		
ShF: Shelocta	0-4	10-25	1.15-1.30	0.6-2.0	0.16-0.22	4.5-5.5	Low	0.32	4	.5-3
	4-23	18-34	1.30-1.55	0.6-2.0	0.10-0.20	4.5-5.5	Low	0.28		
	23-50	15-34	1.30-1.55	0.6-6.0	0.08-0.16	4.5-5.5	Low	0.17		
	50	---	---	0.0-0.06	---	---	-------------	----		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
St---------------- Steadman	0-12	12-30	1.10-1.30	0.6-2.0	0.17-0.22	5.6-7.8	Low----------	0.37	5	1-3
	12-52	12-35	1.30-1.50	0.6-2.0	0.17-0.22	5.6-7.8	Moderate-----	0.37		
	52-75	12-30	1.10-1.30	0.6-2.0	0.12-0.18	5.6-7.8	Low----------	0.32		
TbD2*:										
Talbott----------	0-2	15-27	1.35-1.50	0.6-2.0	0.10-0.18	6.1-7.8	Moderate-----	0.37	2	.5-2
	2-22	40-60	1.40-1.60	0.2-0.6	0.10-0.14	6.1-7.8	Moderate-----	0.24		
	22	---	---	0.0-0.06	---	---	-------------	----		
Rock outcrop.										
Bradyville------	0-3	18-27	1.40-1.55	0.6-2.0	0.18-0.22	6.1-7.8	Low----------	0.43	3	.5-2
	3-21	32-40	1.40-1.55	0.6-2.0	0.14-0.18	6.1-7.8	Moderate-----	0.32		
	21-48	48-60	1.30-1.50	0.2-0.6	0.10-0.15	6.1-7.8	Moderate-----	0.28		
	48	---	---	0.0-0.06	---	---	-------------	----		
TbE2*:										
Talbott----------	0-2	15-27	1.35-1.50	0.6-2.0	0.10-0.18	6.1-7.8	Moderate-----	0.37	2	.5-2
	2-22	40-60	1.40-1.60	0.2-0.6	0.10-0.14	6.1-7.8	Moderate-----	0.24		
	22	---	---	0.0-0.06	---	---	-------------	----		
Rock outcrop.										
Bradyville------	0-10	18-27	1.40-1.55	0.6-2.0	0.18-0.22	6.1-7.8	Low----------	0.43	3	.5-2
	10-21	32-40	1.40-1.55	0.6-2.0	0.14-0.18	6.1-7.8	Moderate-----	0.32		
	21-48	48-60	1.30-1.50	0.2-0.6	0.10-0.15	6.1-7.8	Moderate-----	0.28		
	48	---	---	0.0-0.06	---	---	-------------	----		
UnG--------------- Unicoi	0-5	5-20	1.45-1.55	2.0-6.0	0.08-0.12	3.6-5.5	Low----------	0.20	1	.5-2
	5-18	5-20	1.45-1.60	2.0-6.0	0.04-0.09	3.6-5.5	Low----------	0.15		
	18	---	---		---	---	-------------	----		
Ur*. Urban land										
WaF--------------- Wallen	0-5	8-20	1.40-1.55	2.0-6.0	0.07-0.12	4.5-6.0	Low----------	0.17	2	0-2
	5-32	8-20	1.40-1.55	2.0-6.0	0.05-0.09	4.5-6.0	Low----------	0.17		
	32	---	---		---	---	-------------	----		
WbC2, WbD2-------- Waynesboro	0-5	10-30	1.40-1.55	0.6-2.0	0.15-0.21	4.5-5.5	Low----------	0.28	5	.5-2
	5-11	23-35	1.40-1.55	0.6-2.0	0.14-0.20	4.5-5.5	Low----------	0.28		
	11-62	35-50	1.40-1.55	0.6-2.0	0.13-0.18	4.5-5.5	Low----------	0.28		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In			
BaD2, BaE2, BaF2-- Bays	C	None--------	---	---	>6.0	---	---	10-20	Soft	Low------	High.
BeB--------------- Bellamy	C	None--------	---	---	1.5-3.0	Perched	Jan-Mar	>60	---	Moderate	Moderate.
Bm---------------- Bloomingdale	D	Occasional	Brief-----	Nov-May	0-1.0	Apparent	Nov-May	>60	---	High-----	Low.
BrE, BrF---------- Brookshire	C	None--------	---	---	>6.0	---	---	40-70	Hard	Low------	Moderate.
CaE, CaF, CaG, CcF-------------- Cataska	D	None--------	---	---	>6.0	---	---	10-20	Soft	Low------	Moderate.
CeC2*, CeD3*, CeE3*:											
Collegedale-----	C	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
Etowah----------	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
CuD*, CuE*:											
Collegedale------	C	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
Urban land.											
DtE, DtF, DtG----- Ditney	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	Moderate.
HoB, HoC2, HoD2--- Holston	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
HuC*:											
Holston----------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
Urban land.											
JeE, JeF---------- Jeffrey	B	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	Moderate.
JuC, JuD, JuE----- Junaluska	B	None--------	---	---	>6.0	---	---	20-40	Soft	Moderate	High.
KeC, KeD, KeE----- Keener	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
LoD--------------- Lonon	B	None--------	---	---	>6.0	---	---	>60	---	Low------	High.
MaD, MaE, MaF----- Maymead	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
MoD, MoE, MoF, MoG-------------- Montevallo	D	None--------	---	---	>6.0	---	---	10-20	Soft	Moderate	Moderate.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In			
Pt----------------- Pettyjon	B	Rare---------	---	---	>6.0	---	---	>60	---	Moderate	Low.
SaE, SaF, ShF----- Shelocta	B	None---------	---	---	>6.0	---	---	>48	Hard	Low-------	High.
St----------------- Steadman	C	Occasional	Very brief	Dec-Apr	1.5-3.0	Apparent	Dec-Apr	>60	---	Moderate	Low.
TbD2*, TbE2*:											
Talbott-----------	C	None---------	---	---	>6.0	---	---	20-40	Hard	High------	Moderate.
Rock outcrop.											
Bradyville--------	C	None---------	---	---	>6.0	---	---	40-60	Hard	High------	Moderate.
UnG---------------- Unicoi	C	None---------	---	---	>6.0	---	---	10-20	Hard	Low-------	Moderate.
Ur* Urban land											
WaF---------------- Wallen	B	None---------	---	---	>6.0	---	---	20-40	Hard	Low-------	High.
WbC2, WbD2--------- Waynesboro	B	None---------	---	---	>6.0	---	---	>60	---	High------	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Bays	Loamy, mixed, thermic, shallow Ruptic-Alfic Eutrochrepts
Bellamy	Fine-loamy, siliceous, thermic Aquic Hapludults
Bloomingdale	Fine, mixed, nonacid, thermic Typic Haplaquepts
Bradyville	Fine, mixed, thermic Typic Hapludalfs
Brookshire	Coarse-loamy, mixed, mesic Umbric Dystrochrepts
Cataska	Loamy-skeletal, mixed, mesic, shallow Typic Dystrochrepts
Collegedale	Clayey, mixed, thermic Typic Paleudults
Ditney	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Etowah	Fine-loamy, siliceous, thermic Typic Paleudults
Holston	Fine-loamy, siliceous, thermic Typic Paleudults
Jeffrey	Coarse-loamy, mixed, mesic Umbric Dystrochrepts
Junaluska	Fine-loamy, mixed, mesic Typic Hapludults
Keener	Fine-loamy, siliceous, mesic Typic Hapludults
Lonon	Fine-loamy, mixed, mesic Typic Hapludults
Maymead	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Montevallo	Loamy-skeletal, mixed, thermic, shallow Typic Dystrochrepts
Pettyjon	Fine-loamy, mixed, thermic Dystric Fluventic Eutrochrepts
Shelocta	Fine-loamy, mixed, mesic Typic Hapludults
Steadman	Fine-silty, mixed, thermic Fluvaquentic Eutrochrepts
Talbott	Fine, mixed, thermic Typic Hapludalfs
Unicoi	Loamy-skeletal, mixed, mesic Lithic Dystrochrepts
Wallen	Loamy-skeletal, siliceous, mesic Typic Dystrochrepts
Waynesboro	Clayey, kaolinitic, thermic Typic Paleudults

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